

# **Reasons to be cheerful:**

## **Part I, II, III**

**Dispositional optimism, positive reappraisal coping and positive  
(re)appraisals of the situation: Effects on emotional well-being  
and physical outcomes**

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**This thesis is dedicated to my family**

**Derek, Emma, Sophie and Joseph**

**With all my love and thanks for your patience.**

**And for reminding me what really matters.**

**And to my parents**

**George and Vivien Lyne**

**For the sacrifices you made for my opportunities**

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## Thesis Summary

Three lines of research focus on the influence of positive psychological factors and processes on psychological and physical well-being. In Part I, the unique and shared predictive power of dispositional optimism on women's biological (ovarian) response to fertility treatment was examined. The results suggested that rather than dispositional optimism having direct benefits on ovarian response, this construct shared variance with a broader psychological dimension, and that this dimension compromised biological response. In Part II, a self-administered positive reappraisal coping intervention (PRCI) was developed, and then used by women waiting for an IVF pregnancy test. The effects of the PRCI on psychological well-being and pregnancy rates, compared to controls were examined. The results suggested that the PRCI helped to sustain positive reappraisal coping efforts and other coping efforts, but had no effect on mood or impact on pregnancy rates compared to routine care. In Part III, an experimental paradigm emulating an unresolved period of persistent stress in a medical context was developed (the USP). Reactions became, and remained, persistently negative in response to the USP. The USP was then employed in a test of the "goodness-of-fit" hypothesis, where the influence of dispositional and situational factors on situational coping was examined. The results showed that a manipulation of situational factors had a transient influence on escapism coping and emotional well-being whereas dispositional factors had a more pervasive influence. Overall, this thesis demonstrates that both dispositional *and* situational influences have important effects on emotional well-being and physical outcomes and that it is important that neither should be completely overlooked in favour of the other.

## **Publications**

### **Study 1**

#### **Papers:**

Lancastle D., & Boivin, J. (2005). Dispositional optimism, trait anxiety and coping: Unique or shared effects on physical health? *Health Psychology*, 24, 2, 171-178.

#### **Posters:**

Lancastle, D., & Boivin, J. (2002). Dispositional optimism affects structural but not functional aspects of ovulation. Annual meeting of the British Psychological Society: Health Section. Sheffield, September.

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## Glossary of Abbreviations

### A – L

<b>AGFI</b>	Adjusted goodness-of-fit index
<b>AIDs</b>	Acquired Immune Deficiency Syndrome
<b>ARU</b>	Assisted Reproduction Unit
<b>BHCG</b>	Beta Human Chorionic Gonadotrophin (Beta-hCG)
<b>COPE</b>	Coping Operations Problems Experienced coping inventory
<b>DMC</b>	Daily Monitoring Control (group)
<b>DRK</b>	Daily Record Keeping (measure)
<b>EFCs</b>	Emotion-focused copers
<b>FSH</b>	Follicle stimulating hormone
<b>GFI</b>	Goodness-of-fit index
<b>GnRH-a</b>	Gonadotrophin releasing hormone analogue
<b>hCG</b>	Human chorionic gonadotrophin
<b>HFEA</b>	Human Fertilisation and Embryology Authority
<b>HIV</b>	Human immunodeficiency virus
<b>hMG</b>	Human menopausal gonadotrophin
<b>HPA</b>	Hypothalamic–pituitary–adrenal
<b>ICSI</b>	Intracytoplasmic Sperm Injection
<b>IVF</b>	<i>in vitro</i> fertilisation treatment
<b>LH</b>	Lutenising hormone
<b>LOT</b>	Life Orientation Test
<b>LOT-R</b>	Life Orientation Test-Revised

## **M - Z**

<b>MBSS</b>	Miller Behavioral Style Scale
<b>MSE</b>	Mean Squared Error
<b>PCM</b>	Personal control manipulation
<b>PFCs</b>	Problem-focused copers
<b>PILL</b>	Pennebaker Inventory of Limbic Languidness
<b>PMI</b>	Positive Mood Induction
<b>PRCI</b>	Positive Reappraisal Coping Intervention
<b>RMSEA</b>	Root-mean-square error of approximation
<b>SAM</b>	The Stress Appraisal Measure
<b>SEM</b>	Structural equation modelling
<b>STAI-T</b>	Trait scale of the State-Trait Anxiety Inventory
<b>SUSP</b>	Standard Unresolved Stressor Paradigm (i.e., no manipulation)
<b>USP</b>	Unresolved Stressor Paradigm

## Chapter 1

### The power of positive thought.

*“There is nothing either good or bad, but thinking makes it so”*

(Hamlet, Act II, scene 2, line 259, as cited in Lazarus & Folkman, 1984, p. 25)

#### *A lay perspective*

If someone told you to “think positive” because it could add 12 years to your life expectancy would you do so? And surely you would endeavour to “look on the bright side more often” if your efforts could add more to your life expectancy than such well-known and generally accepted health efforts as regular exercise or giving up smoking! Although such claims may seem stranger than fiction, readers of a popular weekly magazine in January 2005 were implored to “Make a few simple changes to your lifestyle and you could be looking forward to reaching a ripe old age” (Sullivan, 2005). Her advice to “think positive” was one of the “simple changes” that readers were encouraged to implement. Unfortunately, no supporting evidence was given for the effects of positive thinking on longevity, and that such claims are published without substantiation may be a sore point with the scientists amongst us. However, in some ways that deficit is irrelevant. The point is that such information is in the public domain. The magazine boasts a readership of 1, 274, 000 adults (Bauer, 2006), meaning that more than a million people may have read, thought about, laughed at, accepted or dismissed, the promise of a longer life by dint of efforts to “think positive”.

### *Positive thinking in difficult circumstances*

Bereavement, examinations, illness, financial and relationship problems, accidents and crime are just a few of the stressful events that a child born today can expect to encounter in his or her lifetime. Stressful experiences are part and parcel of life, as are efforts to deal with the practical and emotional consequences of them. And it is not only in glossy popular publications that advice to “think positive” is likely to be tendered. Many of us will have heard such advice from friends, loved ones and professionals (and offered it to others ourselves) during the difficult life-experiences we all encounter.

One experience that all but the healthiest and luckiest people are guaranteed to have at some point in their lives is that of a medical problem afflicting themselves or a loved one. Depending on the affliction, days, weeks, months, or even years of worry and uncertainty about the final outcome of the illness or injury may result, and during this time, the individual may well find that others implore them to “stay positive”, and “hope for the best”, and “count their blessings”, like some 21<sup>st</sup> century personification of Pollyanna! (Porter, 1913). However, to what extent is such advice actually justified? Do your efforts to “stay positive” really calm your fears during periods of unrelenting uncertainty about the outcome of distressing or painful medical treatment? Is your persistent “hoping for the best” likely to be realised in a more positive physical response to medical treatment? Or could it be that such advice is at best a form of encouragement, given by those who want to do something to help to those who are struggling? And at worse, could such words unintentionally increase the burden of those who are sick, frightened and in pain? Could the consequence be that those in receipt of such exhortations feel unable to complain or voice their fears in case others deem them to be failing to be as positive as they ‘ought’, or in some way responsible for their own ill-health?

Given that the latter scenario would be unacceptable, and given that research shows that infertile couples' attributions for their infertility as their own emotional state and their own personality were concurrently associated with greater distress (Lord & Robertson, 2005), it seems vital that the true extent of the benefits of positive thought in medical contexts is established. Should research show that positive thinking *does* have positive effects on psychological and physical outcomes, then the responsibility of researchers is to communicate the benefits to all who could be helped. However, should evidence suggest that the power of positive thought is little more than an urban myth, then advice to "think positive" should be relegated to the archives along with other discredited health advice, and people should be free to complain and grieve and to express anxiety, bitterness and sadness without fear of censure. In line with this philosophy, the main purpose of this thesis is to contribute to the ever increasing wealth of knowledge about whether and to what extent, positive thinking (broadly defined here as "...selectively perceiving or interpreting a stressor's implications as positive...", Goodhart, 1985, p. 217) has beneficial effects on physical and psychological outcomes.

## **Chapter 2**

### **Introduction.**

#### **2.1 Overview of Thesis**

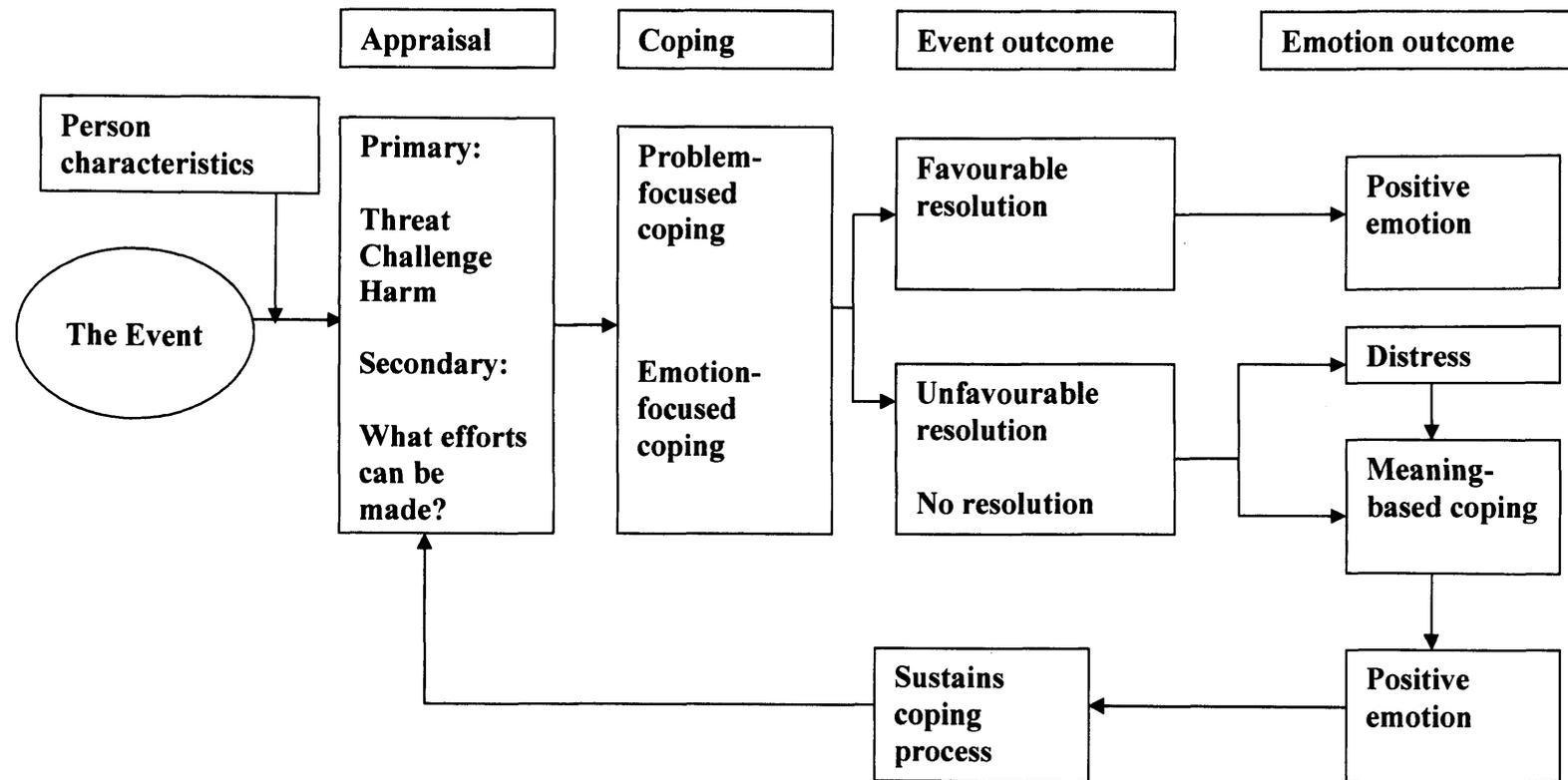
This thesis comprises three lines of research, separated into three sections. Part I (Chapter 3) examines the extent to which dispositional optimism has beneficial effects on women's biological response to in vitro fertilisation (IVF) treatment, and the extent to which optimism effects are unique or due to shared variance with other psychological characteristics (i.e., trait anxiety, coping). Part II describes the development (Chapter 4) and implementation (Chapter 5) of a brief, self-administered positive reappraisal coping intervention (the PRCI) on women's psychological well-being during the waiting period between embryo transfer and pregnancy test during fertility treatment. Part III (Chapter 6) describes the development and validation of an unresolved stressor paradigm (the USP), which emulates an extended period of stress in a hypothetical medical context, and the application of the USP in a study examining the influence of a manipulation of situational control appraisals on situational coping.

Because the literature relevant to each Part diverges somewhat according to the hypotheses and contexts under investigation, Part I, II, and III will each contain a review of the pertinent literature. However, I intend to demonstrate the convergence between these three lines of research in two ways. First, I will begin with general coverage of the theoretical model of the coping process advanced by Lazarus and Folkman (1984) and developed by Folkman (1997), focusing primarily on the approach of these authors, because this model encompasses the psychological factors and processes that are the

subject of this Thesis, Second, I will emphasise the relationships between the findings of each section in the General Discussion of this Thesis (Chapter 7).

## **2.2 A theoretical model of the coping process**

The work of Lazarus and Folkman (1984) advances a theoretical framework to explain how individuals negotiate stressful life-events. Later work by Folkman (1997) and colleagues (Moskowitz, Folkman, Collette, & Vittinghoff, 1996; Folkman & Moskowitz, 2000) extends this framework, suggesting that positive emotions and meaning-based coping may promote continued efforts to cope during stressful events of a chronic nature. The coping process refers to cognitive, emotional and behavioural activity from the time a person initially encounters an event (event onset), through evaluation of the implications of the event (appraisal) and efforts to deal with the event (coping), to event outcome and emotional consequences (see Figure 1, page 6). Although the aim of this thesis is not to test this theoretical model, the model provides a helpful overarching framework to illustrate and link the role of the various psychological factors and processes that are discussed and examined in this Thesis. Therefore, to begin with, individual elements of this theoretical model (Lazarus & Folkman, 1984; Folkman, 1997) will be discussed, in order to demonstrate the complexity of the process of negotiating demanding life experiences from onset to resolution.



*Figure 1. Theoretical model of the appraisal and coping process*

(Reproduced without permission from Folkman & Greer, 2000, p. 12)

## 2.3 The Event

Although it seems certain that catastrophic events such as bereavement, terrorism and war will be found stressful by virtually every person unfortunate enough to experience them, it is difficult to arrive at a precise definition against which each and every event can be compared and judged as ‘a stressful experience’ or not. Indeed, even events such as holidays and celebrations, which are traditionally viewed as positive, a treat or a pleasure, are not necessarily stress free for everyone, every time. For example, Relate UK reported an increase of 20% in couples seeking help for their relationships after a holiday, along with a similar increase following the Christmas period (Taggart, 2003).

One well-known attempt to ascertain the relative stressfulness and impact of various life-events was made by Holmes and Rahe (1967), who developed an index of life-events, ranked in order of stressfulness from the most stressful (death of a spouse, with a stress value of 100), to the least stressful (minor legal violations, with a stress value of 11). However, it is generally accepted that such ordering of the ‘magnitude’ of events is not incontrovertible (e.g., Lazarus & Folkman, 1984), because there can be individual differences in reactions to the ‘same’ events. For example, divorce had a stress value of 73 (second only to the death of a spouse) on the Holmes and Rahe scale. However, although some individuals might feel stressed and distressed at the end of a marital relationship, others may undoubtedly feel relieved that a damaging relationship has ended. Therefore, if all events are not equal, and the same events are not equal for everyone “...it becomes important to understand what factors make a given event psychologically damaging for some persons, inconsequential for others, and beneficial for still others” (Goodhart, 1985, p. 216).

One of the factors that can contribute to the psychological impact of an event are “formal properties of the situation” (Lazarus & Folkman, 1984, p. 83), which may affect

an individual's response to *any* situation (i.e., regardless of the 'label' given to that situation). Lazarus and Folkman (1984) discuss numerous such situation properties, including the timing of the event in the life-cycle, novelty, unpredictability, uncertainty about whether an event will happen (and if so when), and uncontrollability. Two of these factors, uncertainty and uncontrollability may have a particular impact on the experience of stress during medical treatment. These will be discussed in more detail at the appropriate junctures during this Thesis, along with the impact of other situation properties pertinent to the context of infertility, IVF treatment and other stressful medical events.

#### **2. 4 Person characteristics**

Despite the undoubted contribution of the features of an event to perceptions of that event as stressful, Lazarus and Folkman (1984) emphatically assert that characteristics of the situation *and* the person contribute to the designation of an event as stressful. They argue that individual differences in the experience of stress highlight the importance of considering the "psychological situation" (p. 23), in terms of psychological variables that influence whether or not a situation is stressful for an individual.

One factor that may help to determine how important any event is and reactions to it is an individual's personality. Personality is generally accepted as unique to an individual (Pervin, 2003), and therefore, to the extent to which personality influences reactions and the extent to which personality differs between people, it is to be expected that there will be individual differences in reactions to the same event. Two dispositional attributes that Park and Folkman (1997) propose to influence reactions to an event are dispositional optimism (Scheier & Carver, 1985) and neuroticism (e.g., Costa & McCrae, 1987). Dispositional optimism refers to "generalized outcome

expectancies” (Scheier & Carver, 1985, p. 219) of *positive* outcomes, and thus higher dispositional optimism may lead to greater recognition of the positive implications of an event, and to greater expectations that the outcome of the event will be favourable. In contrast, neuroticism (Eysenck & Eysenck, 1975), or negative affectivity (e.g., Costa & McCrae, 1987) refers to a trait complex comprising negative traits (e.g., trait anxiety, pessimism) as well as associated emotions and mood states (e.g., anger, sadness) and behaviours (e.g., denial, behavioural disengagement) (Watson & Clark, 1984). Such a trait complex may lead to greater recognition of (and impact from) the negative aspects of any event. For example, research suggests that the anticipation of a potentially threatening event is more stressful for some than it is for others. In one study in which participants were presented with potentially distressing photographs, higher neuroticism measured at the start of the study was related to greater worry at that time, and to retrospective reports of higher state anxiety during the anticipation period before the images were shown (Greco & Roger, 2003).

As well as such dispositional attributes, an individual’s view of the world, comprising beliefs, goals, values and commitments may be an important influence on the significance ascribed to a particular situation (Park & Folkman, 1997; Folkman & Moskowitz, 2000). If a situation threatens one’s core beliefs, values, goals and commitments, stress and distress are likely consequences (Park & Folkman, 1997), and it may be difficult to ascertain the positive implications of an event that threatens fundamental aspects of one’s view of oneself, such as self-esteem or self-efficacy (Goodhart, 1985). Thus, according to Lazarus and Folkman’s (1984) theoretical framework, whether or not an event is ‘stressful’ is determined by both the “formal properties” or contextual features of the situation and by the unique personal qualities that an individual brings to the event.

## 2.5 Appraisal

According to Lazarus and Folkman (1984, p. 31), cognitive appraisal is the “process of categorizing an encounter, and its various facets, with respect to its significance for well-being”. In other words, the process of working out whether any part of what is happening might have a positive or negative impact on oneself. Primary and secondary appraisal (see Figure 1, page 6) refer to cognitive evaluations about the significance of an event to well-being and what might be done to maximise the positive and/or alleviate the negative consequences of the event (Lazarus & Folkman, 1984). A primary appraisal of harm is made when the event has already resulted in negative consequences, whereas threat and challenge appraisals are future oriented, but differ in terms of the consequences anticipated. A threat appraisal refers to *anticipation* of harm or loss, whereas a challenge appraisal focuses on anticipation of gain. Although not included in Folkman’s model, Lazarus and Folkman (1984) identify two further primary appraisals. A benign-positive appraisal is made when the situation is beneficial to current well-being and an ‘irrelevant’ primary appraisal occurs when the situation does not threaten values, needs or commitments and nothing of personal significance will be lost or gained (e.g., Park & Folkman, 1997).

Lazarus and Folkman (1984) categorise harm, threat and challenge appraisals as *stress appraisals*, which require evaluation of efforts that may ameliorate actual or anticipated harms and losses and maximise anticipated gains. Secondary appraisal (see Figure 1, page 6) refers to this complex process, in which the person considers possible ways of coping, whether these will be effective in terms of managing the situation and influencing the outcome and whether he or she is capable of applying these strategies. Effective primary and secondary appraisal refers to the realistic evaluation of whether or not a situation represents a danger to well-being and what can be done to offset this threat (Lazarus & Folkman, 1984). If no danger is noted where it should be, and no

efforts to offset the danger are considered, then this could have disastrous consequences for the individual. For example, if he or she does not consider particular physical symptoms to be threatening nor what might be done about them, a disease may progress to the point at which it is incurable. Further, the experience of psychological stress is determined by the relationship between primary appraisal and secondary appraisal. If the demands of the situation are evaluated as exceeding the resources and options for dealing with them, stress and distress can ensue (Lazarus & Folkman, 1984). Therefore accurate appraisal would also minimise the chance of experiencing unnecessary psychological stress, distress and other negative consequences.

However, although congruence between appraisal and reality is the hallmark of *effective* appraisal, Lazarus and Folkman (1984) suggest that challenge appraisals are more *adaptive* appraisals with beneficial consequences. For example, an individual who is disposed or whose environment provides the feedback to promote a challenge appraisal is likely to feel more confident, suffer fewer negative emotional consequences, be more able to muster resources and be less likely to suffer illness. Further, a challenge appraisal may have a beneficial effect on how the coping process evolves. A challenge appraisal "...implies certain emotions such as optimism and/or hope, joy or eagerness and certain cognitive and behavioral correlates such as expansiveness and realistic and co-ordinated efforts", whereas a threat appraisal "...implies anxiety and distress, cognitive and behavioral constriction, and preservative rather than expansive efforts" (Lazarus & Folkman, 1984, p. 342). In other words, challenge appraisals may be associated with consideration of a situation from all angles, the appraisal and implementation of varied coping efforts, and to positive emotions, whereas threat appraisals may be associated with negative emotions, a focus on only part of the problem and the restriction of the evaluation of ameliorative strategies to that part of the problem. Such restricted thinking may result in important implications and options

being missed. Further, the experience of stress in *any* situation is influenced by whether or not the individual feels able to cope with the practical and emotional demands of the situation. Indeed, Lazarus and Folkman's definition of psychological stress is of "... *a particular relationship between the person and the environment that is appraised by the person as taxing or exceeding his or her resources and endangering his or her well-being*" (p. 19).

Such proposals suggest that primary and secondary appraisals have a vital role in determining subsequent efforts to cope with the event. Indeed, Chang (1998) showed that students' appraisals of an exam as important, a threat, a challenge, and stressful (categorised by Chang as primary appraisals) were significantly and positively related to a number of different efforts to cope with the situation, as were students' appraisals that the situation was controllable and that their efforts would be effective (secondary appraisals). However, although this evidence suggests that appraisal of an event, both in terms of its implications for the individual and the degree to which the event can be effectively managed might influence coping efforts, assessment of appraisals was retrospective (after the exam had taken place). Given this experimental design it would not be possible to conclude that appraisals had influenced coping rather than, for example, that effective coping with the exam had resulted in more positive emotions and thus more positive (*re*)*appraisals* of the experience (see Figure 1, page 6). Furthermore, although the results of this study suggested that person characteristics influenced appraisals because dispositional optimists reported significantly higher secondary appraisals of control and effectiveness than pessimists (although optimism was not related to primary appraisals), it is not possible to assert that dispositional optimism is a causal factor influencing secondary appraisal because optimism and appraisals were assessed concurrently, prior to the exam. Instead, it may simply be the case that students in a more positive frame of mind at the time of assessment of mind

rated themselves more positively on both measures. A prospective design in which dispositional optimism was measured some time in advance of the exam (e.g., at the start of semester), followed by appraisals of the exam immediately prior to it taking place and coping efforts after the exam had finished would have allowed allow firmer conclusions to be drawn about causal relationships between dispositional optimism, appraisals and coping.

## 2.6 Coping

Figure 1 (page 6) shows that the implementation of problem-focused and emotion-focused coping strategies follows appraisal. The function of the former coping strategies is to improve the *situation* and of the latter is to *regulate the emotions elicited by the situation*. Problem-focused coping involves trying to deal with the source of stress, by making efforts to remove the threat (e.g., trying possible solutions to the problem). Emotion-focused coping involves reducing or removing emotional distress surrounding the problem (e.g., expressing emotions, denying the meaning of the situation). Lazarus and Folkman (1984) assert that emotion-focused coping has benefits because reducing distress is, in itself, a positive outcome and because heightened negative emotion makes it difficult to deal effectively and actively with a problem. In this way, emotion-focused coping may facilitate the employment and effectiveness of problem-focused coping. Further, the nature of the stressful event may affect the coping strategies employed and their effectiveness. Problem-focused coping may be more evident and helpful when the person believes he or she *can* do something about the situation (i.e., the event is potentially changeable or controllable), whereas emotion-focused coping may be more likely in occurrence and in benefits for the individual (i.e., alleviating distress) when the situation cannot be changed or controlled, but must be merely endured. Proposals about which type of strategies would be most helpful, given

the control one has over events is known as the ‘goodness-of fit’ hypothesis (e.g., Folkman, Lazarus, Gruen & DeLongis, 1986; Park, Armeli & Tennen, 2004; Vitaliano, DeWolfe, Maiuro, Russo & Waton, 1990).

Terry and Hynes (1998, p. 1079), however, argue that the “distinction between problem- and emotion-focused strategies is too simplistic” with regards to the relative impact of each on adjustment to low-control stressors. They argued that some problem-focused strategies would be helpful in low-control stressors whereas others would not, and that the same was true of different sorts of emotion-focused strategies. Specifically, they proposed that problem-focused coping aimed at managing the situation would be related to poorer adjustment to a low control stressor, whereas problem-focused coping aimed at managing the way one thought about the situation would be related to better adjustment. Regarding emotion-focused strategies, Terry & Hynes (1998) proposed that strategies aimed at avoiding the reality of the situation would be associated to poorer, whereas emotional-approach coping (e.g., social support seeking, emotional expression) would be associated with better adjustment.

These predictions received some support in a study in which Terry and Hynes (1998) investigated the impact of coping on adjustment to a low-control stressor (failed fertility treatment). Participants’ distress was assessed at three time points: prior to treatment (Time 1), 1 – 2 weeks after failed treatment (Time 2) and again six weeks later (Time 3). Coping was assessed at Time 2 and 3 and other indices of adjustment (self-reported task performance, coping effectiveness) and partner ratings of emotional distress and coping effectiveness were also assessed at Time 2 and 3. Terry and Hynes separated problem-focused coping into strategies that involved active attempts to solve fertility problems (*problem-management*) and those directed towards appraising the experience in a different way (e.g., trying to see the positive aspects, making the most of the experience; *problem-appraisal*). Emotion-focused coping was divided into strategies

that involved expressing emotions engendered by infertility and talking with friends and relatives about fertility problems (*emotional approach*) and those that involved efforts to avoid the reality of infertility by daydreaming and fantasising (*escapism*). As predicted, greater problem-management coping efforts at Time 2 were related to poorer concurrent adjustment to failed fertility treatment (i.e., greater self-reported distress, lower self-reported coping effectiveness), whereas more problem-appraisal coping was related to less distress and perceptions that coping had been more effective at this time. Furthermore, more escapist coping at Time 2 was associated with concurrent reports of poorer adjustment on all self-reported indices of adjustment, whereas emotional approach coping was related to better self-reported task performance at this time.

With regards to the influence of Time 2 coping strategies on *subsequent* (i.e., Time 3) self-reported adjustment, Time 2 problem-appraisal was related to better task performance and coping effectiveness and emotional-approach coping was related to less distress and better task performance, whereas escapism was related to poorer coping task performance, more distress and poorer coping effectiveness. Problem-management coping at Time 2 was not related to subsequent self-reported adjustment. Regarding partner ratings of adjustment at Time 3, Time 2 escapism was positively related to poorer coping effectiveness and greater distress, and problem-management coping was also positively related to greater distress. However, contrary to expectations, greater emotional approach coping was related to partner ratings of *lower* coping effectiveness and problem-appraisal coping was unrelated to partner ratings on these indices of adjustment at Time 3. The results of this study suggest firstly that situation properties (e.g., the degree to which the situation can be controlled) may influence the relative effectiveness of different coping strategies, and secondly that categorising coping efforts into broad emotion-focused and problem-focused constructs may lose something of the different relationships between these different *types* of emotion- and

problem-focused strategies and adjustment. However, it must be noted that not all results were entirely consistent with Terry and Hynes's hypotheses in terms of the predicted relationships between coping constructs and all indices of adjustment, concurrent *and* prospective, self-reported *and* observer rated.

There is not complete agreement about whether people do actually "...approach each coping context anew...[or whether they] bring to bear a preferred set of coping strategies that remains relatively fixed across time and circumstances" (Carver, Scheier & Weintraub, 1989, p. 270), or in other words, whether situational coping is always explained by appraisals of the situation. Another way to understand the way that people cope with a stressful situation is that this is determined by a dispositional coping style that individuals bring to and re-employ in every situation (e.g., Carver & Scheier, 1994; Carver et al., 1989), regardless of how controllable the situation might be. Carver and Scheier (1994, p. 185) suggest that dispositional coping style might be expressed as a "main effect", in other words that dispositional emotion-focused copers would always report more emotion-focused strategies than dispositional problem-focused copers (with the direction of differences reversed for problem-focused copers) in every situation, or that a dispositional coping style might be influenced by the situation at some times but not another, which suggests a potential role for situational factors influencing a dispositional coping style.

## **2.7 Event outcome**

Lazarus and Folkman's (1984) conceptualisation of coping is of *efforts* made to ameliorate the experience of a stressful event, irrespective of whether or not these achieve the results for which they were implemented. In other words, the individual's efforts may or may not solve the problem or make him or her feel any better. Further,

the situation may improve or be resolved and/or the person may feel better for reasons unrelated to the efforts made. Therefore, although event outcome is the next element of the coping process (see Figure 1, page 6), and although coping is shown as *leading* to the event outcome, it is important to stress that the outcome of the event is not necessarily *caused* by coping efforts. As an example, consider the resolution of financial difficulties. Although this outcome could be achieved by working extra hours or being frugal (i.e., because of the individual's efforts), it could also be achieved by inheriting money from a relative (i.e., for a reason unrelated to the individual's efforts).

As with deciding what constitutes a stressful event, deciding what constitutes a favourable or unfavourable outcome is open to debate. Some outcomes, such as getting a job, or winning a prize seem more obviously positive and others, such as losing one's home or a loved one seem more obviously negative. However, for other outcomes, this delineation may be less cut and dried. For example, becoming pregnant may be a joyous outcome for an infertile woman, but a disastrous one for a schoolgirl with no support or financial resources. Outcomes may also be more 'psychological' or grounded in personal development than tangible gain. For example, in work by Goodhart (1985), a selection of event outcomes classed as positive were developing more trust in judgments and learning that others could be relied upon for help, whereas negative outcomes included feeling that little personal progress was being made and that a situation interfered with daily activities.

As Coyne and Racioppo (2000) stress, it may not be possible to ascertain what constitutes a favourable or unfavourable event outcome without an understanding of an individual's circumstances and what his or her goals might be. Coyne and Racioppo (2000) argue that a common assumption in coping research is that a reduction in distress is the primary goal of individuals during stressful experiences. If that *is* the case for an individual and he or she *does* 'feel better', then this is a favourable outcome. However

if, for example, the goal of an individual's coping efforts was to stop smoking, an increase in distress as he or she persists with endeavours not to smoke may actually be indicative of a more positive outcome for him or her (i.e., maintaining resolve not to smoke) than the relief of distress from smoking (although an increase in feelings of pride and self-satisfaction may also occur in the former case).

## **2.8 Emotion outcome**

Regardless of whether an event outcome is brought about by coping efforts, the nature of the event outcome (i.e., favourable, unfavourable, unresolved) is a vital determinant of emotional reactions to the event. For example, if an infertile woman undergoes fertility treatment for the first time and becomes pregnant as a result (a favourable outcome), according to this model the consequence would be an outcome appraisal of personal gain, positive emotions and the cessation of the coping process (Folkman & Greer, 2000). Conversely, if she does not become pregnant (unfavourable outcome) and decides to undergo further treatment, the original stressor (infertility) remains. Depending on how important it was to the woman that she becomes a mother, the consequences of the unfavourable outcome could be emotional distress and the need to cope anew with the stressor (Folkman 1997; Folkman & Greer, 2000).

## **2.9 Sustaining the coping process**

Regenerating the coping process starts with (re)appraisal<sup>1</sup>. According to Lazarus and Folkman (1984) (re)appraisal differs from appraisal in terms of the point at which it occurs in an experience. Whereas appraisal occurs at the onset of an event, (re)appraisal occurs *during* the event when new information about the situation and/or from reactions to it promotes redefinition of the situation (Lazarus & Folkman, 1984). To expand on

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<sup>1</sup> To avoid confusion between reappraisal of events and positive reappraisal (which is introduced later), the former term will be called (re)appraisal and the latter positive reappraisal coping.

the example of failed fertility treatment, it seems likely that this unfavourable event outcome would influence primary and secondary (re)appraisal. In terms of primary (re)appraisal, the unfavourable outcome has provided new information about the stressor (e.g., “This event has caused me distress before, and becoming pregnant through fertility treatment may be more difficult than I originally thought”). This new information may influence primary (re)appraisal, such that future fertility treatment is appraised as more threatening to well-being than the first treatment. In terms of secondary (re)appraisal, when evaluating potential coping strategies to cope with the next treatment, efforts to cope with the first treatment may be re-evaluated. Were problem-focused efforts directed at maximising chances of becoming pregnant (e.g., taking medication as directed) effective? Were emotion-focused efforts directed at feeling better (e.g., seeking reassurance, expressing emotions) effective? Was the reason for treatment failure unrelated to the efforts she had made (e.g., poor response to medication, failed fertilisation)? If the woman considers previous coping efforts to have been helpful, she may persist with these efforts. If not, then she may evaluate new ways of coping with future fertility treatment. Thus, although objectively the stressor remains the same (i.e., fertility treatment), primary (re)appraisal of the implications of the stressor and secondary (re)appraisal of coping options has been influenced by the unfavourable outcome of the first treatment.

Thus reappraisal is made on the basis of enriched information about the stressor, derived from event history, emotional reactions to the unresolved outcome and new information about the situation. This enriched information represents both an outcome that confirms the situation has not been satisfactorily resolved *and* the antecedent of reappraisal (Lazarus & Folkman, 1984), and thus reappraisal may result in confirmation of the original appraisal or a change from a primary appraisal of threat to one of challenge (or vice versa). For example, if the situation has an unsatisfactory resolution,

re-evaluation takes place whilst the individual is experiencing negative emotions engendered by the unsatisfactory resolution (Folkman & Greer, 2000). A situation initially appraised as a challenge may be reappraised as a threat in this case because reappraisal of potential harm, loss or gain would be made in the face of distress (harm) engendered by the unsatisfactory outcome.

## **2.10 Meaning based coping, positive emotion, and reappraisal**

It is at the point of unsatisfactory event outcome that Folkman's (1997) elaboration of the theoretical model of appraisal and coping incorporates positive emotion and meaning-based coping as factors that *sustain the coping process* (see Figure 1, page 6). As discussed above, distress is a likely consequence of an unsatisfactory outcome and some argue that research into coping outcomes considers the reduction or regulation of distress to be indicative of effective coping and does not consider the role of positive affect in stressful situations (Coyne & Racioppo, 2000; Folkman & Moskowitz, 2000). This focus reflects the assumption that the reduction of distress is the primary goal (Coyne & Racioppo, 2000), whether problem-focused or emotion-focused strategies are employed for this purpose.

However, the importance of positive psychological states in stressful circumstances is evident in recent longitudinal research which suggests that even in the most trying of circumstances (caregiving and bereavement), positive affect is evident, co-exists with negative affect and may have a vital role in motivating an individual to renew coping efforts during a chronic, persistent and distressing experience (e.g., Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996). Folkman (1997) found that the types of coping associated with positive affect were those which focused on finding positive meaning in an incredibly demanding situation and this

association between positive meaning and positive psychological states led Folkman and Moskowitz (2000, p. 648) to propose that the “coping processes that generate and sustain positive affect in the context of chronic stress involve meaning”. Finding positive meaning may involve, for example, appreciating the positive changes the situation has brought to one’s life (e.g., closer relationships), comparing oneself more positively with others less well off, or redefining the situation such that it seems more positive (Thompson, 1985).

## **2.11 Summary**

This overview of the theoretical model of the coping process advanced by Lazarus and Folkman (1984) and developed by Folkman (1997) introduces the roles of the person, situation, cognitive appraisal and (re)appraisal, coping efforts, outcome and emotion as factors that contribute to the way in which we progress through stressful life-experiences. Further, the model provides a framework for understanding how these factors ‘fit’ together and the complexity of the relationships between them, thereby helping to explain “...what factors make a given event psychologically damaging for some persons, inconsequential for others, and beneficial for still others” (Goodhart, 1985, p. 216). The focus of the next experimental chapters will be on the role of certain of these factors in explaining physical and psychological outcomes in stressful medical contexts.

## **2.12 Overview and aims of research**

One of the most enduring controversies in Psychology is the person-situation controversy, which refers to the relative importance of enduring person characteristics in explaining consistency in people’s responses across time and situation, versus the importance of contextual features in explaining why people’s responses change in line

with the particular situations that they find themselves in (Pervin, 2003). In line with the main purpose of the thesis, which is to demonstrate whether and to what extent positive thinking has beneficial effects on physical and psychological outcomes, the focus of the next experimental chapters will be on the role of a form of dispositional positive thinking about the future (dispositional optimism) and two forms of positive thinking about stressful situations (positive reappraisal coping, positive situational (re)appraisal), in explaining physical and psychological outcomes in stressful medical contexts.

Dispositional optimism (Scheier & Carver, 1985) was the form of dispositional positive thinking of choice because prior research suggests that this trait has beneficial effects on well-being, both physical (e.g., Chang, 1998; Lobel, DeVincent, Kaminer, & Meyer, 2000; Scheier & Carver, 1985, Study 3; Scheier et al., 1989; Scheier, Carver, & Bridges, 1994; Segerstrom, Taylor, Kemeny, & Fahey, 1998; Tomakowsky, Lumley, Markowitz, & Frank, 2001), and psychological (e.g., Chang, 1998; Dunn, 1996; Thuen & Rise, 2006). Positive reappraisal coping and positive situational (re)appraisals of the situation were the forms of situational positive thinking of interest because prior theory and research suggest that (re)appraising a situation more positively, whether this is because the situation *has* changed for the better or as a result of efforts to focus on positive aspects of the situation, is associated with positive psychological states, e.g., greater positive affect (e.g., Folkman, 1997; Folkman & Moskowitz, 2000; Lazarus & Folkman, 1984; Moskowitz et al., 1996; Sears, Stanton & Danoff-Burg, 2003). The experimental chapters of this Thesis are organised into three sections (Part I, II, III), each focusing on one of these forms of positive thinking. The content and aims of the three sections are as follows:

**Part I:** Study 1 (Chapter 3) examines the effects of dispositional optimism on ovarian response to IVF treatment. Based on research showing that dispositional optimism has

beneficial effects on various physical health outcomes, the aim was to establish whether dispositional optimism had direct and unique benefits on biological response to fertility treatment, or instead, as critics of the dispositional optimism construct would argue, optimism effects were really due to shared variance with a broader psychological dimension (i.e., neuroticism, negative affectivity).

**Part II:** Chapter 4 presents three pilots describing the development and validation of a novel brief, self-administered positive reappraisal coping intervention (PRCI), which was developed to help women cope with the stressful waiting period between embryo transfer and the pregnancy test during fertility treatment. Study 2 (Chapter 5) is a randomised controlled study, conducted with the aim of establishing the effects of the PRCI on psychological well-being during the waiting period and on pregnancy rates.

**Part III:** This section describes the development and application of an experimental paradigm emulating an unresolved, stressful experience (the USP) by means of three studies (Chapter 6). The USP was developed as a means of investigating the influence of psychological factors and processes on the evolution of the coping process over time. After three Pilots describing the initial stages of USP development, Study 3 describes the validation of the USP as a paradigm that emulates situation properties proposed by Lazarus and Folkman (1984) to contribute to perceptions of an event as stressful. Study 4 describes changes in appraisals and emotional reactions over time in response to the USP, and Study 5 employs the USP to examine the influence of a manipulation of situational appraisals of personal control on (re)appraisal and coping during the USP. The aim was to determine whether dispositional factors or situational appraisals determined situational coping and emotional well-being during an unresolved stressor.

# **Part I**

## **Dispositional optimism and physical health**

## Chapter 3

### Study 1: Dispositional Optimism, Trait Anxiety, and Coping: Unique or Shared Effects on Biological Response to Fertility Treatment?

#### 3.1 Introduction

Study 1 of this Thesis examines whether dispositional positive thinking about future outcomes (i.e., dispositional optimism) is associated with better physical health outcomes.<sup>2</sup> In other words, whether persistently *expecting* favourable outcomes from life in general translates into *actually experiencing* favourable health outcomes in a specific health context. In terms of the relationship between the research presented in Part I of this Thesis and the theoretical model of the coping process (Folkman, 1997; Lazarus & Folkman, 1984) discussed in Chapter 2 (pages 4 – 23), the present study thus focuses on the influence of stable *person characteristics* that an individual brings to a stressful situation on physical health *event outcomes* (see Figure 1, page 6). The main aim of the present study was to establish whether dispositional optimism was uniquely related to health outcomes, or whether it was related because it shares variance with a broader underlying personality constellation that is the true influence on physical health. This is a main controversy in health psychology. Scheier and Carver (1987) argue that dispositional optimism has direct physiological effects as well as indirect effects on health through coping. However, others have argued that optimism is strongly related to neuroticism and that it is the neuroticism trait complex that is the true influence on health (e.g., Smith, Pope, Rhodewalt, & Poulton, 1989). Moreover, any indirect effects of optimism through coping may be linked to associations between coping and

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<sup>2</sup> Study 1 comprises archival data collected between 1995 and 1997 for an Economic and Social Research Council grant awarded to the author's PhD supervisor (Grant R-000 22 1701). The research questions in Study 1 were conceptualised and the data was analysed by the author. The remainder of the data in this Thesis was collected and analysed by the author, unless otherwise stated.

neuroticism. Study 1 examines these proposals about the unique and shared predictive power of dispositional optimism, coping, and neuroticism with regards to the effects of these characteristics on women's biological response to in vitro fertilisation (IVF) treatment.

### *Dispositional optimism*

Dispositional optimism (Scheier & Carver, 1985) is defined as a stable personality characteristic comprising of "...expectations on the part of the person that good, as opposed to bad, outcomes will generally occur when confronting problems across important life domains" (Scheier et al., 1989, p. 1025). There is a wealth of evidence suggesting that dispositional optimism has some important benefits to individuals who have such a tendency to think positively about the future. In terms of the psychological impact of an optimistic disposition, research suggests that optimists<sup>3</sup> report better psychological well-being (e.g., life-satisfaction, Chang, 1998), react less negatively to difficult life experiences (e.g., divorce, Thuen & Rise, 2006), and adjust better to circumstances that cannot be altered (e.g., amputation, Dunn, 1996). Regarding physical well-being, research suggests that optimists also enjoy better physical health than their more pessimistic counterparts. Prior research shows that dispositional optimism is associated with fewer and/or less severe physical symptoms, in concurrent (e.g., Chang, 1998; Scheier & Carver, 1985, Study 3; Tomakowsky et al., 2001), prospective (e.g., Scheier & Carver, 1985, Study 3) and retrospective (Scheier et al., 1994) research. Research also suggests a link between dispositional optimism and better

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<sup>3</sup> In research examining the effects of dispositional optimism on health, participants are variously designated as optimists or pessimists on the basis of median splits on total optimism scores, differences between their scores on positively and negatively worded optimism items or those with higher optimism scores may simply be called optimists whilst those with lower scores are called pessimists. In this review of research, the term 'optimist' or 'pessimist' will be used to describe those with more positive or less positive dispositional expectancies regarding future outcomes, respectively, howsoever the researchers have designated the individuals as optimists or pessimists.

response to coronary bypass surgery (Scheier et al., 1989), better immune response (Segerstrom et al., 1998), and better birth outcomes (Lobel et al., 2000).

However, although these findings provide some support for the proposal that dispositional optimism has physiological effects that may promote better health outcomes (Scheier & Carver, 1987), it may not be as simple as optimism being the ‘royal road’ to good health or that those who are dispositionally optimistic enjoy better health full stop. Indeed, if that were the case, there would not be any optimistic individuals in research examining the impact of this construct on recovery from coronary artery bypass surgery! Instead it seems that other factors and processes associated with an optimistic disposition (e.g., coping, neuroticism) may help to explain the link between optimism and physical and psychological well-being. That being the case, it would be important to control for such mediators and confounds in order that claims of causality between dispositional optimism and physical health outcomes were not erroneous or exaggerated (Robbins, Spence & Clark, 1991). The potential influence of trait anxiety and coping as constructs that may explain the link between dispositional optimism and physical health will be discussed in due course. First however, the focus will be on the theoretical rationale behind the construct of dispositional optimism, in order to explain the proposed links between dispositional optimism, behaviour and outcome.

### *Control theory, dispositional optimism and behaviour*

Scheier and Carver (1985) propose that dispositional optimism is a stable personality characteristic that affects behaviour in a range of circumstances. The proposal that this personality attribute should influence behaviour is derived from Carver and Scheier’s model of behavioural self-regulation known as control theory (e.g., Carver & Scheier, 1982). Consideration of the principles of control theory answers

the question “If optimists expect everything to turn out alright, then surely they would just sit back and wait for it to happen?”<sup>4</sup> Carver and Scheier (1982) propose that when thinking about a goal, individuals focus on the discrepancy between their current state and the desired goal state, and that this focus influences an individual to behave in a way that minimises the discrepancy. If the process of discrepancy reduction is hampered, for example by situational factors or failure to behave in the appropriate discrepancy reducing way, goal-directed behaviour ceases (however momentarily) while the individual assesses how to proceed. It is at this point that Carver and Scheier (1982) propose that the “outcome expectancy” is evoked.

The outcome expectancy can be understood as a judgment on the part of the person about *how likely* it is that he or she can achieve the goal. If the individual thinks that he or she *can* achieve the goal, attempts to achieve the goal are resumed. If, on the other hand, he or she believes that he or she *cannot* achieve the goal then goal-directed behaviour will be reduced or stopped altogether. Such disengagement is reflected in the sort of comments we have all heard (or made) ourselves, such as “there is no point keeping on trying to get a job, pass my driving test, make amends for my bad behaviour (or whatever) as nothing I do makes any difference”. Carver and Scheier propose that disengagement is reflected in behavioural withdrawal from the goal, where possible, and where behavioural withdrawal is not possible, the person will mentally disengage from it. For example, coronary bypass patients are ‘stuck with’ their circumstances (Scheier & Carver, 1987). They cannot physically escape from ill health so if their expectations for their future recovery are negative the only option they have is to mentally escape by blocking out thoughts about their predicament and their future.

The theoretical link between the principles of control theory and dispositional optimism seems plain. In other words, it seems highly likely that a person who is

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<sup>4</sup> With thanks to Cliff Arnall for this pertinent question!

dispositionally optimistic, i.e., who expects that "... good, as opposed to bad, outcomes will generally occur when confronting problems" (Scheier et al., 1989, pg. 1025) and whose "... positive expectations are not limited to a particular behavioural domain or class of settings" (Scheier & Carver, 1985, p. 220) will be more likely to renew goal directed behaviour when faced with problems, interruptions, and failures in their quest to attain various goals – because they expect to succeed.

### *Measuring an optimistic disposition*

#### *i. The Life Orientation Test (LOT; Scheier & Carver, 1985)*

According to Scheier and Carver (1985), dispositional optimism simply represents the extent to which an individual has positive expectations about future outcomes, and they argue that other conceptualisations and measures of optimism confound the *existence* of positive expectancies with the *reasons* for those expectancies (e.g., attributions about cause, morale, reinforcement, luck). Therefore, Scheier and Carver's conceptualisation of dispositional optimism diverges from the concept of optimistic explanatory style (e.g., Abramson, Seligman & Teasdale, 1978; Peterson & Seligman, 1984), which is derived from the learned helplessness model. The latter theorists propose that that an optimistic explanatory style is derived from attributions of the cause of negative events as external (low personal responsibility), unstable (not permanent) and specific (peculiar to that situation). Optimistic explanatory style therefore seems more grounded in past and present experience whereas Scheier and Carver's (1985) construal of dispositional optimism seems more future oriented because it focuses on what might happen. In line with their conceptualisation of dispositional optimism, Scheier and Carver (1985) designed the Life Orientation Test (LOT), to measure outcome expectancies without contamination from reasons for those expectancies. The eight-item LOT comprises four items framed in positive terms (e.g.,

“In uncertain times, I usually expect the best) and four framed in negative terms (e.g., “If something can go wrong for me it will”) as well as four filler items (e.g., “I enjoy my friends a lot”).

*ii. The Life-Orientation Test-Revised (LOT-R; Scheier et al., 1994)*

The original LOT was subsequently revised (Scheier et al., 1994) in response to the realisation that two items in the original LOT assessed a “particular way of reacting to problems and stress”, reflecting “positive reinterpretation and growth” (a coping strategy akin to positive reappraisal) rather than ‘pure’ outcome expectancies (Scheier et al., 1994, p. 1072). In Scheier et al.’s (1994) revision of the LOT, the two problematic items “I always look on the bright side of things” and “I’m a believer in the idea that every cloud has a silver lining” were removed. In addition, to balance the number of positively and negatively worded items another positively worded item was developed “Overall, I expect more good things to happen to me than bad” and a negatively worded item “Things never work out the way I want them to” was removed. The revised questionnaire included six optimism items and the same filler items as the original LOT and is known as the Life Orientation Test-Revised (LOT-R).

*iii. The LOT and LOT-R in this Thesis*

The optimism data presented in the present study (Study 1) was collected using the original LOT and optimism data presented in Study 2 (page 140) and Study 5 (page 307) was collected using the LOT-R. The original LOT was used in the present study because the grant application, ethical review and data collection for this archival study were carried out at about the same time as revisions to the LOT were published (i.e., 1994 – 1995). Scheier et al. (1994) not only removed two positively worded items in their revision of the original LOT, they added a new positively worded item, and it was

not possible to add this item after data was collected. Therefore, creating a new optimism variable by removing two positively worded items from the original LOT would not be a faithful representation of the LOT *or* the LOT-R. However, to establish whether removing the two problematic positive LOT items would have altered the results of Study 1, the data for this study was reanalysed, excluding these items. Doing so had no major impact on the values reported in the present study (see Appendix A, page 382 for details). Furthermore, a PsychLit search conducted in 2003 for abstracts mentioning the LOT versus the LOT-R yielded around 67% using the LOT and 27% using the LOT-R, since the LOT-R was first employed in 1995. Indeed, data from the original LOT was still being reported at the time of writing this Thesis (e.g., Thuen & Rise, 2006). Thus it was decided to report the data from the original LOT in Study 1 because results obtained using the original LOT would still make an important contribution to the literature and readers would still be interested in results obtained using the LOT.

The LOT-R was used in Studies 2 and 5. Although it could be argued that the original LOT should always be employed in this Thesis where dispositional optimism was assessed for the sake of consistency, Studies 2 and 5 focused on precisely the sort of process-oriented positive thinking represented by the two problematic LOT items. It was therefore necessary to use the LOT-R in Studies 2 and 5 in order that the results would not be contaminated by relationships between the two “positive reinterpretation and growth” items in the original LOT and positive reappraisal coping (Study 2) or positive situational (re)appraisals (Study 5).

### *Dispositional Optimism and physical health*

That dispositional optimism might have implications for physical health is suggested by studies showing that higher scores on the LOT or LOT-R are related to

more favourable health outcomes across various types of medical stressors. Scheier and Carver (1985) found that during a stressful period at the end of university semester, dispositional optimism was concurrently related to self-reports of less severe physical symptoms (e.g., fatigue and muscle tension), at two assessments taking place four weeks apart. Higher dispositional optimism at the first assessment was also related to less severe physical symptom reports at the second assessment. Moreover, this prospective relationship remained significant after controlling for physical symptom reports from the first assessment. In contrast, reports of physical symptoms at Time 1 were *not* significantly associated with dispositional optimism at Time 2, after controlling for optimism at Time 1. This suggests that dispositional optimism predicted the experience of less severe physical symptoms at a later date, rather than it being the case that feeling more physically healthy was responsible for more positive expectations. In another study, optimistic students recalled that they had experienced fewer physical symptoms during an earlier four-week period (Scheier et al., 1994), and in a cross-sectional study, Tomakowsky et al., (2001) found that higher scores on the LOT were concurrently related to less severe self-reported symptoms (e.g., night sweats, swollen glands, herpes) in men testing positive for the Human Immunodeficiency Virus (HIV+). Chang (1998) also reported that dispositional optimism was concurrently related to reports of less severe physical symptoms in a stressful period during university examinations.

However, although these studies provide some support for proposals that optimists enjoy better physical health than pessimists, the main criticism of using self-reported symptoms as an index of physical health, and of citing examples of symptom reduction as an effect of an optimistic disposition is that a reporting bias on the part of more optimistic individuals (i.e., that they *underreport* negative outcomes rather than *experiencing* more positive outcomes) may explain the relationship between

dispositional optimism and self-reported physical health. Furthermore, when dispositional optimism and self-reported physical symptoms are assessed concurrently, the observed relationships may be due to an unmeasured third variable (e.g., some participants being in a more positive mood at the time of assessment than others), which might result in some individuals rating themselves more positively on both the dispositional optimism measure *and* the symptom inventory. That said, the prospective study by Scheier et al. (1985) suggests that a positive reporting bias influenced by state factors such as transient mood may not fully explain the observed relationships between dispositional optimism and physical symptom reports.

To control for any possible self-report bias, however, it is imperative to consider studies which show optimism effects on objective markers of physical health (e.g., immune function) or observer rated markers of physical health (e.g., ratings by medical staff). Unfortunately, consideration of research including such objective markers suggests that the effects of dispositional optimism on physical health may be less pervasive than is suggested by research that includes only self-reported indices of health. For example, in the study by Tomakowsky et al. (2001), CD4 T-lymphocyte levels were used as the indicator of immune status.<sup>5</sup> The results of this study showed that despite the LOT being negatively related to self-reported physical symptoms, it was unrelated to CD4 counts. Furthermore, although there was some indication that dispositional optimism assessed two weeks before students started their first year of law school was related to better immune response some 10 weeks later (more CD8 cytotoxic T cells, controlling for Time 1 immune response), this single relationship between dispositional optimism and immune response was marginal, whereas situational optimism was related to several indicators of better immune response in this prospective study (Segerstrom et al., 1998).

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<sup>5</sup> Lower CD4 counts indicate compromised immune function, and are an indication of disease progression, Tomakowsky et al. (2004).

To this author's knowledge, Scheier et al. (1989) conducted the first study including some evidence suggesting that dispositional optimism may have beneficial effects on indices of physical health other than self-reported symptoms alone. Scheier and colleagues investigated the effects of dispositional optimism (assessed the day before surgery) on recovery from coronary bypass surgery. More optimistic individuals were in a more positive frame of mind at this preoperative assessment, with concurrent associations found between dispositional optimism and self-reports of better social support and work satisfaction and of less hostility and depression. Post-operatively (6 – 8 days after surgery) the optimists had recovered more quickly from surgery, reaching recovery milestones (e.g. sitting up, getting out of bed) before pessimists (as rated by the hospital cardiac rehabilitation team). However, it could be argued that these apparent optimism effects could be due to the individual's *state of mind* perioperatively, with greater fear, low mood or low motivation in some individuals at that time (rather than a more pessimistic *disposition*) explaining why they were slower to achieve recovery targets after surgery.

The associations between dispositional optimism and response to coronary artery bypass surgery in this study were not limited to self-reported or behavioural outcomes, however, as dispositional optimism was also related to better perioperative physiological response to surgery, indicated by a lower incidence of new Q-waves on electrocardiograms (Q-waves are an indicator of myocardial infarction), and a lower likelihood of a clinically significant release of an enzyme (aspartate amino transferase; AST) that is released during myocardial infarction (Scheier et al., 1989). Moreover, these optimism benefits occurred in the absence of significant differences on pre-operative physical indices between optimists and pessimists. However, Scheier et al. (1989), concede that only one patient actually showed new Q-waves during surgery in this study, and that AST release is not as reliable an indicator of perioperative

myocardial infarction as Q-waves. Any assertion that optimistic patients will definitely have a better physiological response to coronary artery bypass surgery than pessimistic patients, based on these results, would therefore be an over-generalisation. Despite these limitations, however, the converging self-report, observer and objective evidence in this study (including a positive prospective relationship between dispositional optimism measured preoperatively and self-reported quality of life six months post-surgery) suggests some positive influence of an optimistic disposition on an individual's response to the stressful experience of coronary artery bypass surgery.

More robust evidence suggesting a link between dispositional optimism and objective physical health outcomes was presented by Scheier et al. (1999), who studied the prospective relationship between dispositional optimism (measured  $\leq 20$  days before coronary artery bypass graft surgery) and rehospitalisation six months later. Higher dispositional optimism predicted less rehospitalisation for reasons related to surgery and heart disease, sternal wound infection, and coronary artery disease, after controlling for other contributory factors such as cholesterol level and diabetes status. Moreover, optimism independently predicted rehospitalisation for surgery/heart disease after controlling for depression and neuroticism, and optimism predicted rehospitalisation for coronary artery disease after controlling for neuroticism and self-esteem. However, in analyses controlling for depression, depression not optimism was the independent predictor of rehospitalisation for sternal wound infection.

Optimism benefits on long term physical outcomes were also evident in a study examining the effects of dispositional optimism on survival in head and neck cancer patients. Dispositional optimism (assessed 1 – 2 weeks after diagnosis) was a significant predictor of survival in these patients one year later, with the odds of dying increasing by 1.12 for each unit decrement in LOT scores (i.e., greater pessimism; Alison, Guichard, Fung & Gilain, 2003). These later studies address some of the limitations of

earlier studies investigating the link between dispositional optimism and physical health outcomes because they were (1) prospective, (2) included objective markers of physical health status, and (3) controlled for possible covariates that may explain the optimism – health link. Such improvements in the design of research supporting the proposed relationship between dispositional optimism and physical health allows firmer conclusions to be drawn about the potential benefits of an optimistic disposition on physical health outcomes.

### *Dispositional Optimism and Neuroticism*

Neuroticism (e.g., Eysenck & Eysenck, 1975; Costa & McCrae, 1985, 1987) is a stable, multifaceted personality characteristic comprising a constellation of negative personality traits, mood states, and associated behaviors. Personality traits can be construed as stable reaction tendencies which remain consistent across time and situation (Pervin, 2003), and some proponents of the trait approach to personality believe that personality traits are inherited and manifested because of differences in the biological make up of the individual. For example, greater baseline arousal in the limbic system (Eysenck & Eysenck, 1975) may account for emotional lability because some individuals may require less stimulation than others to alter their mood. Neuroticism can be best understood as an umbrella term for a collection of interrelated personality traits, such as anxiety, irritability, pessimism, and hostility, which can be assessed with measures such as the neuroticism scale of the Eysenck Personality Questionnaire (EPQ; Eysenck & Eysenck, 1975). The EPQ includes items assessing whether the participant is highly strung or tense (anxiety), generally irritable (moodiness) and whether he or she worries about possible future problems (pessimism). In addition, the EPQ neuroticism scale includes items that assess approaches to dealing with situations (i.e., coping), such

as whether the rater relies on friends to cheer him or her up (social support) or seeks information when he or she has a problem (problem-focused coping).

Negative affectivity (Watson & Clark, 1984) is also construed as a stable predisposition to general, pervasive, negativity. Watson and Clark assert that individual personality traits such as trait anxiety, along with persistent negative mood, distress, guilt, dissatisfaction and so on are all indicators of the same construct of negative affectivity. According to Watson and Clark (1984), a central component of negative affectivity is trait anxiety (e.g., Spielberger, Gorsuch, & Lushene, 1970), and relationships of around .80 have been found between negative affectivity and trait anxiety and  $\geq .70$  between measures of neuroticism and trait anxiety (e.g., Scheier et al., 1994; Watson & Clark, 1984). Neuroticism and negative affectivity are also positively related to self-reported physical symptoms, with typical relationships ranging from .29 - .51 (Costa & McCrae, 1987; Scheier et al., 1994; Watson & Clark, 1984), as is trait anxiety with relationships of .47 - .52 (e.g., Robbins et al., 1991; Scheier et al., 1994; Smith et al., 1989). However, none of these constructs is consistently related to organic disease, suggesting that all are associated with exaggerated reports of physiological signs of ill health (Costa & McCrae, 1985, 1987; Watson & Pennebaker, 1989)<sup>6</sup>.

Relationships between neuroticism and dispositional optimism (e.g., -.50; Scheier et al., 1994) and between trait anxiety and dispositional optimism (range: -.40 to -.66; Robbins, Spence, & Clark, 1991; Smith et al., 1989) are also high.<sup>7</sup> In light of these findings, it has been proposed that the health effects of optimism may be due to shared variance with neuroticism and negative traits related to it rather than to unique aspects of optimism (e.g., Andersson, 1996; Kennedy & Hughes, 2004; Smith et al.,

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<sup>6</sup> Because of the similarities between these constructs, the term neuroticism will be used to refer to both neuroticism *and* negative affectivity, to avoid the clumsiness of repeatedly referring to both terms in every reference.

<sup>7</sup> Because this is an archival study which did not include a neuroticism measure, but did include the trait form of the Spielberger et al. (1970) trait anxiety scale, data collected using this scale (STAI-T) will be presented in Study 1.

1989). Several findings support such a neuroticism hypothesis. First, stronger correlations have been found between the LOT and indicators of neuroticism than between the LOT and other measures of dispositional optimism (Smith et al., 1989) or physical symptom reports (Andersson, 1996). In addition, controlling for indicators of neuroticism or indicators of neuroticism such as trait anxiety has reduced significant relationships between optimism and physical health reports to nonsignificance (e.g., Scheier et al., 1994; Smith et al., 1989, Study 2).

Smith et al. (1989) examined the concurrent and prospective influence of dispositional optimism on coping and symptom reports, after controlling for trait anxiety. They found that dispositional optimism was positively related to concurrent reports of problem-focused coping and support-seeking, negatively related to wishful thinking, self-blame and avoidance coping, and negatively related to symptom reports five weeks later. However, controlling for trait anxiety eliminated the relationship between dispositional optimism and symptoms and coping. Conversely, trait anxiety was positively related to symptom reporting at both assessments but controlling for dispositional optimism did not eliminate that relationship. On the basis of these results, Smith et al. argued strongly that the relationship they had found between dispositional optimism and symptom reports actually reflected the influence of trait anxiety, asserting that “the LOT is virtually indistinguishable from measures of neuroticism, and previously reported findings using this scale are more parsimoniously interpreted as reflecting neuroticism rather optimism” (p. 640).

Williams (1992, p. 475) picked up on proposals that the only difference between the LOT and measures of neuroticism may be a “...a reversed direction of scoring”, with lower dispositional optimism being equivalent to greater neuroticism. Williams (1992) assessed dispositional optimism and neuroticism in university students, looking at concurrent relationships between ratings on the four negatively worded LOT items

(which he called pessimism) and the four positively worded items (optimism) and the neuroticism scale of the EPQ. The results showed significant relationships between LOT scores and neuroticism scores. The direction of relationships between these constructs was negative for the optimism subscale and positive for the neuroticism subscale, thereby supporting the assertions of Smith et al. (1989) that dispositional optimism is at the opposite end of a 'neuroticism continuum'. It therefore seems imperative to consider whether neuroticism might be a "...general nuisance factor in health research" (Watson & Pennebaker, 1989, p. 234) that contaminates conclusions about the relationship between dispositional optimism and physical health.

In answer to some of these concerns, Scheier et al. (1994) studied the relationships between dispositional optimism and neuroticism. They also found that significant relationships between dispositional optimism and students' retrospective reports of the number and intensity of physical symptoms they had experienced over a four week period became nonsignificant when neuroticism or trait anxiety were controlled, supporting proposals that relationships between dispositional optimism and physical symptom reports may be better explained as an effect of neuroticism. Together, the above evidence might seem to call into question the point of investigating links between dispositional optimism and physical health. However, Williams's conclusions about whether or not the LOT is redundant as a measure of dispositional optimism diverge somewhat from those of Smith et al. (1989, p. 646), who had concluded that the LOT was simply a "weaker measure" of neuroticism than traditional neuroticism measures. Instead, Williams asserts that the LOT has a unique focus on "generalised outcome expectancies" that is not seen in measures of trait anxiety (as used by Smith et al., 1989), which focus on worry, tension, and pervasive anxiety. Moreover, Scheier et al. (1994) point out that neuroticism is a multifaceted construct and ask us to consider "...whether all facets of neuroticism are important to the effects [of neuroticism], or

only the part of neuroticism that is related to optimism and pessimism” (p. 1077). They argue that even if optimism and pessimism are simply facets of a broader neuroticism dimension, researchers should continue to examine the exact nature of associations between these individual facets and the outcomes in which they are interested.

Although the findings of Smith et al. (1989), Williams (1992), and Scheier et al. (1994) suggest that optimism effects on physical health may be confounded by covariation with neuroticism, mediation analyses controlling for neuroticism may lack explanatory power with respect to the impact of dispositional optimism on actual physical health when symptom self-report measures are used. Indeed, a negative neuroticism reporting bias may explain relationships between this construct and physical health reports as much as a positive optimism reporting bias may explain relationships between the LOT and physical health reports. Symptom self-report reflects both true physical processes and subjective impressions of physical health (Watson & Pennebaker, 1989). Therefore if the LOT remained significant after controlling for neuroticism, it would not be possible to ascertain whether this was because of its association with the subjective or with the objective component of self-reported outcomes. The same can be said of neuroticism, as it has been argued that neuroticism is not related to actual physical health but merely contaminates symptom self-report (e.g., Costa & McCrae, 1987; Watson & Pennebaker, 1989). In a sample of more than 900 men aged between 17 and 98 years of age, those scoring high on a neuroticism scale reported two or three times as many physical symptoms as those scoring low on neuroticism (Costa & McCrae, 1985), and in another study, greater negative affectivity in university employees at one assessment was associated with reports of more physical complaints three months later (Watson & Pennebaker, 1989). Whether different results relating to the relationship between neuroticism and physical health would emerge if objective markers of health were assessed is equivocal, however, as it is with

dispositional optimism. On the one hand, a prospective study suggested that optimism but not chronic prenatal maternal stress had a direct effect on birth outcomes (i.e., birth weight, gestational age; Lobel et al., 2000). On the other hand, a study in which both neuroticism and dispositional optimism were assessed prior to a cognitive stressor task showed that neuroticism was related to higher diastolic blood pressure during the task whereas dispositional optimism was not (Kennedy & Hughes, 2004). However, given the potential confounding of dispositional optimism effects on physical health with the effects of neuroticism, it seems vital that neuroticism is controlled in studies investigating the influence of dispositional optimism on physical health outcomes.

### *Dispositional Optimism and Coping*

The ways in which individuals cope with stressful situations can be understood at different levels of stability and specificity. Dispositional coping or coping style refers to what an individual *generally* does to cope with a range of stressful situations, and measures of coping dispositions thus require the individual to engage in some degree of aggregation and recall over time when completing coping measures framed in dispositional terms (e.g., the Coping Operations Problems Experienced inventory [COPE]; Carver & Scheier, 1994). Opinion differs about whether this approach is the best way of understanding the ways in which an individual copes with a specific stressful situation, as it is argued that the type of situation the individual experiences better explains the coping strategies an individual employs (e.g., Lazarus & Folkman, 1984). For example, if the situation allows him or her to seek social support from friends and family then a social support seeking coping style may be used and found helpful, but if the individual is denied this opportunity (e.g., if he or she experiences problems when travelling alone in a remote region), then a different way of coping would be required. Situation specific coping measures reflect the distinction between

coping style and the ways in which one is *actually* coping with a given situation, by specifying the situation which the individual should consider when completing the measure (e.g., the Ways of Coping questionnaire, Lazarus & Folkman, 1988), or framing individual items in a particular context (i.e., Terry & Hynes's coping with infertility measure, 1998). Situation specific measures may also require a certain amount of aggregation and recall, however. For example, when the measure is employed to enquire about coping with infertility, the experience of infertility may have lasted for several years. However, respondents to such a measure will be homogenous with respect to the stressor they are considering, and thus such measures may be more valid assessments of the ways in which individuals cope with a specific situation than are dispositional measures (Lazarus & Folkman, 1984).

Carver et al. (1989) suggest that certain personality characteristics may predispose individuals to “stable coping dispositions” (p. 270) that determine how they react to novel stressful situations (Carver & Scheier, 1994), and Scheier and Carver (1987) propose that problem-focused coping may be more likely in people who expect to see positive results from their efforts. Therefore, it seems feasible that optimists would use more problem-focused coping whereas pessimists might employ more emotion-focused strategies to cope with the distress aroused by their negative expectations (Carver et al., 1989; Scheier & Carver, 1987). This difference in coping could influence health because optimists may be more likely to tackle health problems directly rather than avoid them as pessimists might. Research has supported these proposals insofar as optimism is associated with a greater use of problem-focused coping strategies and a lesser use of emotion-focused coping strategies (e.g., Lobel et al., 2000; Scheier et al., 1989; Scheier, Weintraub, & Carver, 1986, Study 1), and with better health behaviours (Lobel et al., 2000; Robbins et al., 1991).

Scheier et al. (1989) found that coronary heart bypass patients who were more optimistic preoperatively used more problem-focused strategies such as making plans and goals for recovery and seeking information, and focused less on their negative emotions than more pessimistic patients, both concurrently and after surgery. Also, optimism was positively associated with reports of problem-focused strategies, positive reinterpretation and acceptance, and negatively related to denial and distancing in students recalling how they coped with a recent stressful event. Importantly, optimism was also associated with acceptance when the situation was recalled as uncontrollable (Scheier et al., 1986). In other words, where trying to change or control a situation would be ineffectual, optimists may be more likely to have employed emotion-focused strategies such as looking for positive aspects of the situation and accepting what cannot be changed (Scheier et al., 1994). Such a use of situationally appropriate strategies is considered to be adaptive and is associated with better adjustment to stressful events (e.g., Terry & Hynes, 1998). Together, such evidence suggests that optimistic individuals might show a more flexible and adaptive approach to stressful experiences that confers a “coping advantage” (Scheier & Carver, 1987, p. 188), and if optimists do cope more effectively than pessimists, the negative effects of stress on health might be ameliorated (Scheier & Carver, 1987). A relationship between optimism and coping is therefore a potential mechanism through which optimism could influence physical health. However, it should be noted that these studies used concurrent (Scheier et al., 1989) and retrospective (Scheier et al., 1986) designs and thus a direction of causality between dispositional optimism and coping strategies cannot be inferred.

Clear evidence that coping might mediate the health effects of optimism is lacking, mainly because of a dearth of studies examining the relationship between coping and objective markers of physical health. An overview of literature (Aldwin & Park, 2004) regarding the relationship between coping and physical health found that

few studies submitted for consideration examined coping directly (i.e., rather than adjustment) *and* included objective physical health outcomes (e.g., cardiovascular reactivity, immune outcomes). Those that did supported proposals about the benefits of a ‘fit’ between the person’s predicament and the coping strategies employed, showing that active coping strategies were related to better physical outcomes in controllable situations (e.g., rehabilitation after surgery), but that adaptive emotion focused strategies were related to better outcomes in uncontrollable situations (e.g., chronic pain). Further, in a study not reviewed by Aldwin and Park (2004), coping strategies and depression were measured early in the follicular phase of IVF treatment (i.e., days 4 – 5 of treatment). Pregnancy rates were significantly predicted by depression, avoidance, emotional expression coping, and active coping. Women scoring higher on these psychological variables were less likely to become pregnant during the subsequent IVF treatment (Demyttenaere, Nijs, Evers-Kiebooms & Koninckx, 1992). In a later study, Demyttenaere et al. (1998) found that women who scored higher on subscales assessing palliative and emotional expression coping (at the start of treatment, days 3 – 5) were less likely to become pregnant than women who had lower scores. This evidence suggests that psychological distress and coping, particularly maladaptive emotion focused strategies, may have had detrimental effects on fertility treatment outcomes.

However, although this evidence provides some support for the idea that the coping strategies employed during medical stressors may affect physical health outcomes, other studies do not show consistent correlations between coping and markers of physical health. Notably, in a meta-analytic review of 34 studies reporting data pertinent to the association between coping and physical and psychological outcomes, Penley, Tomaka and Wiebe (2002) found that although most of coping strategies were related to psychological outcomes, they were not consistently related to

physical health outcomes. From the following list, escape-avoidance coping, wishful thinking, positive reappraisal coping, confrontive coping, and accepting responsibility were primarily correlated with psychological but not physical well-being in this meta-analysis. Further, planful problem-solving was not consistently correlated with either physical or psychological well-being. Indeed, of the coping strategies considered, Penley et al. (2002) found that only social support seeking and self-control were correlated with physical health (with the former being related to poorer and the latter to better). In short, there seems to be a lack of strong evidence showing that coping efforts are reliably related to objective physical health outcomes, which seems at odds with proposals that coping efforts will influence physical health.

Even if coping were shown to mediate optimism effects on health, however, this finding could also support the neuroticism hypothesis because coping may be a behavioural manifestation of this constellation of personality traits. That is, individuals who are prone to react to stressful situations with tension, worry, or nervousness may be less likely to contact health practitioners, be more likely to avoid information related to their medical problems, and be more likely to express the negative emotions they are more likely to be feeling. As such, associations between the LOT and coping may actually be due to associations between neuroticism and coping. Indeed, Scheier et al. (1994) report moderate correlations between trait anxiety (and neuroticism) and emotion-focused coping (denial, disengagement) and between trait anxiety (and neuroticism) and problem-focused coping. The former correlations were positive and the latter were negative, supporting such a proposal. In addition, Smith et al. (1989) found that moderate correlations between the LOT and problem-focused coping or avoidance became nonsignificant after controlling for trait anxiety. However, as only symptom reports were considered, it is not known to what extent such findings apply to objective physical markers of health.

### *Summary of research into psychological predictors and physical health outcomes*

Although some research suggests a link between dispositional optimism and various physical health outcomes, other research suggests that this relationship may be explained by neuroticism or the coping strategies employed by more optimistic individuals. Further, consideration of the literature examining relationships between dispositional optimism, neuroticism, coping and health suggests that certain methodological issues should be addressed when examining links between these variables. First, research may be limited by reliance on self-reported physical outcomes (Scheier et al., 1989), particularly where dispositional optimism and neuroticism are examined as predictors. Both predictors may have immeasurable influences on self-reported outcome measures, and hence it is important to include objective indices of health outcomes in research looking at their impact on health. Second, research may be limited by retrospective recall of coping, permitting the consideration of stressors of choice, and by coping situations that are “relatively benign in nature” (Scheier et al. 1989, p. 1025). In consideration of these issues, the present prospective study examined the relationship between psychological predictors and women’s biological (ovarian) response to the early stages of in vitro fertilisation (IVF) treatment (i.e., prior to fertilisation). The main aim was to determine whether dispositional optimism, trait anxiety, and coping had unique predictive power on these physical health parameters or whether their effects were due to the fact that all were indicators of an underlying trait complex that was the ‘true’ influence on physical health.

### *IVF treatment*

IVF is a fertility treatment that helps couples with a range of fertility problems to achieve a pregnancy through a series of pharmacologic (i.e., hormonal) and physical

(e.g., embryo transfer) interventions (see Figure 2, page 48). The initial stages of treatment (downregulation, stimulation) last approximately 21 days, and involve artificially recreating the menstrual cycle with synthetic hormones to stimulate the formation, growth and maturation of several eggs (oocytes). This process is known as oogenesis (Austin & Short, 1982). During the normal menstrual cycle, ovulation represents the culmination of a complex series of interactions between the pituitary gland and ovaries. At the beginning of the menstrual cycle, follicle stimulating hormone (FSH) is released from the pituitary gland. As its name suggests, FSH stimulates the growth of follicles (around 15-20), containing developing oocytes. As these grow and mature, the ovaries secrete oestrogen, which feeds back to the pituitary and decreases the production of FSH. This mechanism results in sufficient FSH for only one follicle to mature fully. The increasing levels of oestrogen stimulate the release of luteinising hormone (LH) from the pituitary gland and this LH surge stimulates the release of the mature egg from the follicle (i.e. ovulation). The development of multiple oocytes is prevented by these interactions between the pituitary gland and the ovaries, resulting in the maturation of a single mature oocyte from around 15-20 follicles (except in fraternal multiple pregnancies). The remaining follicles degenerate (a process known as atresia), which results in the death of the oocyte (Johnson & Everitt, 1980).

The purpose of pharmacologic interventions in the stimulation stage of IVF is to cause multiple follicles to mature and estradiol<sup>8</sup> levels to remain high so that the number of oocytes retrieved for treatment is maximised. Therefore, to prevent the interaction between the pituitary and ovaries (which prevents the development of multiple oocytes in the normal menstrual cycle) IVF treatment commences with the administration of a synthetic hormone (gonadotrophin releasing hormone analogue; GnRH-a), which stimulates, then suppresses, the activity of the pituitary gland.

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<sup>8</sup> In women of reproductive age, estradiol is the principal hormone in the class of steroid hormones known as estrogens.

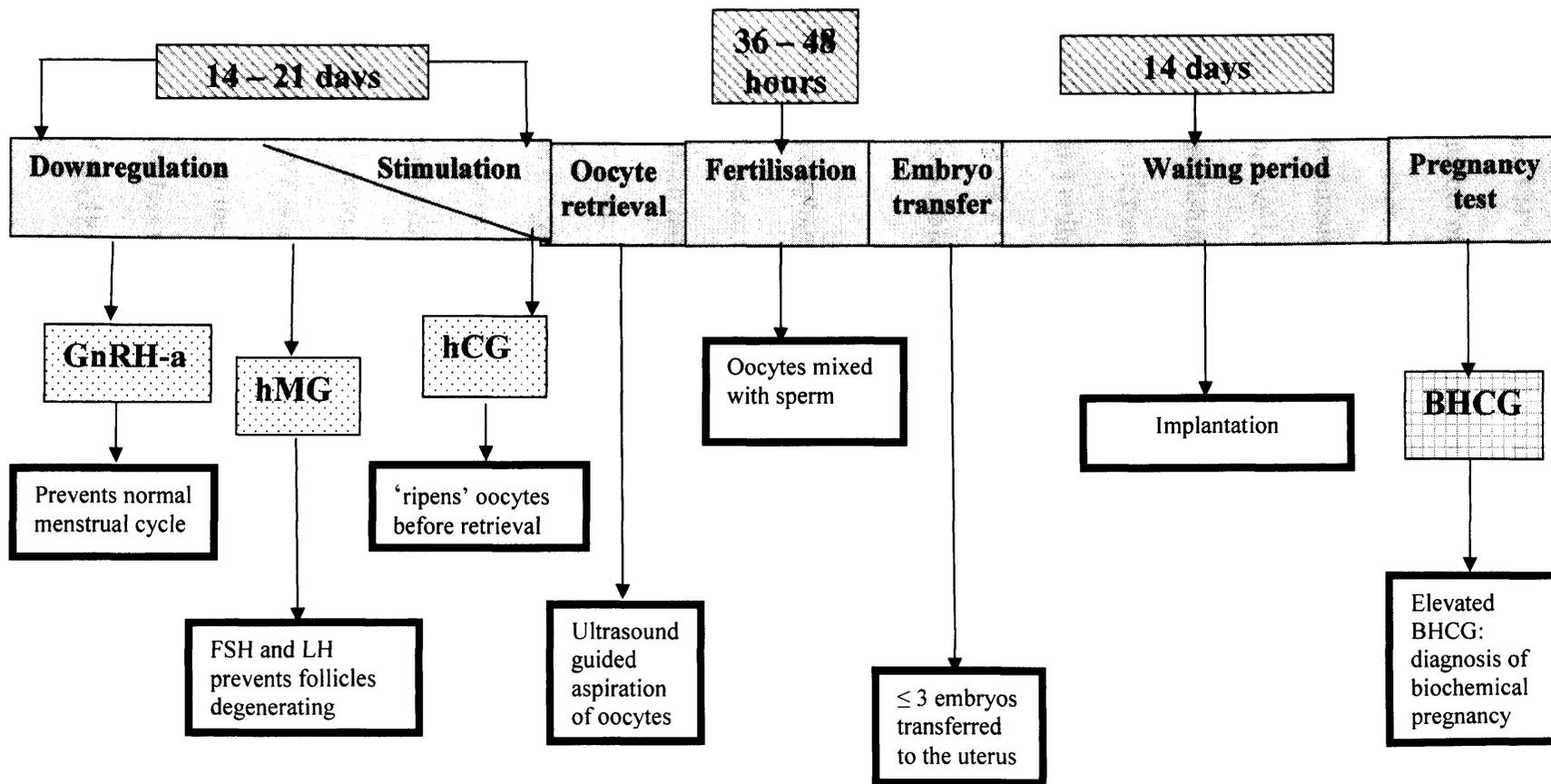


Figure 2. Breakdown of the IVF treatment cycle by day (hatched areas), treatment schedule (shaded areas), hormone of relevance (dotted areas) and purpose of intervention (bold areas).

Human menopausal gonadotrophin (hMG) is then administered, containing sufficient FSH and LH to prevent follicles degenerating. GnRH-a and hMG therapy thereby maximises the number of follicles that reach maturity, resulting in (on average) ten oocytes suitable for fertilisation. This process of oogenesis is concluded with an injection of hCG (human chorionic gonadotrophin), which ripens or primes the oocytes before they are collected from the ovaries (within 36 hours) via aspiration of follicular fluid. Oocytes are placed in a culture dish and fertilised with sperm. If fertilisation is successful, a maximum of three embryos are transferred to the uterus, according to regulation in the United Kingdom (Human Fertilisation and Embryology Authority; HFEA, 1995), and patients wait 14 days before taking a blood test detecting beta-hCG (BHCG) levels, which determines if pregnancy has been achieved.

#### *Biological factors influencing physical response to IVF treatment*

IVF treatment represents a hierarchy of outcomes or succession of biological endpoints, each of which must be successfully achieved for treatment to progress to the next stage. After oocytes are mixed with sperm, progress through treatment partly depends on sperm quality, but progress through stimulation and oocyte retrieval does not. Certain characteristics of the woman can affect her response to treatment. First, the number of oocytes in the ovaries (ovarian reserve) declines with increasing age and the remaining oocytes age with the woman (Austin & Short, 1982). The number and quality of oocytes retrieved during IVF is an index of this ovarian reserve (Akande, Fleming, Hunt, Keay & Jenkins, 2002). Both the quantity *and* quality of oocytes decrease as a woman matures, and hence fewer and/or less viable oocytes may be retrieved from older women during IVF (Demyttenaere et al., 1992). Second, “biological ovarian ageing” and reduced ovarian

reserve can occur in advance of chronological age, because of accidental or iatrogenic damage to the ovaries or degeneration of excessive follicles (Akande et al., 2002, p. 2003).

The highest estradiol level reached (peak estradiol), the number of follicles reaching maturity, and the number of oocytes retrieved all represent the functional capacity of a woman's ovaries. Further, because women are born with all the oocytes they will ever produce, the number of oocytes additionally reflects the effects of factors that have impacted on the ovary across the life span. These factors include biological events (e.g., aging), lifestyle factors (e.g., smoking, obesity; Cramer, Barbieri, Fraer, & Harlow, 2002), and, potentially, the effect of negative personality traits. Such factors may degrade the quality of oocytes and/or reduce their numbers (Cramer et al., 2002), and explain why not all follicles yield oocytes. In the present study, the link between psychological predictors and women's biological response to IVF treatment was examined. IVF is a good clinical model to test relations among psychological variables and women's biological response to treatment because the treatment protocol includes assays of blood to determine whether estradiol levels are sufficiently elevated to achieve optimum ovarian stimulation and ultrasound scans to determine when oocytes have reached maturity. Further, the numbers of follicles aspirated and oocytes collected are recorded as routine. Finally, couples attend clinic for an initial consultation with medical staff some weeks before treatment. This appointment represents an ideal opportunity to measure psychological predictors prospectively before medical intervention can influence self-report.

#### *Psychological factors influencing physical response to IVF treatment*

The above discussion clarifies the 'biological side' of IVF treatment, but it is clear that infertility and fertility treatments are not purely biological or medical experiences for

infertile couples. Although infertility is not life-threatening, failure to become pregnant is quality of life-threatening for women who have endeavoured to become pregnant without success, and research shows that infertile women may experience heightened levels of depression and anxiety. For example, in one study 42% of infertile men and women scored above the clinical cut-off point for anxiety, and 12% for depression (Lord & Robertson, 2005), 17% of women met clinical criteria for a diagnosis of reactive depression after failed IVF in another study (Litt, Tennen, Affleck & Klock, 1992), and 19.4% of women had depression scores indicative of moderate depression prior to IVF (Demyttenaere et al., 1998). Further, Lord and Robertson (2005) report that couples perceived that they had little control over their infertility, little faith that treatment would work, and around half of the couples thought that chance, stress and age (i.e., factors beyond their control) were responsible for their infertility.

Other than a lack of perceived control, a number of other factors combine to help explain why women may find infertility in general and IVF in particular to be particularly stressful. One of the situation properties discussed by Lazarus and Folkman (1984) as contributing to the experience of stress is the timing of an event in the life-cycle. They propose that experiences which are “off time” (p. 109) in an individual’s natural progression through life-stages may be particularly stressful. Infertility is a prime example of such an off-time stressor. Because women have a finite number of years in which to conceive, the chances are that siblings, cousins, friends and peers of a similar age as her are conceiving, delivering and raising children at the time she is undergoing fertility treatment. It is unsurprising therefore that infertile women can feel jealous and inadequate in the face of other women’s ease in bearing children (along with feelings of guilt and disloyalty for having such feelings) and a sense of rage and injustice about issues such as the abuse of

children. Some infertile women even feel that their partners should leave them and find a fertile partner (McNaughton et al., 2000).

Further, women undergoing IVF treatment are likely to have been infertile for many months (even years) and to have tried other fertility interventions without success. Due to limits on the number of IVF treatments provided by the National Health Service, couples often pay a considerable sum of money for private IVF treatment. In other words, couples undergoing IVF make considerable practical, emotional and financial investments in trying to become parents. Finally, because IVF treatment is the final treatment option available to assist conception, couples may be aware that they will have to face up to the likelihood of remaining childless if treatment fails and they do not have the financial or psychological resources to continue with more treatment. Coupled with the physical and psychological concomitants of the medication regimens (e.g., hot flushes, breast tenderness, abdominal discomfort, and irritability and tearfulness; Boivin & Takefman, 1996; Lord & Robertson, 2005), some invasive techniques for collecting oocytes and transferring embryos to the uterus, and a realistic probability of achieving pregnancy in the first cycle of IVF or ICSI of 18.7% for women aged  $\leq 30$  years, and 12.5% for women aged  $\geq 36$  years (Stolwijk, Wetzels & Braat, 2000), it is unsurprising that women find IVF stressful.

It is unfortunate therefore that a link has been found between psychological stress and poorer response to IVF treatment. In one study by Boivin and Takefman (1995), women reported their daily psychological reactions to IVF treatment, and medical information regarding treatment outcomes (peak estradiol level, number of oocytes retrieved, number of embryos transferred) was collected from medical charts. Stress scores at oocyte retrieval were significantly and negatively related to the number of oocytes retrieved, and stress scores at embryo transfer were significantly and negatively associated

with the number of embryos transferred. Furthermore, compared to women who became pregnant, women who did not become pregnant reported more negative psychological outcomes at each stage of treatment and had poorer biological response in terms of stimulation response, number of oocytes retrieved and number of embryos. Further, state anxiety prior to oocyte retrieval was significantly and negatively related to BHCG levels in research by Demyttenaere et al (1992). Another study also suggests a prospective relationship between negative psychological states and IVF treatment outcomes, as state anxiety measured 90 minutes before IVF oocyte retrieval was significantly and negatively related to BHCG levels some 15 days later in research by Demyttenaere et al (1992). In short, it seems as though IVF treatment is more than a simple series of pharmacologic and physical interventions to the women who undergo it. Moreover, the stress engendered by treatment may have the effect of compromising the very physical responses that might otherwise maximise the chances of pregnancy.

Converging evidence also suggests that not only might acute stress compromise response to IVF treatment, various psychological characteristics measured at the start of treatment may influence pregnancy outcomes. Demyttenaere et al. (1992) assessed depression and coping style in the first few days of IVF treatment and found lower pregnancy rates in women who were more depressed and reported using more active coping, avoidance and emotional expression coping. In addition, Demyttenaere et al. (1998) found that scores for expressing negative emotions and for palliative coping at the start of treatment were significantly higher in women who were not pregnant at the end of treatment than they were in those who did. Moreover, Demyttenaere, Nijs, Steeno, Koninckx, and Evers-Kiebooms (1988) found that women who were more trait anxious pre-treatment required more cycles of artificial insemination with donor sperm before they

conceived. Evidence from other prospective studies also suggests a link between psychological well-being and fertility treatment outcomes, particularly pregnancy rates.

Depression (Smeenk et al., 2001), measured at the start of fertility treatment correlated negatively with pregnancy rates in that same treatment cycle, trait anxiety and negative mood measured prior to fertility treatment was associated with a lower probability of pregnancy (Sanders & Bruce, 1999), and women having repeated cycles of IVF who were depressed one month before treatment (first time participants) or on the first day of a repeat treatment cycle (veteran participants) had a lower probability of pregnancy in the first five or six cycles following that assessment than non-depressed women (Thiering, Beaupaire, Jones, Saunders & Tennant (1993). Significant and negative relationships have also been found between chronic negative affect measured at the start of fertility treatment and the number of oocytes retrieved and embryos transferred in that cycle (Klonoff-Cohen, Chu, Natarajan, & Sieber, 2001). It would not be possible to assert that any of these psychological variables assessed at the start of fertility treatment *caused* poorer response to treatment, because poorer reproductive function is often the reason that women are undergoing fertility treatment in the first place. The start of fertility treatment will not be the first inkling a woman has that she might have difficulty becoming pregnant and she may have been trying to conceive for many months before being referred. It seems highly likely that women who are aware that their reproductive systems (and/or those of their partners) are not functioning as they should, will feel stressed, anxious and depressed at the start of treatment. However, the evidence does suggest that distress at the start of fertility treatment is associated with poorer fertility treatment outcomes, notably pregnancy rates.

However, although these findings provide some support for psychosomatic effects on fertility, the methodology is problematic when pregnancy is used as an outcome

measure. Although a viable pregnancy is dependent on the woman's contribution to treatment (i.e., her ovarian response), it is also dependent on the man's (i.e., his sperm quality). As spouse scores on psychological variables tend to be moderately correlated (Boivin et al., 1998), it would be impossible to know whether a psychological influence on pregnancy outcome was due to the psychological profile of the woman, the man, or both. In addition, once oocytes have been removed from the woman's body, decisions by medical staff as to the quality of oocytes and which embryos to transfer may impact on the ultimate outcome of IVF. Thus, after oocytes are removed it is difficult to ascertain the extent to which pregnancy outcome is influenced purely by the psychological profile of the woman. Hence, in the present study, the outcome variables used reflected only the woman's biological or ovarian response to IVF.

### *The present study*

In order to establish whether optimism effects on reproductive health were due to unique aspects of optimism, to aspects shared with coping, or to shared variance with an underlying psychological dimension (i.e., neuroticism), which itself was related to physical health, a combination of regression and structural equation modeling (SEM) analyses were used. The rationale for this data analysis strategy was as follows: If optimism health effects were due to unique aspects of this construct, then regression analyses should show that optimism remained significantly related to physical health after controlling for trait anxiety and coping (see Figure 3, page 67, Figure 4, page 68). Further, if these potential causal variables are distinct elements in the causal pathway to health rather than correlated indicators of a single underlying latent dimension (i.e., neuroticism), then indicator loadings and goodness-of-fit statistics from the SEM should show that the proposed latent

structure (see Figure 5, page 70) was not a good fit to the data (i.e., underlying variance–covariance/correlation matrix). The reverse was expected if optimism effects were due to shared variance with the other psychological predictors. That is, regression analyses should show reduced or nonsignificant path coefficients when the other predictors were entered into the model and the structural equation model of a latent psychological complex underlying all the psychological predictors should be a good fit to the model predicting biological response to fertility treatment.

In line with theoretical predictions suggesting that a more optimistic disposition may promote better health outcomes (e.g., Scheier & Carver, 1987) and prior research evidence showing an association between dispositional optimism and indicators of better physical health, including fewer HIV symptoms (Tomakowsky et al., 2001) and better perinatal outcomes (Lobel et al., 2000), a significant relationship between dispositional optimism and biological response to the pharmacologic interventions received in the stimulation stage of IVF treatment was expected. Specifically, that greater dispositional optimism would be related to:

1. Higher estradiol levels.
2. More follicles observed at the ultrasound scan prior to oocyte retrieval.
3. More oocytes retrieved from follicles at oocyte retrieval.

Furthermore, it was expected that the relationship between dispositional optimism and these aspects of biological response to IVF treatment would remain significant after controlling for potential mediators of optimism effects on physical health outcomes, these being trait anxiety (e.g., Smith et al., 1989) and coping (e.g., Scheier et al., 1986, 1989).

## 3.2 Method

### *Design*

The study used a prospective, correlational design. Psychological predictors were assessed around three months before women started IVF treatment and biological outcomes were assessed after the IVF treatment cycle had finished. The predictors were women's scores on measures of dispositional optimism, trait anxiety and coping style, and the biological outcomes were (1) peak estradiol level (ng/mL): the highest blood estradiol level reached before ovulation was triggered (approximately 9–12 days after initiation of ovarian stimulation), (2) number of follicles: the number of follicles observed by ultrasound scan 9–12 days after initiation of ovarian stimulation and (3) number of oocytes: the number of oocytes retrieved from the follicles.

### *Participants*

Participants were recruited from 287 women who had appointments scheduled to take place approximately 3 months before they started IVF treatment at the Assisted Reproduction Unit (ARU) of a large urban hospital. Women were recruited for the present study at this appointment. The selection criteria for the study were that women were accepted into the IVF programme, started the IVF cycle, spoke and understood English sufficiently well to be interviewed, had completed all study materials and that full information about the biological variables of interest was available from medical charts. Of these 287 potential participants, 211 (73.5%) attended their appointments and were interviewed and the remainder (26.5%,  $n = 76$ ) did not attend their appointments. No demographic, fertility history, psychological or biological information was available for non-attendees.

The final sample therefore included 97 women. The mean age of women was 33.33 years ( $SD = 3.32$ ), almost all (97.9%,  $n = 95$ ) had completed at least some secondary education, and the majority (83.5%,  $n = 81$ ) were employed. In terms of reproductive history, the women had been infertile for an average of 7.77 years ( $SD = 3.0$ ). More than half (58.8%,  $n = 57$ ) were experiencing primary infertility (i.e., had never had a pregnancy, whether it resulted in an ectopic pregnancy, abortion, miscarriage, or live birth), and around a third (35%,  $n = 34$ ) had previously undergone one or more cycles of IVF treatment. IVF had been successful for 4 of these women (4.1%).

## *Materials*

### *i. Psychological Measures*

*Dispositional optimism.* The Life Orientation Test (LOT; Scheier & Carver, 1985) was used to assess dispositional optimism. The LOT contains eight items assessing generalised outcome expectancies (e.g., “In uncertain times, I usually expect the best”) and four filler items (e.g., “It is important for me to keep busy”). Women indicated the extent to which each item reflected their attitudes “towards life in general”, according to a five-point scale anchored 0 (strongly disagree) to 4 (strongly agree). Optimism scores were computed by reverse scoring negatively worded items and summing the scores for all items (excluding filler items). Higher scores indicate greater dispositional optimism. The LOT has reasonable internal consistency (Cronbach’s  $\alpha = .76$ ), and test–retest reliability of .79 reflects the dispositional quality of the construct. The mean LOT score for a normative sample of female students was 21.41 ( $SD = 5.22$ ; Scheier & Carver, 1985). In the present research, the reliability of the LOT was high ( $\alpha = .82$ ) for the eight-item scale.

*Trait anxiety.* The Trait Anxiety subscale scale of the State–Trait Anxiety Inventory (STAI-T; Spielberger et al., 1970) was used to assess trait anxiety (i.e., the extent to which women were prone to experience greater anxiety in stressful situations) The STAI-T subscale contains 20 items and women reported how they generally felt in response to each. Higher scores indicate greater trait anxiety. The mean STAI-T subscale score for a normative sample of general medical patients without psychiatric complications (the sample most appropriate for comparison with the current sample) was 41.33 ( $SD = 12.55$ ). Internal consistencies for the STAI-T are high ( $\alpha = .90$ ), reported test–retest reliability of .73 to .86 reflects the stable quality of trait anxiety (Spielberger et al., 1970), and validity of the STAI-T is supported by its correlations with other measures of trait anxiety (Spielberger et al., 1970). In the present study, the reliability of the STAI-T subscale was high ( $\alpha = .92$ ).

*Coping.* The coping measure was adapted from the Ways of Coping Questionnaire (Folkman & Lazarus, 1988). The 66-item Ways of Coping questionnaire was shortened to 23 items because of practical limitations (e.g., time taken to complete). Four subscales (problem management, problem appraisal, emotional expression<sup>9</sup>, and escapism) were created on the basis of the approach described by Terry and Hynes (1998). Problem-management coping refers to active efforts to solve a problem, whereas problem-appraisal refers to attempts to deal with the stressful nature of an experience by, for example, attending to any positive aspects of the situation. Emotional expression refers to expressing the emotions engendered by a stressful situation, whereas escapism represents attempts to

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<sup>9</sup> The items used to create an Emotional Approach coping subscale in this study were “Talked to someone about how I was feeling”, “Talked to someone who could do something about the problem”, “Kept my feelings to myself” and “Kept others from knowing how bad things were”. These items reflect the *expression* of emotion but not acknowledging or understanding emotions (e.g., Stanton, Danoff-Burg, Cameron and Ellis, 1994). Therefore, this scale will be called Expressing Emotions in this Thesis, in order to accurately reflect the nature of items from which this scale is comprised.

avoid the situation by daydreaming, fantasising and denying that there is a problem. This adapted coping measure was used in order to establish whether Terry and Hynes's proposals about the beneficial effects of problem appraisal and emotional expression and the negative effects of problem management and escapism on psychological outcomes (see pages 14 – 16) could be extended to objective physical health outcomes. Terry and Hynes (1998) report alpha coefficients for each subscale over two assessments as: Problem-Management  $\alpha = .74$  and  $\alpha = .78$ ; Problem-Appraisal  $\alpha = .71$  and  $\alpha = .76$ ; Emotional Approach  $\alpha = .68$  and  $\alpha = .61$  and Escapism  $\alpha = .78$  and  $\alpha = .75$ . In the present study, women endorsed each item according to how frequently they had used each when coping with infertility, according to a four-point scale anchored 1 (not used at all) to 4 (used a great deal). Cronbach's alpha was .62 for the resulting Problem Appraisal subscale (3 items), .65 for Problem Management (6 items), and .85 for Escapism (10 items). Cronbach's alpha for the Expressing Emotions subscale was unacceptably low (.35, 4 items), so this scale was not used.

*Biological measures.* Ovarian response to IVF was assessed with three variables: peak estradiol level, number of follicles, and number of oocytes retrieved. Peak estradiol level (ng/mL) was the highest blood estradiol level reached before ovulation was triggered (approximately 9–12 days after initiation of ovarian stimulation), number of follicles was the number of follicles observed by ultrasound scan at this time, and number of oocytes was the number of oocytes retrieved. Also recorded was the outcome of IVF, that is, whether treatment was cancelled after oocytes were retrieved but before the pregnancy test (i.e., failed fertilisation) or whether the result of the pregnancy test was positive or negative. Biological variables were converted to standard scores ( $z$  scores; Cohen & Cohen, 1983)

and summed as a measure of ovarian response. Higher scores indicated better ovarian response. Regarding normative data for biological outcome variables, normative data for peak estradiol levels could not be established because different medication regimens across fertility clinics mean peak estradiol levels differ (and the information is not always included). However, Cramer et al., (1999) reported the mean number of follicles and number of oocytes for a treatment regimen similar to the one provided by this Assisted Reproduction Unit (ARU), for a sample of 254 women undergoing IVF as 9.56 ( $SD = 4.86$ ) and 9.83 ( $SD = 5.14$ ), respectively.

In the present study, 13 women (13.40%) had a positive pregnancy test; 63 (64.95%) had a negative test; and for 21 women (21.64%), treatment was cancelled after oocytes were retrieved but before the pregnancy test. The Human Fertilisation and Embryology Authority (HFEA) provide national and clinic specific data for patients who are considering fertility treatment, to help them decide which ARU to attend. The clinic specific data shows that clinics vary nationally with regards to the number and type of treatments offered and success rates. The information provided by the HFEA does not include pregnancy rates, so pregnancy rates for the sample in the present study cannot be compared with a national average. However, HFEA data for the period 1<sup>st</sup> April 1995 to 31<sup>st</sup> March 1996 (the appropriate comparison period for data collected in the present study), show national cancellation rates<sup>10</sup> for treatment cycles started as 17.82%, lower than the cancellation rate for the ARU from which the present sample was drawn. The national live birth rate<sup>11</sup> for this ARU at this time was 13.00% compared to a national average of 15.50% (HFEA, 1996).

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<sup>10</sup> Treatment cycles abandoned due to lack of eggs, failed fertilisation, or Ovarian Hyperstimulation Syndrome, for example.

<sup>11</sup> The number of live births per every 100 treatment cycles commenced.

### *Procedure*

This study received ethical approval from the Bro Taf Local Health Authority, Cardiff, Wales, which received applications for medical clinics governed by the National Health Service in the area in which participants were recruited at the time of the study. Approximately 3 months before commencing IVF ( $M = 2.84$  months,  $SD = 1.58$ ), women attended an initial appointment with the medical consultant, at which time medical procedures for IVF were outlined and blood tests were carried out to assess suitability for treatment. At this time, women were provided with a complete description of the study and its requirements. Those interested in participating signed a consent form and were interviewed to obtain demographic and medical information. Women were given a questionnaire pack to complete privately at home in the following week and return in the prepaid envelope provided. Women underwent the routine IVF treatment protocol for the clinic, and information about ovarian response (i.e., estradiol level, number of follicles and oocytes) was collected from medical records once treatment was finished.

### *Data Analysis*

Prior to conducting the planned analyses, data were examined to determine suitability for multivariate analyses. Missing values were identified on psychological predictors (trait anxiety;  $n = 2$ ; dispositional optimism,  $n = 1$ ; coping,  $n = 2$ ) and biological outcome variables (peak estradiol,  $n = 1$ ; number of oocytes,  $n = 1$ ). As there were moderate to high intercorrelations among the psychological predictors and among the biological response variables (see Table 1, page 63), regression analyses were used to predict missing values.

**Table 1.***Zero-order Correlations among Psychological Variables and Ovarian Response Variables.*

<u>Variables</u>	<u>1</u>	<u>2</u>	<u>3</u>	<u>4</u>	<u>5</u>	<u>6</u>	<u>Mean</u>	<u>SD</u>	<u>Range</u>
1. Dispositional Optimism	--						18.03	4.96	7 - 28
2. Trait Anxiety	-.51***	--					39.95	10.02	21 - 66
3. Escapism	-.38***	.66***	--				12.18	6.44	1 - 27
4. Peak estradiol level <sup>a</sup>	.10	-.11	-.12	--			5.50	3.44	.27-16
5. Number of follicles <sup>a</sup>	.20*	-.14 <sup>t</sup>	-.11	.63***	--		11.06	5.53	2-30
6. Number of oocytes <sup>a</sup>	.30**	-.31**	-.31**	.68***	.81***	--	8.10	4.65	1-19
7. Ovarian response <sup>b</sup>	.22*	-.21*	-.20*	.86***	.91***	.93***	.00	2.69	-

*Note.* <sup>a</sup>Standardised variables; <sup>b</sup>Ovarian response = (peak estradiol + number of follicles + number of oocytes retrieved).

*Note.* Means and standard deviations for peak estradiol and number of follicles are before variables were transformed.

<sup>t</sup>  $p < .10$ . \*  $p < .05$ . \*\*  $p < .01$ . \*\*\*  $p < .001$ .

Missing values on psychological (biological) variables were predicted from the other psychological (biological) variables. Three outliers were found ( $\geq 3$  standard deviations from the mean of the outcome group, to which the case belonged). Outliers (peak estradiol,  $n = 2$ ; oocytes,  $n = 1$ ) were set equal to the next highest value in the distribution for that outcome group. To reduce extreme skewness (i.e., skewness coefficients  $> 2.58$ , equating to an alpha level of .001, following Tabachnick & Fidell, 2001), peak estradiol and number of follicles were square-root transformed, improving normality (skewness, 0.53 and 1.84, respectively).

Zero-order correlations were computed to assess pairwise relationships among variables, and mediation was tested by using the method of Baron and Kenny (1986). According to this method, mediation is only possible if at the zero-order level the predictor (i.e., optimism) is significantly related to the mediator (e.g., trait anxiety or coping) and dependent (i.e., ovarian response) variables. Importantly, the initial relationship between the predictor and the dependent variable must be significantly reduced when the mediator and predictor are included in the analyses, whereas the relationship between the mediator and dependent variable remains significant (Holmbeck, 1997, 2002) (see Figure 3, page 67, and Figure 4, page 68). SEM with maximum likelihood estimation procedures (LISREL 7.20; Jöreskog & Sörbom, 1989) was used to test the hypothesis that dispositional optimism, trait anxiety, and coping, on the one hand, and estradiol level, number of follicles, and number of oocytes, on the other, represented two latent dimensions of psychological and biological constructs, respectively, that were significantly related (see Figure 5, page 70).

### 3.3 Results

In the present study, 34 women had previous experience of IVF and treatment had been unsuccessful for all but 4. To establish whether women with experience of previous unsuccessful IVF attempts were less optimistic *because* of this experience, these women were compared with those without prior experience to establish whether these groups differed in their scores on psychological predictors or biological outcome variables. Using *t*-tests, it was found that there were no significant differences on predictors or outcome variables, whether or not treatment had been successful. Moreover, regression analyses (excluding those with previous IVF success) showed that previous experience did not interact with psychological predictors to predict response on any of the ovarian response variables. Therefore, all women were included in subsequent analyses.

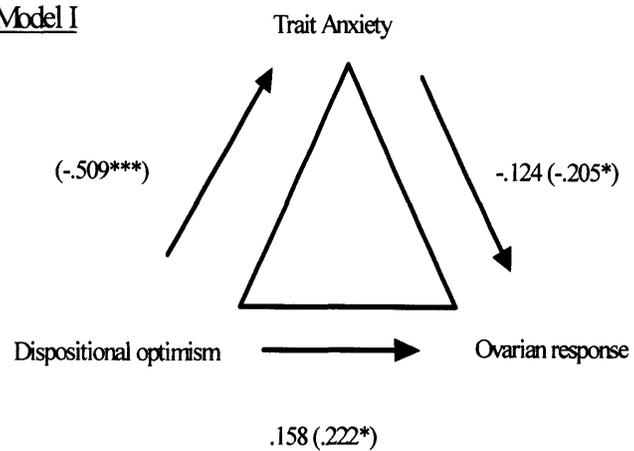
Zero-order correlations between psychological variables and ovarian response showed that neither problem appraisal nor problem-management coping satisfied the basic requirements for mediational analyses (Baron & Kenny, 1986). Problem appraisal coping was significantly related to the LOT,  $r(95) = .17, p = .05$ , but not to ovarian response,  $r(95) = .15, p = .08$ , and problem-management coping was not significantly related to either the LOT,  $r(95) = -.11, p = .14$ , or ovarian response,  $r(95) = -.039, p = .35$ . Consequently, these coping variables were not examined further. Table 1 (page 63) shows zero-order correlations among remaining variables. Correlations between psychological and biological variables were in the expected directions. Trait anxiety and escapism were related to poorer ovarian response and dispositional optimism to better response, although correlations with functional aspects of ovarian response (i.e., estradiol level, number of follicles) were not all significant. Correlations among standardised biological variables were also as expected. Correlations among psychological variables were consistent with past research, showing

that dispositional optimism was inversely related to trait anxiety (e.g., Smith et al., 1989; Scheier et al., 1994) and escapism (e.g., Litt et al., 1992) whereas the latter two variables were positively associated with each other.

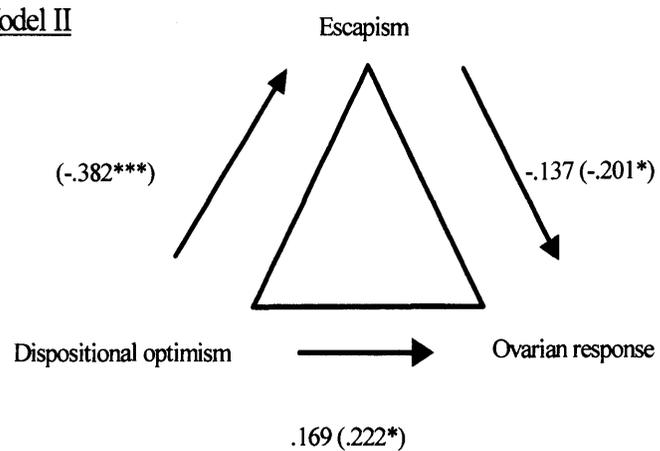
Figure 3 (page 67) and Figure 4 (page 68) show the results for the three path models used to test for the unique effects of dispositional optimism on ovarian response. Model 1 controlled for trait anxiety, Model 2 tested escapism as a mediator, and Model 3 controlled for both trait anxiety and escapism. Model 1 was marginally significant,  $F(2, 94) = 3.03$ ,  $MSE = 6.94$ ,  $p < .10$ , and the relationship between dispositional optimism and ovarian response became reduced and nonsignificant when trait anxiety was controlled. However, the relationship between trait anxiety and ovarian response was also nonsignificant.

Model 2 (page 67) was significant,  $F(2, 94) = 3.27$ ,  $MSE = 6.91$ ,  $p < .05$ , but the relationship between dispositional optimism and ovarian response was not significant after controlling for escapism. The link between escapism and ovarian response also became nonsignificant. As the relationships between trait anxiety or escapism and ovarian response were not significant when optimism was controlled, the conditions for demonstrating mediation (Holmbeck, 2002) were not met. Finally, when both trait anxiety and escapism were controlled in Model 3 (page 68), the relationship between each predictor and ovarian response became nonsignificant and the equation was marginally significant,  $F(3, 93) = 2.22$ ,  $MSE = 6.97$ ,  $p < .10$ . Together these models show that there was sufficient covariation among the psychological variables to inhibit the unique prediction of any one variable.

Model I



Model II



*Figure 3.* Standardised beta weights and zero-order coefficients (in parentheses) for Models 1 and 2. Model 1 shows trait anxiety as a mediator, and Model 2 shows escapism as a mediator.  $*p < .05$ .  $***p < .001$ .

Model III

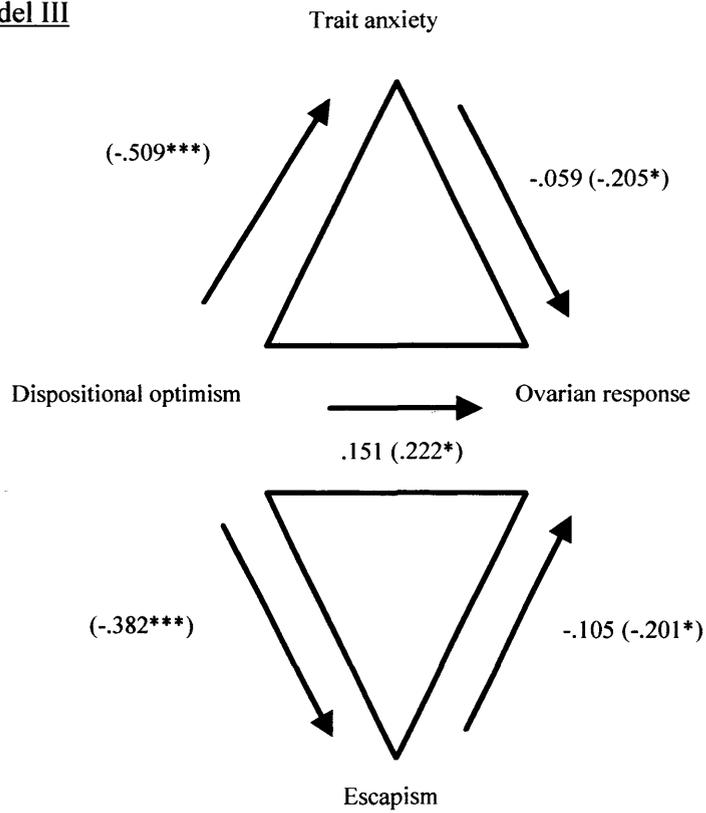


Figure 4. Standardised beta weights and zero-order coefficients (in parentheses) for Model 3, which shows trait anxiety and escapism as mediators.  $*p < .05$ .  $***p < .001$ .

To examine shared variance among psychological variables and their ability to predict physical health, a full-measurement structural equation model was carried out. In this model, the three indicators for the underlying latent psychological dimension were dispositional optimism, trait anxiety, and escapism. The three indicators for the ovarian response dimension were peak estradiol level, number of follicles, and number of oocytes. To make the interpretation of path coefficients unambiguous, scoring on the LOT was reversed so that higher scores meant less optimism. Figure 5 (page 70) shows the results for the test of the overall model of the latent psychological construct predicting the biological dimension. Standardised coefficients showed that all indicators were significant predictors of their proposed latent constructs. Lambda values for the psychological construct ranged from .57 to .89, whereas lambda values for biological variables ranged from .70 to .98. Of the psychological indicators, trait anxiety had the highest loading with the latent psychological construct; of the biological variables, the number of oocytes showed the highest loading with the latent biological construct. The psychological dimension significantly predicted the biological dimension ( $\beta = -.36, p < .05$ ).

The chi-square statistic for Figure 5 (page 70) was marginally significant,  $\chi^2(8, N = 97) = 13.88, p < .10$ . A *nonsignificant* chi-square statistic is generally accepted as indicating good model fit because it implies no significant difference between the implied and observed correlation/covariance matrices. However, chi-square is not an appropriate fit statistic for samples  $< 200$  (Kelloway, 1998) and thus the Root-Mean-Square Error of Approximation (RMSEA; a fit index independent of sample size) was examined. The RMSEA in the present study was .089, and a RMSEA  $< .10$  indicates good model fit (Kelloway, 1998).

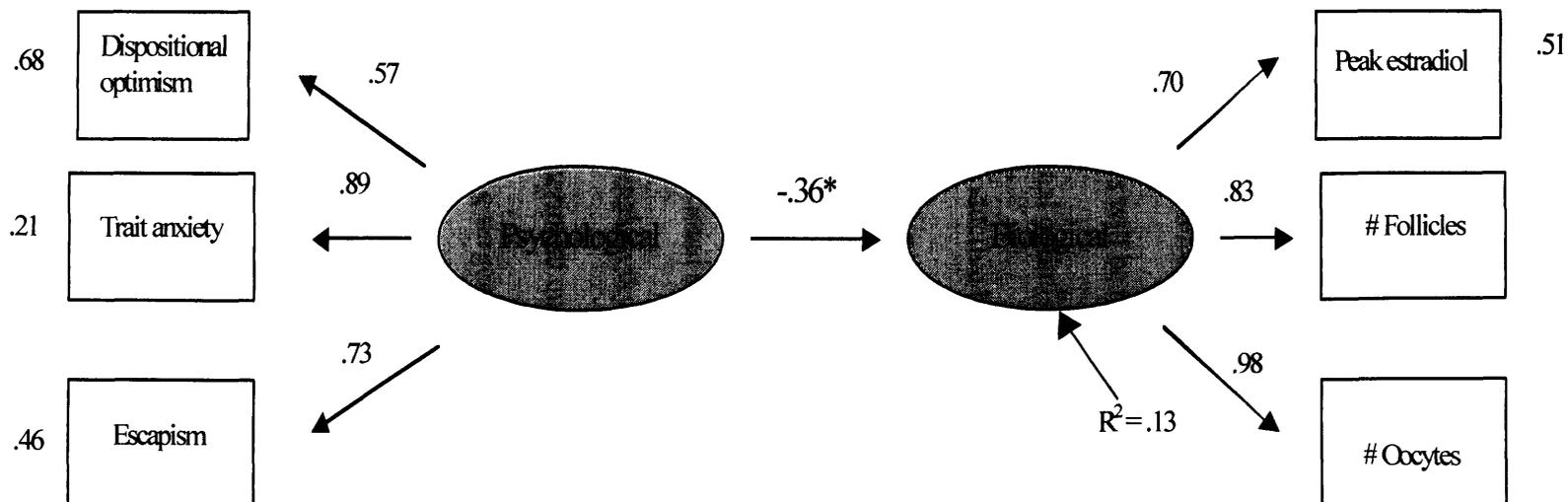


Figure 5. A structural equation model testing the role of a latent psychological complex in predicting biological response to fertility treatment. Scoring on the Life Orientation Test is reversed so that higher scores mean less optimism.  $\chi^2(8, N = 97) = 13.88$ , root-mean-square error of approximation = .089, goodness-of-fit index = .95, adjusted goodness-of-fit index = .88,  $*p < .05$ .

Other fit statistics were also within the range considered acceptable: goodness-of-fit (GFI) = .95; adjusted goodness-of-fit (AGFI) = .88. Thirteen percent of the variance in ovarian response to IVF was associated with psychological characteristics.

### **3.4 Discussion**

It is commonly believed that patients with a positive outlook on life fare better during difficult health ordeals, which reflects an assumption that positive expectancies about outcomes will be reflected in positive health outcomes. The present study showed that dispositional optimism (Scheier & Carver, 1985) was significantly related to several aspects of reproductive health, which together indicated a more favourable biological response to the pharmacologic interventions received in the stimulation stage of IVF treatment. Significant links between optimism and indicators of physical health in the IVF context were expected and are in line with numerous other findings showing an association between dispositional optimism and aspects of physical health, such as fewer HIV symptoms (Tomakowsky et al., 2001), improved immune function (Seegerstrom et al., 1998), better perinatal outcomes (Lobel et al., 2000), and lower likelihood of myocardial infarction during surgery (Scheier et al., 1989). The present study improves on the design of some earlier studies investigating the relationship between dispositional optimism and physical health by using a prospective design in which dispositional optimism was assessed a number of months before treatment, and by including objective biological markers of response to treatment to assess optimism effects in the fertility context.

It is not yet clear how positive expectancies promote positive health. One hypothesis is that they motivate people to engage in behaviours that promote good health, for example, by using coping strategies that aid recovery (e.g., planful problem solving:

Lazarus & Folkman, 1988) rather than strategies that cause or exacerbate physical health problems (e.g., alcohol use, ignoring physical symptoms; Scheier & Carver, 1987). Indeed, according to the principles of control theory (e.g., Carver & Scheier, 1982), it is to be expected that an individual who generally expects to be able to achieve his or her goals is more likely to continue with active, goal-directed efforts. However, an alternative explanation of optimism effects is that rather than optimism being a force driving efforts to maintain or improve health, both optimism *and* coping are facets of a broad, pervasive and complex personality constellation, which itself relates to physical health (e.g., Smith et al., 1989). According to this proposal, people who are prone to react to situations with tension, anxiety, or worry are also likely to be less optimistic and more likely to use coping strategies such as wishful thinking or avoidance to deal with these unpleasant reactions. The results of this study support the second explanation for health effects of dispositional optimism, i.e., that dispositional optimism shares variance with a broader psychological dimension, and that it is this broader dimension that influences physical health.

This conclusion is based on one key finding supported by two types of statistical analyses. First, neither optimism or escapism, nor trait anxiety uniquely predicted reproductive health when other variables in this trio were included in mediational analyses. Second, each variable was a significant indicator of an underlying latent psychological dimension, which was more correlated to reproductive health than was any variable on its own. Together, these findings provide strong evidence for shared variance among optimism, escapism, and trait anxiety and for an underlying psychological dimension linking all three. Because negative affectivity (Watson & Clark, 1984), or neuroticism (Eysenck & Eysenck, 1975), are construed as stable personality characteristics comprising of a constellation of negative traits, mood states and associated behaviours (Watson &

Clark, 1984) it seems likely that the underlying dimension is akin to neuroticism, particularly because trait anxiety, which loaded highest on the dimension, is thought to be a core aspect of this personality constellation.

There is some debate as to the effects of neuroticism on physical health. Some consider this trait complex a “nuisance” variable that contaminates reports of physical symptoms but does not generally lead to poorer physical health (Watson & Pennebaker, 1989, p. 234). Others suggest that facets of this dimension are indicative of a disease-prone personality, which has significant implications for people’s physical well-being (Friedman & Booth-Kewley, 1987). The findings of the present study support the latter proposals and extend the scope of influence to reproductive functioning. The present findings may be more in line with those of Friedman and Booth-Kewley because this sample (i.e., patients) and outcome variable (i.e., biological indicator) were more similar to those included in their meta-analysis than those included in the Watson and Pennebaker (1989) review, which included mainly a healthy population and distal disease indicators (e.g., blood pressure).

The pathways by which personality variables could impact reproductive health outcomes include indirect effects via lifestyle (e.g., smoking) or reproductive behavior (e.g., intercourse frequency). Additionally, personality could exert direct biological effects. As the biological end-points examined in this study were assessed prior to implantation, personality effects would need to be exerted on processes that occur prior to this stage of reproduction, namely follicular maturation and ovulation. It seems reasonable to propose that personality would influence reproductive health via the pathways that mediate the effects of stress, namely via activation of the hypothalamic–pituitary–adrenal (HPA) axis that regulates the stress response. It is generally agreed that the final neuroendocrine event causing stress-induced disruptions to reproductive function in untreated women is

inhibition of the GnRH pulse generator and the slowing of the LH pulse frequency (Ferin, 1999). Inhibition of GnRH is ultimately caused by an increase in corticotrophin-releasing hormone, which reflects the increased activity of the HPA axis during stress (Sapolsky, Romero, & Munck, 2000). However, stress effects in IVF are unlikely to occur through this functional pathway because pharmacological interventions used during treatment already inhibit GnRH receptors, and chronic FSH administration overrides the negative feedback mechanism to the pituitary, thus allowing multiple follicles to mature and estradiol to reach supraphysiologic levels even though GnRH is inhibited.

However, two alternative routes may mediate stress effects on reproduction. Research suggests that in the presence of high estrogen levels, as would be the case in IVF, HPA activation may cause a premature release of LH (Xiao, Xia-Zhang, Barth, Zhu, & Ferin, 1998), which may damage or degenerate the oocyte contained within the follicle (Ferin, 1999) and account for fewer oocytes being observed in more trait-anxious women. Such events have been reported in IVF treatment cycles (Pepperell, 1994). The results of the present study would be in line with this explanation, as they show that psychological variables correlated more strongly with number of oocytes than with indices of ovarian function (i.e., estradiol). Second, the corticotrophin-releasing hormone would cause an increase in cortisol, and cortisol inhibits estradiol production (Chrousos, Torpy, & Gold, 1998). One would therefore expect stress to be associated with lower estradiol levels even if levels of this hormone remained in the supraphysiologic range because of chronic FSH administration. This proposal is consistent with the negative correlation between negative personality traits and estradiol level in the present study. However, the pharmacological interventions in IVF may make it too complex to study more basic interactions between HPA and HPG axes using this clinical model. Future research aimed at identifying these

processes may be more productive if targeted at the normal menstrual cycle or at treatments that do not require as much pharmacological intervention (e.g., artificial insemination).

A key purpose of the present study was to determine whether dispositional optimism had a direct effect on biological response to fertility treatment. The results suggest that this was not the case. Instead, the results of this study and others (e.g., Smith et al., 1989) suggest that neuroticism is the key trait influence on physical health. It seems pertinent therefore to consider whether the construct of dispositional optimism is redundant in health research. In line with the stance of Scheier et al. (1994), however, it seems a valid enterprise to continue to decompose neuroticism into its constituent facets, because too little is yet known about the nature of relationships among different manifestations of this trait complex and how these relationships impact physical health. For example, it is possible that cognitive (e.g., appraisals, expectancies), affective (e.g., depression, emotions), behavioural (e.g., poor health habits, coping), and physiological (e.g., anxiety) manifestations of neuroticism are synergistic, moderate each other's influence, and differentially impact other variables in affecting physical health. If neuroticism effects on physical health were simply considered as those of a single psychological 'entity' then any unique effects of individual elements of neuroticism and the intricacies of the relationships between elements may be lost.

If, on the other hand, neuroticism is conceptualised as an interactive system of individual elements, this has implications for interventions to remedy the effects of a 'disease-prone personality', and may go some way to answering concerns that if disposition is responsible for poorer health, then people higher on neuroticism are doomed to poorer health. Intervening to ameliorate the effects of any manifestations of neuroticism, whether it is to modify expectations and appraisals, encourage more adaptive health behaviours, or

lessen depression, should, in principle, feed back into the neuroticism system. In this way, intervention on one facet of neuroticism may serve to lessen the effect of the whole complex on health. Indeed, a recent study showed higher pregnancy rates in chronically infertile women who received cognitive behavior therapy aimed at altering distorted cognitions, in combination with relaxation training (Domar et al., 2000). However, although these results seem promising, a recent review of psychological interventions in infertility found that although some had beneficial effects on psychological outcomes, there was scant evidence that they increased pregnancy rates (Boivin, 2003).

### *Limitations*

As well as the results of the present study suggesting that dispositional optimism was not the key trait influence on biological response to fertility treatment, another unexpected finding was that the coping constructs assessed in the present study had little utility as predictors of ovarian response or as potential mediators of the relationship between dispositional optimism and ovarian response. As discussed above, theory and prior research suggests that dispositional optimism may predispose individuals to particular stable coping tendencies or styles. Specifically, that optimistic individuals will generally employ more problem-focused strategies and less emotion-focused strategies to cope with stressful situations, and moreover, that the strategies they employ will be adaptive and have beneficial consequences for these optimistic individuals (e.g., Carver & Scheier, 1994; Carver et al., 1989; Lobel et al., 2000; Scheier & Carver, 1987; Scheier et al., 1986, 1989). There was little support for such proposals in the present research as, of the four coping constructs measured (problem-management, problem appraisal, emotional expression, escapism), only one (escapism) was related to both dispositional optimism and to ovarian

response. Of the other three factors: alpha reliabilities for the emotional expression scale were too low to use data obtained using this scale, problem-management was not related to dispositional optimism *or* to ovarian response, and problem appraisal was related to dispositional optimism but *not* to ovarian response. Results relating to the influence of coping style on physical health outcomes in the present research are therefore in line with those discussed by Penley et al. (2002), who found that the majority of coping strategies represented in their review were not consistently related to objective physical health outcomes.

One reason for the unexpected findings relating to coping in the present study was that the measures of these constructs developed for the study were not sufficiently reliable measures of the constructs they were meant to assess. It is generally accepted that Cronbach's  $\alpha \geq .70$  indicates acceptable reliability (e.g., Field, 2005), and three of the four coping subscales created in the present study did not achieve this level of reliability. Poor reliability may therefore explain the lack of relationships between coping strategies and other variables. Alternatively, it may be the case that problem appraisal and problem-management coping do not relate to ovarian response or explain the link between optimism and ovarian response. Indeed, in previous research, only the expression of negative emotions and palliative coping were related to objective physical outcomes in fertility treatment (Demyttenaere et al., 1992, 1998). It is not possible to differentiate between these two explanations for the lack of coping effects on ovarian response in the present study. However, as the coping scales developed in the present research were created from (and limited by) the items in the Ways of Coping questionnaire employed in this archival study, it is recommended that future research investigating the influence of problem-management, problem appraisal, escapism and emotional expression coping on outcomes during fertility

treatment uses the measure of these constructs as it was intended by Terry and Hynes (1998).

Another issue to consider is that the number of possible psychological predictors that were assessed was restricted in order to minimise patient burden and to focus on three dispositional attributes that have been oft cited as predictors of physical health. However, Scheier et al. (1994) present evidence showing that there are moderate relationships between dispositional optimism and numerous other psychological constructs including self-esteem, locus of control and social desirability. In research investigating the relationships between potential indicators of a multi-faceted construct such as neuroticism and physical health, it would be difficult to know where to stop with respect to how many interrelated factors should be included for completeness. Moreover, a neuroticism measure such as the EPQ neuroticism scale (Eysenck & Eysenck, 1975) is unlikely to be of much assistance if one wishes to measure individual facets of the construct reliably, because each facet may be reflected in only one questionnaire item. Because other potential correlates of dispositional optimism and/or neuroticism were not included in the present research, it is stressed that other unmeasured facets of the neuroticism complex may offer at least a partial explanation of the results obtained in the present study (Robbins et al., 1991).

### **3.5 Conclusions**

Future research should focus on the interactive and moderated effects of different facets of the neuroticism complex on specific health outcomes. Such work would serve to untangle the effects of dispositional optimism, trait anxiety and associated behaviours on physical health. Further, as it seems that more neurotic infertile women have poorer biological response to expensive, invasive and stressful assisted reproduction techniques

such as IVF, it seems important that psychosocial interventions to lessen the impact of this trait complex are developed in order to maximise an otherwise compromised chance of success in treatment. With this latter consideration in mind, the aim of Part II of this Thesis was to develop a coping intervention to be used by women during the two weeks of waiting between an IVF embryo transfer and pregnancy test. The rationale behind developing a coping intervention was that escapism (a less adaptive way of dealing with low-control stressors; Terry & Hynes, 1998) was a significant indicator of the latent psychological construct predicting poorer biological response to treatment in the present study. It was expected that an intervention promoting a more adaptive way of coping with the stress of waiting, would primarily have benefits on women's psychological well-being during the waiting period. However, as previous research suggests an influence of psychobiological mechanisms on pregnancy rates, such influences may determine whether embryos implant in the uterus. Therefore pregnancy rates will also be examined to determine whether the coping intervention has a beneficial effect on IVF pregnancy rates.

# **Part II**

## **Positive reappraisal coping and psychological well-being**

“You then have the dreaded 2-week wait (2ww)[for the pregnancy test], although some hospitals may make you wait a little longer – torture!...you assume that your body will suddenly start kicking out all the pregnancy hormones and we should all be feeling something 'positive' to say 'YES' we're definitely pregnant!... I think we are all so desperate for some sign, that our imaginations run wild, we analyse every twinge, every bit of tiredness etc... A nail biting, knicker checking, every twinge and pain analysing time that is the culmination of the rollercoaster!” ([www.fertilityfriends.co.uk](http://www.fertilityfriends.co.uk), 2006).

## Chapter 4

### Development of a Positive Reappraisal Coping Intervention (PRCI).

#### 4.1 Introduction

The aim of Part II of this Thesis was to develop a Positive Reappraisal Coping Intervention (PRCI) card to be used by women waiting to find out whether they are pregnant after an IVF embryo transfer procedure. After the PRCI was developed and had undergone some preliminary validation by other samples of people waiting for important events, the PRCI was used by women in the 14 day period between embryo transfer and the pregnancy test (the IVF waiting period). The effects of the PRCI compared to (1) a control positive mood induction intervention and (2) simply monitoring reactions on a daily basis were evaluated to establish whether an intervention designed to promote positive reappraisal coping had beneficial effects on the psychological well-being of women at this time. In addition, as evidence supports a link between psychological well-being and various fertility outcomes the secondary aim was to establish whether the PRCI was associated with increased pregnancy rates. With regards to the relationship between the research presented in Part II and the theoretical model of the coping process (Folkman, 1997; Lazarus & Folkman, 1984) discussed in Chapter 2 (pages 4 – 23), Part II thus focuses on the influence of a form of *meaning-based coping* (positive reappraisal coping) on *emotion outcomes* (e.g., distress) and *event outcome* (i.e., pregnancy) during IVF treatment (see Figure 1, page 6).

### *The IVF waiting period as a stressful event*

Women undergoing IVF report that the days between embryo transfer (when fertilised embryos are transferred to the uterus) and pregnancy test are a particularly stressful stage of IVF treatment. Indeed, this stage is recalled as the most stressful stage and as stressful as discovering that treatment did not work (Boivin & Takefman, 1995).

Consideration of “formal properties of the situation” (Lazarus & Folkman, 1984, p. 83) suggests that some of the situation factors Lazarus and Folkman (1984) propose to be likely to contribute to the perception of an experience as stressful are present in the IVF waiting period.

### *Uncontrollability and uncertainty*

Once the embryo transfer has taken place, there is little, if anything, a woman can do to change or control the outcome of IVF treatment, because numerous factors beyond her control can explain why an embryo does or does not implant after embryo transfer (e.g., endometrial environment, in-vitro culture of oocyte and embryo, embryo quality; Macklon, Geraedts, & Fauser, 2002). Further, women are likely to be uncertain about whether or not they will be pregnant as a result of treatment. Laboratory studies suggest that event uncertainty (i.e., whether or not an event will occur; Lazarus & Folkman, 1984) is stressful. In one study, one group of participants was shown neutral photographs and the other was shown distressing photographs. Presentation of the photographs in each case was preceded by an anticipation period (Greco & Roger, 2003). Half of the participants were told about the nature of the photographs and how to predict when a neutral or distressing image would be presented. The other half were not. Those who did not know when distressing images would occur were more physiologically aroused (in terms of higher diastolic blood pressure

measured during the anticipation period) than those who did. According to Greco and Rogers (2003), these results suggest that individuals prefer to know *what* is going to happen, even [or especially] when that event may be unpleasant. Knowing that an unpleasant event will occur allows one to engage in anticipatory coping (Lazarus & Folkman, 1984), or, in other words to evaluate and put into place coping strategies that will help one to deal with the unpleasant event.

Not knowing what will happen is a feature common to the IVF waiting period. A woman is unlikely to be certain about which of two *mutually exclusive* outcomes will occur (i.e., whether she will be pregnant or not; Seibel & Levin, 1987). In reality, the objective probability of achieving pregnancy during IVF is low, averaging around 20-25% (Macklon et al., 2002), which means that around 3/4s of women undergoing IVF will not become pregnant and that women *should* therefore be more certain they will not become pregnant than that they will. However, women may disregard or downplay factual information about IVF pregnancy rates and make their own judgments about the probability of becoming pregnant. These may be based on heuristics such as having embryo transfer on a 'special' day or feeling lucky, or on feedback from medical staff about progress through IVF thus far (Boivin, 2000), and may be more optimistic (or pessimistic) than objective probabilities suggest they should (Lazarus & Folkman, 1984; Leiblum, Kemman & Lane, 1987).

Uncertainty about being pregnant may lead to rumination about a positive *and* a negative IVF outcome and to worry about which is more likely to occur and which should be prepared for. Such persistent thinking can be stressful and distressing. Research shows that infertile women report levels of intrusive ideation (e.g., having persistent and strong thoughts about the experience and implications, even when they do not mean to) that were not significantly different from patients attending a stress clinic. Furthermore, levels of

intrusive ideation were related to infertility-specific distress in infertile women, after controlling for depression and anxiety (Miller et al., 1998). The process of secondary appraisal of potential coping options during the waiting period is further complicated because strategies appropriate to deal with a positive pregnancy test result (e.g., celebration, planning purchases for the baby) may not be appropriate to deal with a negative result (e.g., grieving, deciding whether to try IVF again). This complex process of appraisal may be demanding, confusing and anxiety provoking and interfere with the cognitive processing needed to evaluate and employ effective coping options (Lazarus & Folkman, 1984).

### *Imminence*

Regarding the length of time between ‘now’ and the pregnancy test (Lazarus & Folkman, 1984), a woman undergoing IVF will know how imminent the pregnancy test is. At embryo transfer she is told when the test will take place, and each day that passes brings her closer to this day. She may also experience cues that signal *what* the pregnancy test result will be as the day of the test draws near (e.g., abdominal cramps, spotting). Such imminence effects on psychological well-being during IVF treatment were reported in research by Boivin and Walker (1997), who tracked the daily psychological well-being of women throughout the IVF treatment cycle. Figure 6 (page 84) shows women’s ratings of anxiety, positive affect, and depression in the last seven days of ovarian stimulation (S1 – S7), which are just prior to oocyte retrieval and embryo transfer, the last seven days of the waiting period (W1 – W7), the pregnancy test (P1), and two days after the pregnancy test (P1 – P3). Figure 6 shows that compared to the stimulation days, positive affect decreased and anxiety and depression increased in the week prior to the pregnancy test. With the

exception of the pregnancy test day (when ratings include the reactions of women who had a negative pregnancy test result), the greatest deterioration in psychological well-being occurred in the last three days before the pregnancy test (Boivin & Walker, 1997).

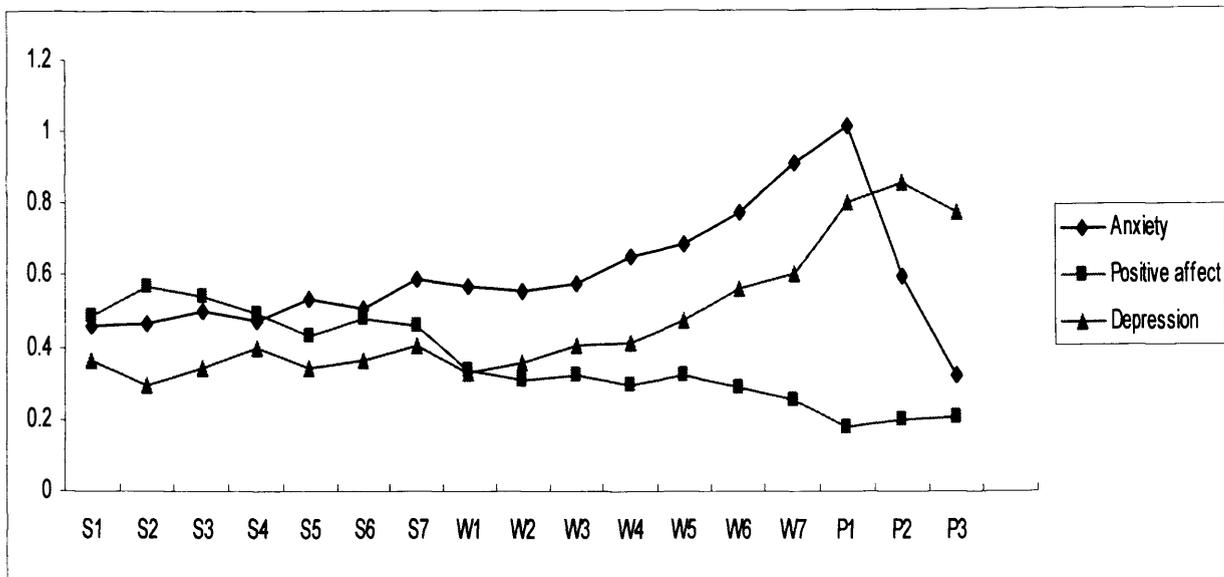


Figure 6. Changes in anxiety, positive affect and depression across stages of an IVF treatment cycle (Reproduced with permission from Boivin & Walker, 1997).

### *Social support and information*

During the IVF waiting period, women do not routinely attend clinic for tests or procedures until the day of the pregnancy test. Consequently, during this particularly stressful waiting stage, they do not have the same opportunities for social support and information about physical and psychological concomitants of IVF treatment that they may have received from medical staff at clinic or other patients during earlier stages of treatment. Women waiting for breast biopsies reported that they valued such support from staff and from other individuals with experience of the same medical procedures as themselves (Lebel et al., 2003).

In summary, the IVF waiting period combines several of the features proposed by Lazarus and Folkman (1984) to be common to stressful situations, and thus it is unsurprising that women recall this stage of IVF as particularly demanding (Boivin & Takefman, 1995). Moreover, research suggests that other patients waiting for the results of medical tests or procedures (e.g., breast cancer diagnosis, cardiac catheterisation) find the waiting period before these medical events stressful, experiencing anxiety at clinical levels (Lowe et al., 2003), and becoming more anxious as the day of diagnosis or treatment approaches (Harkness, Morrow, Smith, Kiczula, & Arthur, 2003; Lebel et al., 2003; Poole et al., 1999).

### *Coping with waiting*

As the outcome of the medical tests or procedures for which patients are waiting cannot be changed or controlled, it might be expected that the types of coping strategies that patients reported when waiting would be emotion-focused strategies, and that these strategies would be negatively associated with distress (i.e., “goodness-of-fit” hypothesis, Folkman & Lazarus, 1984; Folkman et al., 1986; Park et al., 2004; Vitaliano et al., 1990). Further, in line with the proposals of Terry and Hynes (1998, p. 1080), it might be expected that the use of avoidant-type, emotion-focused strategies which involve efforts to “avoid the reality of the situation”, would be associated with poorer psychological well-being than emotion-focused strategies directed at expressing emotions. In terms of problem-focused coping efforts, it might be expected that active problem-management efforts would be associated with poorer psychological well-being, whereas the use of cognitive efforts to manage the way the situation is appraised (e.g., problem-appraisal, positive reappraisal coping) would be associated with better psychological outcomes (Terry & Hynes, 1998).

Qualitative and quantitative studies of patients waiting for medical tests and procedures such as breast assessment and diagnosis, genetic risk assessment, liver transplant, and assisted reproduction treatment (Brown, Sorrell, McClaren & Cresswell, 2006; Lebel et al., 2003; Lowe et al., 2003; Phelps, Bennett, Iredale, Anstey & Gray, 2006, Tarabusi, Volpe & Facchinetti, 2004), suggest that patients *do* endorse emotion-focused coping strategies, including denial, venting, distraction, avoidance, depressive coping and resignation/acceptance during medical waiting periods. However, where information about the relationship between such strategies and psychological well-being was provided, this showed that the use of these emotion-focused strategies was associated with negative psychological well-being (i.e., depression, anxiety), contrary to proposals that emotion-focused coping alleviates distress.

Lebel et al. (2003) found that reports of self-distraction, venting, denial and religious coping were significantly associated with concurrent reports of greater depression and anxiety in women waiting for a biopsy and diagnosis of possible breast cancer, but that active coping was not significantly related to anxiety or depression (although this latter strategy was related to more intrusive thoughts two days before breast biopsy and diagnosis). Lowe et al. (2003) found that avoidance and acceptance/resignation coping were associated with concurrent reports of greater anxiety in a sample of women waiting for assessment and diagnosis of possible breast disease. Confrontation (only) was related to less depression in the latter study. However, it should be stressed here that if relationships are found between coping strategies and distress when these constructs are measured together during stressful situations, it is not possible to assert that the type of coping employed has *caused* distress. The purpose of emotion-focused coping is to regulate negative psychological reactions, and thus higher distress may be the cause, not the

consequence, of emotion-focused coping. Only prospective studies allow conclusions about causal relationships between coping and distress. Evidence regarding the prospective effects of active coping strategies on distress in men waiting for fertility treatment was presented by Tarabusi et al. (2004). Tarabusi and colleagues found that men who reported more active coping at the start of the 12 month waiting period for fertility treatment showed a significant increase in anxiety four months later, and that the lowest levels of active coping were related to the greatest reduction in psychological distress (anxiety, depression, somatisation and feelings of inadequacy) at this follow-up assessment.

Together, these results provide some support for the proposals of Terry and Hynes (1998) that avoidant-type emotion-focused strategies and active problem-focused strategies will be related to poorer adjustment during low control stressors. Moreover, these results extend the scope of these proposals to coping with the period *before* the outcome of tests and procedures are known. Regarding Terry and Hynes's proposals about the benefits of other strategies in low-control situations, the studies by Lebel et al. (2003) Lowe et al. (2003) and Tarabusi et al. (2004), did not assess strategies which involve efforts to redefine the situation, such as problem-appraisal or positive reappraisal coping. Hence it is not possible to ascertain the extent to which such strategies would have had positive effects on psychological well-being during these waiting periods. In a recent qualitative study, however, women waiting for information about their genetic risk of developing particular conditions (e.g., breast or ovarian cancer) said that although they took part in activities (e.g., gardening, yoga) to distract themselves from worries about genetic risk assessment, they also used positive appraisal as a strategy and considered it "an important coping strategy" (Phelps et al., 2006, p. 171). Regarding the emotional-approach type strategies proposed by Terry and Hynes (1998) to be more adaptive in low control stressor, Lebel et

al. (2003), assessed venting, Lowe et al. (2003) assessed confrontation, and Tarabusi et al. (2004) assessed social support seeking and expressing emotions. Terry and Hynes's proposal was supported in the case of confrontation (Lowe et al., 2003) but not in the case of venting (Lebel et al. 2003), and neither social support seeking nor emotional expression were associated with changes in the psychological well-being of infertile patients after four months (Tarabusi et al., 2004).

Another reason for positive associations between avoidant emotion-focused strategies and distress is that efforts not to think about a stressor could have the paradoxical effect of increasing the very thoughts one's efforts were intended to suppress (Wegner, Schneider, Carter, & White, 1987), because one must be vigilant for the unwanted thought in order to suppress it. If that is the case, then an increased focus on any negative aspects of the experience, aggravated by ineffective efforts to suppress such a focus, may explain associations between avoidant-type coping strategies and negative psychological outcomes. In contrast, efforts to redefine the situation (e.g., problem-appraisal coping, positive reappraisal coping) *do* involve thinking about a situation, but involve cognitive efforts to "control the meaning of the problem" (Park & Folkman, 1997, p. 124) in order to derive some benefit. Efforts to redefine, rather than to avoid thinking about, a stressor may be a more helpful strategy for the IVF waiting period than active coping strategies. Positive reappraisal coping may be effective because it involves efforts to *redefine the situation as it stands* in a more positive way, focusing on positive aspects of the experience, or reinterpreting neutral information as positive (i.e., "selectively perceiving or interpreting a stressor's implications as positive", Goodhart, 1985, p. 217).

### *Positive reappraisal coping*

Sustaining the coping process may be understood as attempts to “re-engage in efforts to cope with the ongoing stressor” (Folkman, 1997, p. 1216), and according to Folkman’s theoretical model (see Figure 1, page 6), this re-engagement starts with cognitive (re)appraisal. One coping strategy that seems particularly likely to make (re)appraisal more positive is positive reappraisal coping. Cognitive (re)appraisals are defined by Lazarus and Folkman (1984, p. 151) as the “cognitive maneuvers” that change the meaning of a situation. To extend this definition, cognitive efforts to reframe the situation in a more positive light, or *efforts* to “control the meaning of the problem” (Park & Folkman, 1997, p. 124) may be understood as *cognitive manoeuvres that change the meaning of the situation in a positive way*. There is a subtle difference between a positive (re)appraisals of a situation and positive reappraisal *coping*. The former implies only that one reappraises the situation more positively, which may be because the situation has actually changed for the better, for example. The latter, because it is a coping strategy, by definition involves effort (Lazarus & Folkman, 1984). Because positive reappraisal coping involves the effortful derivation of benefit from a difficult situation, this may mean that individuals focus more on any positive aspects of the situation rather than ruminating about, or conversely trying not to think about, negative and distressing aspects. Such a positive focus seems likely to enhance and sustain positive psychological well-being (Folkman, 1997; Folkman & Moskowitz, 2000), and prior research certainly suggests that positive reappraisal coping does have beneficial effects in various difficult circumstances (e.g., breast cancer, failed fertility treatment, caregiving and bereavement).

In longitudinal research, Folkman and colleagues (e.g., Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996) assessed the positive and negative psychological

well-being of the caregiving partners of men with Acquired Immune Deficiency Syndrome (AIDS), before and after their partners had died. Folkman (1997) found that although participants' positive affect scores were lower than negative affect scores at assessments five and one month before bereavement, and again a few weeks post-bereavement, levels of positive affect did not differ from levels of negative affect in subsequent assessments, and that the former had returned to the levels of one year earlier. Further, the frequency with which participants reported positive psychological states did not differ from the frequency with which they reported negative states. In these studies, Folkman and colleagues found that the types of coping associated with positive psychological states during caregiving and bereavement were those that focused on efforts to derive some benefit from the experience (e.g., positive reappraisal coping). For example, positive reappraisal coping was significantly and positively related to positive mood in the caregiver at assessments three months and one month before the patient died and again three and five months after the partner died (after controlling for the caregiver's mood at the previous assessment; Moskowitz et al., 1996). In light of this evidence, Folkman and colleagues proposed that positive psychological states may have a vital role in motivating the individual to renew his or her coping efforts during such a demanding experience (Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996; see Figure 1, page 6).

In other research, Sears, Stanton and Danoff-Burg (2003) studied the relationship between positive reappraisal coping and mood, perceptions of health and posttraumatic growth in women living with breast cancer. In this longitudinal study, baseline levels of positive reappraisal coping were positively related to positive mood and physical health at three and 12 months after the baseline assessment and to better posttraumatic growth 12 months post baseline. Interestingly, Sears et al. (2003) found that benefit finding (i.e.,

identification of the benefits in the situation) and the number of benefits identified were not significantly related to these physical and psychological outcomes, which they suggest is because benefit finding is a more habitual, effortless phenomenon than positive reappraisal coping. In other words, it may be that simply ‘barking positive’ at a situation, or listing the benefits of your experience may not be as helpful as the effortful process of actively trying to *derive* benefits from a difficult situation. Indeed, Sears et al. (2003, p. 494) assert that it is the “the effortful and regular use of benefit-related information as a coping strategy (i.e., positive reappraisal coping) “...that predicts future physical and psychological well-being” and not “...the simple identification of benefit (i.e., benefit finding).”

The results of these studies converge with those of Terry and Hynes (1998), who found that a greater use of problem-appraisal coping (e.g., trying to see the positive side of the situation), was related both concurrently and prospectively to women’s self-reported adjustment to failed fertility treatment. Together, this evidence suggests that efforts to redefine a difficult situation in a more positive way may indeed have positive effects on psychological well-being during various demanding life-events.

#### *Positive reappraisal as a psychosocial intervention*

Consideration of theory and research about the effects of different coping strategies on psychological well-being during medical waiting experiences suggested that positive reappraisal coping may be a particularly effective strategy for the uncertainty of the waiting period, because focus on positive aspects of the situation may preclude as much attention on future outcomes that cannot yet be ascertained. Such efforts in the IVF context may, for example, involve focusing on the fact that the most advanced fertility treatment available is being tried, or that a partner is especially loving and supportive. Further, positive

reappraisal may potentially help to alleviate the negative effects of neuroticism on physical and psychological outcomes during IVF treatment. The research in Part I of this Thesis suggested that aspects of neuroticism were prospectively related to poorer biological response to IVF treatment, and hence neuroticism could conceivably impact negatively on implantation processes *after* embryo transfer. Neuroticism was also associated with greater escapism in that study, and associations between such strategies and greater distress have been shown in previous research (e.g., Lebel et al., 2003; Lowe et al., 2003; Tarabusi et al., 2004; Terry & Hynes, 1998). Therefore, positive reappraisal coping may reduce the negative impact of neuroticism on physical and psychological outcomes after embryo transfer.

In light of the evidence presented, it was decided to develop an intervention for the IVF waiting period that would prompt, promote, reinforce or increase positive reappraisal coping efforts. It was predicted that this positive reappraisal coping intervention (PRCI) would have beneficial effects on women's psychological well-being during the stressful experience of waiting for an IVF pregnancy test.

#### *Psychosocial interventions for the IVF waiting period*

To this author's knowledge, no psychosocial intervention has been designed specifically for the IVF waiting period and no studies have evaluated the effects of existing interventions on women's well-being during the IVF waiting period. However, the literature regarding (1) existing psychosocial interventions for infertility and (2) psychosocial interventions for other waiting experiences was examined to inform the format and mode of delivery of the proposed PRCI.

*i. Psychosocial interventions for infertility*

Various psychosocial interventions are already available to help women deal with the strain of infertility. Indeed, under the provision of the Human Fertilisation and Embryology Act (1990), counselling must be available for all individuals undergoing assisted reproduction treatment, should they request it (Bartlam & McLeod, 2000), although one study showed that only 10-15% of infertile patients used the counselling provided by fertility clinics (Boivin, Scanlan & Walker, 1999). A systematic review of the literature regarding psychosocial interventions for infertility (Boivin, 2003), shows that these interventions comprise of counselling (e.g., psychotherapy, infertility counselling), and educational programmes which focus on individual or combined skills training (e.g., coping training, sex therapy, information provision). Although counselling interventions had few benefits on depression, anxiety, mood states and interpersonal relationships, educational programmes had beneficial effects on these and other outcomes. However, given that the IVF waiting period is brief (i.e., 14 days) and that women do not attend clinic for any treatment reason at this time, the method of intervention delivery as well as intervention effects is a crucial consideration when developing an intervention for the waiting period. Further consideration of eight existing interventions for infertility (Domar, Clapp, Slawsby, Dusek, Kessel, & Freizinger, 2000a; Domar, Clapp, Slawsby, Kessel, Orav & Freizinger, 2000b; Hosaka, Matasubayashi, Sugiyama, Izumi, & Makino, 2002; McNaughton-Cassill et al., 2000; McQueeney, Stanton, & Sigmon, 1997; Schmidt, Tjørnhøj-Thomsen, Boivin & Andersen, 2005; Tarabusi et al., 2004; van Balen, Verdurmen & Ketting, 2001) showed that these were typically time intensive, comprising between four (McNaughton-Cassill et al., 2000) and twelve (Tarabusi et al., 2004) sessions of 45 minutes (McQueeney et al., 1997) to one and a half hours (Hosaka et al., 2002; McNaughton-

Cassill, 2000). The interventions (e.g., group therapy, cognitive-behaviour therapy) typically took place in clinics, meaning that IVF patients would have to make a special trip to clinic (sometimes over considerable distances) during the waiting period for intervention purposes. As most women undergoing IVF procedures are employed (e.g., Lancaster & Boivin, 1995) and either carry on working through the waiting period or rest at home (Seibel & Levin, 1987), attendance at clinic may be inconvenient for women at this time. Finally, such interventions require delivery by a trained professional, meaning that the financial costs of such interventions are considerable, either to the National Health Service or to the patient. Together, these factors indicate that an intervention that patients could take home and use without supervision during the waiting period would be a practical mode of intervention delivery in such circumstances.

*ii. Interventions for medical waiting experiences.*

No studies could be found that evaluated the benefits of a self-administered intervention for patients to use at home in medical waiting periods, at the time this research was designed. However, a qualitative study regarding a new distraction coping intervention for patients waiting for genetic risk assessment has very recently been published (Phelps et al., 2006). This intervention comprised a leaflet that included distraction techniques and other information about genetic risk assessment. Qualitative information showed that patients had used the intervention, which suggests that a home-based intervention would be feasible and acceptable to patients, and had found some of the distraction techniques helpful. However, other (medical) information was provided on the leaflet and patients attended focus groups before and after using the intervention, making it difficult to extrapolate the effects of these added factors from the effects of the coping intervention.

## 4.2 Development of the PRCI card

The aim was to develop a PRCI that was (1) theoretically derived, (2) simple enough for untrained patients to use by themselves at home, (3) could be used whenever and wherever patients felt the need, (4) was cost-effective enough to be made freely available to all patients, and (5) was generic enough to be used by other patients waiting for medical tests and procedures in the future. Consideration of how a PRCI fulfilling the above criteria could be delivered led to the development of a simple, pocket-sized card containing statements designed to prompt or promote positive reappraisal coping efforts.

The rationale for delivering the PRCI by means of statements that the individual would read from a card was derived from Velten positive mood induction procedures (Velten, 1968). The original Velten positive mood induction procedure involves reading 60 statements designed to increase positive mood (e.g., I really do feel good) and extensive research using the Velten and modified Velten procedures suggests that reading positive statements has a positive effect on mood (e.g., Velten, 1968; Frost & Green, 1982; Riskind, Rholes, & Eggers, 1982) and cognitive problem-solving (e.g., Raps, Reinhard & Seligman, 1980), even in depressed individuals and those who received helplessness training (Raps et al., 1980). Three groups of participants in Velten's (1968) study either read statements designed to increase positive mood or negative mood, or they read mood neutral statements. Those who read the positive mood induction (PMI) statements reported less depressive symptomology, and showed better performance on tasks assessing writing speed, decision time, word association, and distance approximation than did those in the negative mood induction condition. Moreover, these differences were found after controlling for participants' suggestibility and pre-treatment mood. Riskind et al. (1982) also found PMI effects on mood and cognition. Participants who had read PMI items



reported significantly higher positive mood than participants who had read negative mood induction items, and the PMI group recalled their positive life-experiences significantly more quickly than their negative experiences.

The PRCI was based on such positive mood induction procedures, but used fewer statements for practical reasons (e.g., ease of use) and statements were designed to prompt patients to think about positive aspects of their current situation. In this way the PRCI was expected to increase positive mood *indirectly* via efforts to think positively (see Figure 1, page 6), rather than *directly* increasing positive mood as is the case with the original Velten procedure. This distinction between positive mood induction effects and positive reappraisal coping effects is important because Velten mood procedures have been shown to have short term effects on mood (e.g., lasting around ten minutes; Frost & Green, 1982), whereas it is proposed that positive reappraisal coping would have more robust and enduring effects on a wider range of psychological outcomes (i.e, appraisals, coping). Further, as indicated previously, a simple focus on benefits was not linked to positive outcomes, whereas positive reappraisal coping was (Sears et al., 2003). The following sections summarise the three Pilot phases of PRCI development and initial validation.

A number of Pilots were conducted to develop and validate the PRCI card and the following sections describe these Pilots. The purpose of PRCI-Pilot 1 (page 97) was to select ten positive reappraisal coping items to include on the PRCI card. PRCI-Pilot 2 and PRCI-Pilot 3 were feasibility studies, conducted to establish whether individuals would use such an intervention card and endorse it for use by patients in medical waiting periods. The purpose of PRCI-Pilot 2 (page 113) was to establish whether individuals waiting for an important event (an exam) would read the PRCI card and whether doing so had beneficial effects on their well-being, and the purpose of PRCI-Pilot 3 (page 121) was to establish

whether individuals waiting for important (exam) results would evaluate the PRCI card and a control Positive Mood Induction (PMI) intervention card as acceptable and helpful interventions for waiting experiences. The PRCI and pilot experiments were conceptualised by the author and her supervisor but data in PRCI-Pilots 1 and 2 were collected and analysed by an undergraduate project student (Sewell, 2003). Data in PRCI-Pilot 3 was collected and analysed by the author.

### **4.3 PRCI-Pilot 1: Generation and validation of PRCI items**

#### *4.3.1 Generation of PRCI items*

The purpose of PRCI-Pilot 1 was to generate and validate ten coping items to be included on the pocket-sized PRCI card. A pool of potential PRCI items was generated from four sources known to the author. These sources examined ways of coping with stressful experiences and of the four sources, three included a positive reappraisal coping scale or a conceptually similar scale (i.e., a scale assessing cognitive efforts to derive benefits from a stressful situation). The three sources were: (1) the positive reinterpretation and growth scale of the COPE (Carver et al., 1989); (2) the problem-appraisal coping scale (Terry & Hynes, 1998); and (3) the positive reappraisal scale from the Ways of Coping questionnaire (Folkman & Lazarus, 1988). These three positive reappraisal scales were selected as item sources because they had been previously been shown to be reliable scales. The reliability of the Folkman and Lazarus positive reappraisal coping scale was  $\alpha = .79$  and factor loadings for individual items were  $> .40$  (Folkman & Lazarus, 1988). The reliability of the Terry and Hynes problem appraisal scale on two occasions was  $\alpha = .71$  and  $\alpha = .76$  and average factor loadings of items on this scale were  $.59$  (Terry & Hynes, 1998). The reliability of the Carver et al. (1989) positive reinterpretation and growth scale

was  $\alpha = .68$  and factor loadings for two of the four items making up this scale (“I look for something good in what is happening” and “I try to see it in a different light to make it seem more positive”) were .75 and .59 (respectively). Factor loadings for the other two items (“I learn something from the experience” and “I try to grow as a person as a result of the experience”) were low (.23 and .19, respectively), but were not excluded as all items would undergo further validation as potential intervention items before inclusion on the PRCI card. Seventeen positive reappraisal items that seemed to have face validity as intervention items were selected from these three scales for possible inclusion on the PRCI. The fourth item source (Folkman & Moskowitz, 2000) was a qualitative interview question intended to assess an individual’s experience of positive meaningful events: “Describe something that you did, or something that happened to you that made you feel good, and that was meaningful to you, and helped you get through the day”. This item was adapted to make two shorter items “Try to do something meaningful” and “Try to do something that makes me feel good”.

Seven filler items were also taken from these sources, each of which represented an alternative way of coping with stressful situations. Filler items were included to ensure that the positive reappraisal coping items distinguished themselves from other potential ways of coping by being evaluated as more helpful and beneficial for the experience of waiting for important medical test results. Items were modified as necessary to make them suitable as intervention rather than assessment items (e.g., by changing the tense from past to present) and to ensure they were brief enough to fit on a pocket-sized intervention card. See Table 2 (page 100) for the item pool of positive reappraisal coping items and Table 3 (page 101) for filler coping items. Positive reappraisal items on the PRCI were headed with the phrase “During this experience I will:”

#### *4.3.2 Evaluation and selection of final PRCI items*

The first aim of PRCI-Pilot 1 was to select ten items from a pool of 26 coping items (see Tables 2 and 3) to include on the PRCI card. As the aim of the research in Part II was to develop a PRCI that women waiting for an IVF pregnancy test would use and find helpful, decisions about which items would be included were based on which were (1) most likely to be helpful (2) most likely to have a positive effect on mood and (3) most likely to be used by patients waiting for medical test results. Ten items were selected because these would fit neatly on a pocket-sized intervention card and seemed an acceptable number for patients to read repeatedly. Selection of the final ten items was based on evaluation of all positive reappraisal and filler coping items by patients waiting for assessment or treatment in the Accident and Emergency (A & E) department of a large urban hospital. These participants were chosen to evaluate the suitability of coping items for medical waiting experiences because they were waiting for information relating to the medical condition or injury that had brought them to A & E and this experience of a medical waiting context should make salient the benefits of each coping item for such an experience.

The psychometric properties (i.e., reliability and validity) of the items in Tables 2 and 3 were investigated by means of several analyses. Item reliability was assessed with Cronbach's alpha. Item validity was assessed with respect to the extent to which participants endorsed each item as one they would use in a stressful medical waiting period, the extent to which the item would be helpful, and the extent to which the item would make them feel more positive.

**Table 2.***Positive reappraisal coping item pool*

Item number	Item
<b>Positive reappraisal items</b>	
1	Discover what is important in life
2	Be inspired to do something creative
3	Grow as a person
4	Try to do something meaningful
5	See the situation in a positive light
7	Learn something.
8	Find something good in what is happening
9	Try to do something that makes me feel good
10	Make the best of the situation
12	Rely on my faith to help me stay positive
13	Concentrate on the benefits the situation can bring to my life today
15	Focus on the positive aspects of the situation
16	Gain something that is meaningful and important to me
18	Try to remember something good and why it was important to me
19	Look on the bright side of things
20	Focus on the benefits and not just the difficulties
22	Look for the silver lining
24	See things positively
25	Try to think of something meaningful that helps me to get through the day

**Table 3.** *Filler coping items*

Item number	Item
<b>Filler items</b>	
6	Be matter of fact about the situation
11	Make a plan of action
14	Make light of the situation
17	Accept the situation
21	Take things one day at a time, one step at a time
23	Take a step back from the situation
26	Keep busy with other things to take my mind off the situation

The aim was to establish whether any item seemed less satisfactory as an item for the PRCI card than any other (e.g., less popular with patients, less helpful, etc.), in order that such items could be eliminated from the item pool. It was expected that positive reappraisal coping items would be evaluated as more helpful, as likely to have more positive effects on mood and as more likely to be used during medical waiting periods than filler coping items. No predictions were made about which positive reappraisal coping items would be more evaluated more positively than others.

#### *Design*

The study used a survey design, in which participants evaluated the positive reappraisal and filler coping items in Tables 2 and 3 with respect to three attributes:

whether they would (1) use the statements, (2) find them helpful and (3) whether the statements would engender positive feelings.

### *Participants*

Thirty-six participants waiting in the A & E department of a large teaching hospital took part in PRCI-Pilot 1. Participants were aged between 20 and 50 years of age and were approached and recruited if they were sufficiently well to read and complete the study materials. Participants took part on a voluntary basis and 20 participants were women.

### *Materials*

Scenario and coping item evaluation form. The scenario and questionnaire were presented on a single A4 sheet attached to a clipboard for ease of completion. At the top of the page, a scenario described a hypothetical experience in which the patient had to wait for two weeks to find out the results of screening tests which would inform them whether they would develop a life-threatening medical condition in later life. A two week waiting period was chosen as an approximation of the two week waiting period in IVF treatment. The scenario was as follows:

“Some members of your family have a medical condition that has a significant negative effect on their lives (e.g., cancer). You yourself have no symptoms of this condition but you decide to take a medical test to determine whether you will get it in later life. Because of your family history your doctor does some screening tests. You have to wait two weeks until you find out the results of these tests.”

The 26 coping items were listed in a table below the scenario. Written instructions asked patients to imagine themselves experiencing this situation and then to rate for each

coping item (1) whether or not they *would* think in this way in the situation described, (2) the extent to which they thought it would be *helpful* to think in this way in this situation, and (3) the extent to which they would *feel more positive* as a result of thinking in this way in this situation. Participants responded to (1) by ticking the coping strategies they would use. Responses to (2) and (3) were made according to 4-point scales anchored 1 (not at all) to 4 (extremely). Two forms of this measure were developed, each presenting coping items in a different order to control for order effects possibly influencing which coping items were evaluated more favourably than others (see Appendix B, page 384, for the questionnaire).

### *Procedure*

This study was granted ethical approval by the School of Psychology, Cardiff University School Research Ethics Committee. Participants were approached by the researcher (Sewell) in the waiting room. The researcher explained the study to each participant and those who consented to participate completed the questionnaire whilst they were waiting to be seen by medical staff. The researcher read and filled out the questionnaire for participants who requested such assistance.

### *Data analysis*

In order to determine which positive reappraisal coping items were suitable for inclusion on the PRCI and which should be eliminated, data was subjected to the following series of four analyses: (1) For each of the positive reappraisal and filler coping items, the percentage of patients endorsing each item and mean ratings for evaluations of (a) helpfulness and (b) positive feelings were calculated, along with correlations between (a)

and (b). A composite “benefit” variable was computed from the means for the helpfulness and positive feelings ratings. (2) To demonstrate discriminant validity between positive reappraisal coping and filler items, a paired sample *t*-test was computed on the mean benefit scores for positive reappraisal coping items considered together, compared to the mean of benefit scores for the filler items considered together. (3) To establish whether women and men responded differently to different coping items, independent *t*-tests were used to compare women’s scores on the benefit variable with men’s scores. In cases where Levene’s test of homogeneity of variance was significant ( $p < .05$ ), degrees of freedom for equal variances *not* assumed were used when evaluating these results. (4) Cronbach’s alpha was used to evaluate the extent to which positive reappraisal coping items were reliable indicators of the same construct.

## **Results**

### **1. Endorsement of items and ratings of helpfulness and mood benefits**

Table 4 (page 105) shows the 19 positive reappraisal coping items and Table 5 (page 106) shows the 7 filler coping items. Tables 4 and 5 show the results of analyses of: (1) the percentage of patients endorsing each item (Column 1), (2) mean ratings of helpfulness (Column 2), (3) mean ratings for positive feelings (Column 3), (4) correlation coefficients for the relationship between values for ratings of helpfulness and positive feelings (Column 4), and (5) mean scores for the composite benefit variable (Column 5).

**Table 4.***Reliability and validity of positive reappraisal coping items.*

<b>Item</b>	<b>Positive reappraisal coping item</b>	<b>1. Endorse (%)</b>	<b>2. Helpful (M)</b>	<b>3. Positive (M)</b>	<b>4. r (34)</b>	<b>5. Benefit composite</b>
1	Discover what is important in life	72.2	2.81	2.64	.81	2.72
2	Be inspired to do something creative	25.0	1.75	1.81	.83	1.78
3	Grow as a person	44.4	1.97	2.06	.73	2.01
4	Try to do something meaningful	47.2	2.44	2.50	.82	2.47
5	See the situation in a positive light	47.2	2.78	2.83	.65	2.82
7	Learn something.	61.1	2.39	2.39	.76	2.39
8	Find something good in what is happening	47.2	2.67	2.47	.65	2.57
9	Try to do something that makes me feel good	77.8	3.03	3.06	.62	3.04
10	Make the best of the situation	61.1	2.81	2.67	.76	2.74
12	Rely on my faith to help me stay positive	33.3	1.86	1.86	.98	1.86
13	Concentrate on the benefits the situation can bring to my life today	33.3	2.06	1.94	.89	2.00
15	Focus on the positive aspects of the situation	58.3	2.67	2.72	.77	2.69
16	Gain something that is meaningful and important to me	30.6	2.22	2.33	.78	2.28
18	Try to remember something good and why it was important to me	30.6	2.11	2.17	.87	2.14
19	Look on the bright side of things	66.7	2.75	2.81	.79	2.78
20	Focus on the benefits and not just the difficulties	52.8	2.44	2.39	.77	2.42
22	Look for the silver lining	36.1	2.22	2.28	.85	2.25
24	See things positively	63.9	2.69	2.94	.81	2.82
25	Try to think of something meaningful that helps me to get through the day	58.3	2.50	2.50	.79	2.50

**Table 5.***Reliability and validity of filler coping items.*

<b>Item</b>	<b>Filler coping item</b>	<b>1. Endorse (%)</b>	<b>2. Helpful (M)</b>	<b>3. Positive (M)</b>	<b>4. r (34)</b>	<b>5. Benefit composite</b>
<b>6</b>	Be matter of fact about the situation	55.6	2.31	2.11	.73	2.21
<b>11</b>	Make a plan of action	61.1	2.75	2.50	.77	2.63
<b>14</b>	Make light of the situation	36.1	1.92	1.83	.74	1.88
<b>17</b>	Accept the situation	66.7	2.58	2.44	.85	2.51
<b>21</b>	Take things one day at a time, one step at a time	52.8	2.64	2.39	.51	2.51
<b>23</b>	Take a step back from the situation	50.0	2.25	2.19	.88	2.22
<b>26</b>	Keep busy with other things to take my mind off the situation	83.3	2.72	2.39	.73	2.56

As shown in Tables 4 and 5, the coping item that received the most endorsements was Item 26 (a filler coping item representing efforts to distract oneself from the situation by engaging in other activities). Item 26 was also rated as one of the most helpful strategies, and as more likely to generate positive feelings than several other strategies ( $n = 10$ ). Of the positive reappraisal coping strategies, Item 9 received the most endorsements, and was rated as most likely to be helpful and as more likely to generate positive feelings than any of the other 25 coping items. Tables 4 and 5 also show that less than 40% of patients thought they would be likely to use Items 2, 12, 13, 16, 18 and 22 during a two-week wait for the results of medical screening tests. Furthermore, examination of frequency diagrams for each item showed that the majority of patients rated Items 2, 3, 13, 14, and 18 as not at all helpful and that these items were considered not at all likely to generate positive feelings. Correlation analyses showed that the relationship between ratings of the

helpfulness of each item and of the positive feelings likely to be generated by each item was generally high ( $> .60$  in all but one case). A composite “benefit” score was therefore computed from the means for these two variables. Of the 26 coping items, Items 2 and 12 had the lowest scores on this benefit composite.

## **2. Discriminant validity of positive reappraisal and filler coping items**

The paired *t*-test analysis showed that the mean benefit score for positive reappraisal coping items considered together was significantly higher than the mean benefit score for filler coping items considered together,  $t(35) = 2.13, p < .05$ . As this analysis suggested that positive reappraisal coping items were evaluated as more beneficial on average than filler items, and as filler items did not reflect the construct of positive reappraisal coping, filler items were not included in subsequent analyses nor considered for inclusion on the positive reappraisal coping intervention card. Following the above analyses, the percentage of patients endorsing each positive reappraisal coping item and the mean benefit score for each positive reappraisal coping item was rank ordered, to illustrate which positive reappraisal coping items had received the most/least endorsements and the highest/lowest benefit scores. Table 6 (page 108) shows the frequency with which each positive reappraisal item was endorsed as likely to be used during a medical waiting experience and the mean benefit rating for each positive reappraisal coping item, rank ordered in order of magnitude from the most frequently endorsed/highest benefit rating to the lowest.

**Table 6.**

*Endorsements and benefit ratings for positive reappraisal coping items rank ordered according to magnitude.*

<b>Item</b>	<b>Benefit (mean)</b>
9	3.04
24	2.82
5	2.81
19	2.78
10	2.74
1	2.72
15	2.69
8	2.57
25	2.50
4	2.47
20	2.42
7	2.39
16	2.28
22	2.25
18	2.14
3	2.01
13	2.00
12	1.86
2	1.78

<b>Item</b>	<b>Endorsements (%)</b>
9	77.78
1	72.22
19	66.67
24	63.89
7	61.11
10	61.11
25	58.33
15	58.33
20	52.78
8	47.22
4	47.22
5	47.22
3	44.44
22	36.11
13	33.33
12	33.33
16	30.56
18	30.56
2	25.00

As shown in Table 6, Items 1, 8, 9, 10, 15, 19, 24, and 25 were ranked in the top ten in terms of patient endorsements *and* benefit scores, whereas Items 2, 3, 12, 13, 16, 18, and 22 received the lowest ratings on both evaluation dimensions.

### **3. Comparison of benefit ratings by men and women**

The results of *t*-test analyses comparing men and women on the composite benefit variable showed no significant differences between men's and women's ratings of positive reappraisal coping items ( $ps > .05$ ), although there was a marginally significant difference between men's and women's scores on one positive reappraisal coping item (Item 8: "Find something good in what is happening"),  $t(34) = 1.87, p < .10$ .

### **4. Internal reliability of the positive reappraisal coping items**

Cronbach's alpha for all positive reappraisal coping items considered together was high ( $\alpha = .89$ ). Alpha values if individual items were deleted were also examined, and showed that all items were similarly good indicators of the positive reappraisal coping construct. Deleting any item from the pool of 19 positive reappraisal coping items would not increase the overall reliability of the remaining items considered together. Finally, correlations between each positive reappraisal coping item and the total of all positive reappraisal coping items were examined. These showed that there were negative correlations between some pairs of items. The item pairs in question were: Item 10 with Item 1 and Item 25; Item 12 with Items 1, 8 and 9; Item 13 with Item 1 and Item 25; Item 20 with Item 1 and Item 7; and Item 9 with Item 15. Items 1, 12, 13, 20 and 25 had more than one negative correlation with other items.

#### *4.3.3 Selection of PRCI items*

Decisions were made about which ten items would be retained for the PRCI card and which would be eliminated on the basis of the above analyses. Items in the following list were eliminated from the item pool, for the reasons stated:

1. **Item 2** was endorsed by the fewest patients and received the lowest benefit scores
2. **Item 12** was endorsed by few patients and received a low benefit score. This item also correlated negatively with a number of other items in reliability analyses.
3. **Item 13** was endorsed by only 1/3 of patients, it also correlated negatively with another item, and patients evaluated it as less helpful and less likely to make them feel more positive than other items.
4. **Items 3, 16, 18 and 22** had the lowest benefit scores and fewer patients endorsed these items than other items.
5. **Item 25** was amongst the top ten items in terms of endorsements and benefit scores but it correlated negatively with other items. Also, it was similar to, but considerably longer than item 24.
6. **Item 5** was also similar to item 24, but had been endorsed by fewer patients and received a lower benefit score.

In total, 16 items were eliminated from the initial item pool, leaving ten items to be adapted for the PRCI card. These items were printed onto laminated cards measuring approximately 11 x 8 cm (see Table 7, page 111). The PRCI card was headed by a lead statement (During this experience I will:...) followed by the ten positive reappraisal coping statements.

**Table 7.**

*Ten positive reappraisal coping intervention items for the PRCI card*

Item number	Item
1	Discover what is important in life
4	Try to do something meaningful
7	Learn something
8	Find something good in what is happening
9	Try to do something that makes me feel good
10	Make the best of the situation
15	Focus on the positive aspects of the situation
19	Look on the bright side of things
20	Focus on the benefits and not just the difficulties
24	See things positively

### **Discussion**

The aim of Pilot 1 was to generate and validate a set of ten items for a pocket-sized positive reappraisal coping intervention (PRCI) card. The future target population for the PRCI was patients (e.g., IVF patients) waiting for the results of medical tests or procedures. Because such an experience can be an especially stressful time for patients (e.g., Boivin & Takefman, 1995) it was important to ensure that patients would find positive reappraisal coping items to be beneficial during medical waiting periods. The following procedures were used to help ensure the integrity of the items included on the PRCI card.

First, coping items were generated from published coping measures which included a generally accepted conceptualisation of positive reappraisal coping (i.e., as cognitive efforts to derive benefit from a stressful situation). Second, the relative merits (i.e., helpfulness, generation of positive feelings, endorsements) of each item were made by patients, in the context of a hypothetical and actual medical waiting period. Finally, selection of the items included on the PRCI was based on a series of analyses demonstrating the psychometric properties of each item. At the end of this process, ten items were selected. These were the positive reappraisal coping items which were more frequently endorsed and were rated as more likely to be helpful and more likely to generate positive feelings. Furthermore, men and women evaluated these ten items similarly (meaning that these items were perceived to be suitable for medical waiting periods by both men and women, and hence their benefits should not be limited to female fertility patients) and reliability analyses suggested that all were reliable indicators of the same construct. Because of the origins of the items (i.e., positive reappraisal coping measures), it was considered that this construct represented positive reappraisal coping.

An unexpected finding in PRCI-Pilot 1 was that of all 26 coping items assessed in this study, the item that received the most endorsements and that also received high ratings on the dimensions of helpfulness and generation of positive feelings was a distraction coping item (“keep busy with other things to take my mind off the situation”). Recent research evaluating a simple, self-administered distraction coping intervention that patients used at home suggests that distraction coping is a strategy that women used and found helpful during medical waiting periods (Phelps et al., 2006), although this research was not published at the time of planning and data collection for the research in Part II of this Thesis. The ratings assigned to the distraction coping item in the present research support

the proposals of Phelps et al., that distraction can be an effective coping technique for medical waiting periods. A direction for future research into brief coping interventions for medical waiting periods may be to evaluate the distraction coping intervention against the PRCI.

The aim of the next stage of the validation process (PRCI-Pilot 2) was to assess whether receiving the PRCI conferred benefits on the psychological well-being of individuals waiting for an important event, compared to the psychological well-being of individuals who did not receive the PRCI. In PRCI-Pilot 2, the PRCI was employed by medical students who were waiting to take an important examination.

#### **4. 4 PRCI-Pilot 2: Validation of the PRCI in a waiting experience**

The purpose of PRCI-Pilot 2 was as a feasibility study to establish (1) whether the PRCI would be used by individuals who were waiting several days for an important event to occur and (2) to evaluate the effects of the PRCI on the well-being of those individuals. In PRCI-Pilot 2, the PRCI was used by a sample of medical students waiting for several days to sit important exams and the psychological well-being (e.g., positive affect, optimism) of these students was compared with the psychological well-being of a control group who did not receive an intervention. The aim was to establish whether participants in the PRCI group reported greater psychological well-being than participants in the control group. It was expected that during the period before an important exam, the PRCI group would report more positive affect and optimism, and less negative affect and less severe psychosomatic stress symptoms than the control group.

## **Method**

### *Design*

The study used a 2 (group; PRCI, control) x 7 (day; 1 – 7) mixed within-subjects factorial design with time (Day) as the within-subjects factor. Participants were randomly assigned to groups. The independent variables were group assignment (PRCI, control) and time. The dependent variable was students' psychological well-being during the pre-exam waiting period. Psychological well-being was operationalised as their daily ratings of psychological reactions to the waiting period (positive and negative affect, optimism, psychosomatic symptoms).

### *Participants*

Participants were 43 level 4 medical students about to take end of module examinations at a large teaching hospital. Students' ages ranged between 21 and 24 years and 30 were women. All level 4 students (approximately 180) were informed about the study via an e-mail advertisement describing the aims and requirements of the research and inviting them to participate. As research participation was not a course requirement, participants were entered into a prize draw to win two prizes of £50. Of the 43 students who responded to the advertisement, one (2.32%) declined to participate, and three (6.98%) did not return questionnaires. Therefore the final sample included 39 students; 19 in the PRCI group and 20 in the control group.

## *Materials*

Participants were mailed a questionnaire pack containing instructions and questionnaires and a pre-addressed, pre-paid envelope in which to return the completed questionnaires. Participants in the PRCI group also received the PRCI card in this mailing.

### I. Daily Record Keeping

*Daily Record Keeping (DRK) form* (Boivin, 1997). On a daily basis, students rated the emotions and physical symptoms they experienced during the exam waiting period. Daily records were made on the DRK form<sup>12</sup>, as developed and employed by Boivin and colleagues to assess women's reactions to IVF treatment on a daily basis (see Boivin, 1997; Boivin & Takefman, 1995, 1996). Women in these studies reported that they found the DRK form easy to use, and the daily monitoring method has been found to be a reliable, valid and sensitive method of assessing psychological well-being on a daily basis (Boivin, 1997). The original DRK was adapted for the present study by adding a manipulation check item to the DRK received by the PRCI group, which enquired about how many times they had read the PRCI each day. A further adaptation was the addition of an item assessing students' perception of their exam performance, as follows "After your exam has finished, please estimate your grade in the space provided". Percentages were assigned to letter grades estimated by students: A =  $\geq 65\%$ , B = 60 – 64%, C = 55 – 59%, and D = 50 – 54%.

Students were provided with one DRK to be used for the whole waiting period. The DRK form had seven columns (each column was used for one day of ratings), and written instructions asked students to complete the DRK each day before their exam. Students receiving the PRCI were asked to read the card daily, once in the morning, once in the

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<sup>12</sup> See Study 2, pages 137 and 154 for detailed information about the DRK and daily monitoring.

evening, and at any other time they wished. Responses for each item on the DRK were made according to a four-point scale. If a reaction was not experienced, the student did not fill in the box next to that reaction. If his or her experience of the reaction was mild, a '1' was written in the box; if it was moderate, a '2' was written, and a '3' was written if it was severe. At the end of the waiting period, students returned the DRK in the preaddressed, prepaid envelope.

The DRK enquired about student's experience of 16 psychological reactions to the exam waiting period. The majority ( $n = 11$ ) of these were negatively toned (e.g., nervous, moody, frustrated, tense) and means for these items on a daily basis were summed to derive a negative affect scale. The means of four positively toned reactions were summed to give a positive affect scale. The final item was a single-item measure of students' daily optimism about their exam results. Nine physical stress reactions were also assessed on a daily basis. These physical stress reactions (e.g., racing heart, muscle tension) were based on those included in the Pennebaker Inventory of Limbic Languidness (PILL, Pennebaker, 1982), and comprised physical symptoms associated with psychological distress. Ratings for individual physical symptoms on the PILL are summed to give an overall somatisation scale. Cronbach alphas range from .88 to .91 and test-retest reliabilities range from .79 to .83 (Pennebaker, 1982). Psychosomatic symptoms were assessed in the present study because individuals who report that they are experiencing physical symptoms when they are physically healthy may be experiencing more negative psychological well-being (Costa & McCrae, 1985, 1987; Watson & Pennebaker, 1989).

## II. Intervention card

The laminated PRCI card developed in PRCI-Pilot 1 was enclosed with the questionnaires and instructions mailed to the PRCI group.

### *Procedure*

The Ethical procedure at the time (2002) was for the supervisor to carry out ethical review. The supervisor was satisfied that the study procedure met School ethical standards and approved the project. This study did not involve vulnerable participants, participants were fully informed about the nature of the study, they gave full informed consent and were debriefed at the end of the study. Students were recruited seven days before their examination and randomly assigned to the PRCI or control group. The researcher (Sewell) explained that the purpose of the study was to establish the ways in which individuals might cope with medical waiting periods, and that an intervention had been designed for such an experience. Participants were given a personal code number at this time and were later randomly assigned to the intervention or control conditions. Study packs were mailed to the students, along with written instructions and contact details for the researcher. All participants completed the DRK on a daily basis, starting seven days before they sat their exam. The PRCI group also read the PRCI card during this time.

### *Data analysis*

DRK variables were analysed using mixed between-within ANOVAs with day (7) as the within-subjects factor. Chi-square analyses were used to establish whether there was any association between group membership (PRCI, control) and students' estimates of exam grades.

## Results

### 1. Manipulation check

Table 8 shows the mean number of times per day the PRCI was read by students in the PRCI group, and indicates that on average, participants in the PRCI group read the PRCI card more than twice a day after the first two days of the pre-exam waiting period.

**Table 8.**

*Mean number of times per day students in the PRCI group (n = 19) read the PRCI card (standard deviations in parentheses)*

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
<b>Mean</b>	1.89	1.95	2.16	2.11	2.11	2.05	2.05
	(.81)	(.78)	(.69)	(.66)	(.57)	(.52)	(1.03)

### 2. DRK variables

#### *a. Positive affect*

There were no significant Group differences between the PRCI and PMI groups,  $F(1, 37) = 0.10, p > .05$ , on positive affect scores, but there was a significant effect of Day,  $F(6, 222) = 9.46, p < .001$ . There was no significant Group by Day interaction,  $F(6, 222) = 1.46, p > .05$ .

#### *b. Negative affect*

There were no significant differences between the PRCI and control groups in negative affect,  $F(1, 37) = 0.33, p > .05$ , but there was a significant effect of Day,  $F(6,$

222) = 20.11,  $p < .001$ . There was no significant interaction between Group and Day,  $F(6, 222) = 0.50, p > .05$ .

### **c. Optimism**

There was no significant difference between the PRCI and control groups in optimism about the exam results,  $F(1, 37) = 0.43, p > .05$ , no significant effect of Day,  $F(6, 222) = 1.70, p > .05$ , and the Group by Day interaction was marginally significant,  $F(6, 222) = 1.94, p < .10$ .

### **d. Somatisation**

There was a significant difference between the PRCI and Control groups in reports of physical symptoms associated with stress. The PRCI group reported significantly less severe somatisation than the Control group,  $F(1, 37) = 4.65, p < .05$ . There was also a significant effect of Day on somatisation,  $F(6, 222) = 12.68, p < .001$ , and a significant Group by Day interaction,  $F(6, 222) = 2.86, p < .01$ .

## **3. Examination performance estimates**

Table 9 (page 120) shows participants' post-exam estimates of the grades they expected to achieve. Chi-square analyses showed no association between group membership (PRCI, control) and estimated exam grade,  $\chi^2 = 0.72, df = 3, p > .05$ .

**Table 9.**

*Number and percentage of participants in the PRCI and Control groups predicting each grade*

<b>Estimated exam Grade</b>	<b>PRCI group (<i>n</i> = 19)</b>	<b>Control group (<i>n</i> = 20)</b>
<b>A = <math>\geq</math> 65%</b>	15.8% ( <i>n</i> = 3)	15.0% ( <i>n</i> = 3)
<b>B = 60-64%</b>	36.8% ( <i>n</i> = 7)	30.0% ( <i>n</i> = 6)
<b>C = 55-59%</b>	36.8% ( <i>n</i> = 7)	35.0% ( <i>n</i> = 7)
<b>D = 50-54%</b>	10.5% ( <i>n</i> = 2)	20.0% ( <i>n</i> = 4)

## **Discussion**

The results of the present study suggested that the PRCI had some benefits on students' well-being during the exam waiting period, as students receiving the PRCI reported less severe physical stress reactions than those in the Control group. A trend was also found for daily optimism about the exam results, suggesting that students who received the PRCI felt more optimistic about their exam results in the last three days before the exam. Furthermore, apart from the first two days of the pre-exam waiting period, the results suggest that participants generally complied with the requirement to read the card twice daily. Together, these results suggest that individuals waiting for an important event may read the PRCI and derive some benefit from doing so.

There are two main limitations of this preliminary validation of the PRCI as an intervention for the experience of waiting for test results. First, the experience of waiting *to sit* exams and the experience of waiting for the *results* of exams are different. Students have more control over the exam before it occurs (e.g., planning, revision, checking) than they have after the exam when nothing they do can alter the results (Folkman & Lazarus, 1985).

In this respect, the period *after* an exam has more aspects in common with the period after embryo transfer. Second, in the present study there was no control group for any genuine effects of reading positive statements (i.e., regardless of the *content* of the positive statements), or for demand characteristics engendered by asking people to read positive statements (i.e., that it was plain that they were expected to feel more positive after reading the card). Because of this latter limitation it was not possible to conclude that PRCI effects on somatisation in the present Pilot were unique to the PRCI or would be common to reading *any* positively toned statements. As previous research using Velten procedures shows that reading positive statements increases positive mood (e.g., Frost & Green, 1982; Raps et al., 1980; Riskind et al., 1982; Velten, 1968) this is an important limitation, and it seems important to control for such basic positive mood induction effects in future research. In consideration of this issue it was decided to develop a positive mood induction intervention (PMI) card to be used as a control intervention card for the PRCI.

#### **4. 5. PRCI-Pilot 3: Feasibility and acceptability of the PRCI and PMI**

The purpose of PRCI-Pilot 3 was as a feasibility study to establish whether the PRCI and a control positive mood induction (PMI) card would be evaluated as helpful and acceptable interventions by people waiting for important test results. The PRCI and PMI cards were evaluated to establish the extent to which they were practical, acceptable, had positive effects on psychological well-being, and the extent to which individuals would endorse each as an intervention for medical waiting periods. It was expected that as both interventions were presented as simple, pocket sized cards containing statements designed to improve mood, both would be considered to be suitable and practical interventions for waiting experiences. However, the PRCI was expected to have greater benefits on

psychological well-being than the PMI because Velten mood procedures have been shown to have short term effects on mood (e.g., around ten minutes; Frost & Green, 1982), whereas it is proposed that positive reappraisal coping would have more robust and enduring effects on a wider range of psychological outcomes (i.e, appraisals, coping). Further, a simple focus on benefits was not linked to positive outcomes in prior research whereas positive reappraisal coping was (Sears et al., 2003).

Referring to Folkman's (1997) elaboration of the theoretical model of the appraisal and coping process (Figure 1, page 6), it can be seen that positive mood is the proposed link between meaning-based (e.g., positive reappraisal) coping and the (re)appraisal of the situation which marks renewal of the coping process. Further, research suggests that even in the most difficult of life-experiences (e.g, caregiving and bereavement), positive mood has a vital role in motivating an individual to renew coping efforts in an ongoing, stressful situation (Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996). The purpose of the PMI was to *directly* increase positive mood, rather than doing so indirectly through the manipulation of positive reappraisal coping (i.e., the PRCI). The PMI was considered an appropriate control intervention for the PRCI for three reasons. First, both the PMI and the PRCI were expected to increase positive mood whether directly or indirectly via effects on coping. Second, the PMI would be an effective control against the possibility that reading *any* positively worded statements would have an equally beneficial effect on psychological well-being, regardless of content (i.e., whether the statements encouraged positive reappraisal coping or not). Finally, the PMI would control for demand characteristics that could result in the PRCI seeming more effective than was warranted. The inclusion of a second card containing positive statements would control for the possibility that more positive psychological outcomes would be reported because it was

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obvious to the recipients that the purpose of reading positive statements was to make them feel better.

A target population for the PRCI in the future are women waiting for an IVF pregnancy test. Because women find this stage of IVF treatment particularly stressful (e.g., Boivin & Takefman, 1995; Boivin & Walker, 1997), it is important to establish whether the PRCI and PMI were likely to be helpful and well-received during a stressful waiting experience. Therefore, in PRCI-Pilot 3, the PRCI and PMI cards were used by undergraduate students waiting for the results of their final Psychology exams, because the experience of students waiting for exam results (e.g., Folkman & Lazarus, 1985) has some parallels with the experience of women waiting for the results of IVF treatment. First, nothing can be done to change the results once an embryo transfer or exam has taken place. Second, the results are likely to have some important consequences in both cases, whether or not they are as the recipients hoped. Third, both samples are likely to be somewhat uncertain about whether they will receive the results they hoped for. Therefore, final year students seem a particularly apposite sample on whom to pilot the PMI. Students were randomly assigned to receive either the PRCI or PMI some days before exam results were due and they completed a questionnaire evaluating their respective intervention cards at the end of the waiting period.

#### **4.5.1 Generation of PMI items**

The format of the PMI was similar to the PRCI, comprising ten statements printed onto a small card. However PMI items were based positive mood induction items presented by Jennings, McGinnis, Lovejoy and Stirling (2000). The PMI was expected to be a good control for the PRCI because positive reappraisal coping *or* positive mood induction items

should increase positive mood, whether directly or indirectly (see Figure 1, page 6). Moreover, Velten (1968), and Raps et al. (1980) propose that Velten positive mood induction procedures could be used as an intervention to provide at least some short-term benefits on mood, even in depressed people.

The PMI developed for the present line of research contained ten items, seven of which were adapted from a pool of 24 positive mood induction items presented by Jennings et al. (2000, see Table 10, page 125). PMI items were selected according to the following criteria, decided upon by the researcher: (1) they did not suggest a desired outcome *would* happen (unethical during medical treatment), (2) they did not refer to effective social support (i.e., social support *coping* opportunities and hence coping intervention items), (3) they did not imply that the individual could control an outcome (unethical during medical treatment), and (4) the content seemed appropriate for medical patients (i.e., not insensitive to the stressful and sometimes distressing nature of medical waiting experiences). After excluding items according to these criteria, only seven items from Jennings et al. (2000) were considered suitable for the PMI card. Three further PMI card items were therefore created by the author to balance the number of PRCI and PMI items. These were “I feel on top of the world”, “I’m a great person”, “I can’t remember when I last felt so good”. Table 10 shows the item pool for positive mood induction items, which would be headed by the lead statement “During this experience I feel that:” Items selected for the PMI are underlined and in bold type. Other items were adapted if they were unsuitable in their original form (e.g., too long). The statements were printed onto card as for the PRCI. The PRCI used in PRCI-Pilot 3 was as described in PRCI-Pilot 1 (see Table 7, page 111).

**Table 10.**

*Item pool of potential positive mood induction (PMI) items and reasons for exclusion*

Item	Item	Excluded
1.	When I have the right attitude, nothing can depress me.	Too long
2.	The world is full of opportunity and I'm trying to take advantage of it.	Too long
3.	When it comes right down to it, I'm just too cool.	Inappropriate
4.	<b><u>Nothing can depress me now.</u></b>	
5.	My parents brag about me to their friends.	Assumes has parents
6.	I've got some good friends.	Social support
7.	My future is so bright I've got to wear shades.	Inappropriate
8.	Most people like me.	Inappropriate
9.	<b><u>Life's a blast: I can't remember when I felt so good.</u></b> (2 items)	Modified
10.	<b><u>It's great to be alive.</u></b>	
11.	It doesn't get any better than this.	Inappropriate for medical situation
12.	I'm in charge of my life and I like it that way.	Implies control over the outcome
13.	The relationships I have now are the best I've ever had.	Social support
14.	I'm going to have it all.	Inappropriate
15.	<b><u>I'm energised.</u></b>	
16.	I know if I try I can make things turn out.	Implies control over outcome
17.	I know I can get the things I want in life.	Implies control over outcome
18.	I know I'm going to do it: I'm going to seize the day.	Implies control over outcome
19.	I can make things happen.	Implies control over outcome
20.	I bet things will go well for the rest of the day.	Implies outcome will be positive
21.	Things look totally awesome.	Implies outcome will be positive
22.	<b><u>I feel creative.</u></b>	
23.	<b><u>I feel completely aware.</u></b>	
24.	I can make any situation turn out right.	Implies control over outcome

**Table 11.**

*PMI items*

During this experience I feel that: <i>[Lead statement]</i>
I'm energised
I really do feel good
I'm creative
I feel on top of the world
I feel completely aware
It's great to be alive
Nothing can depress me
I'm a great person
Life's a blast
I can't remember when I last felt so good

**Note.** Table 11 is larger than the actual size of the PMI card.

## Method

### *Design*

The study used a between-subjects design. Participants were randomly assigned to intervention groups (PMI, PRCI) and the experiment was of double-blind design. The independent variable was the intervention received (PRCI, PMI) and the dependent variable was participants' evaluation of the PRCI and PMI cards on a number of evaluation dimensions (e.g., practicality, acceptability, psychological effects, endorsements).

### *Participants*

Participants were 14 Psychology students waiting for the results of their final examinations, recruited from approximately 160 Level 3 and 4 students. Inclusion criteria were that students were uncertain and worried about the results of their exams. Students were informed about the study via an e-mail advertisement describing the aims and requirements of the research and inviting students to participate. As research participation was not a course requirement for final year students, those who participated were entered into a prize draw to win £50. Fourteen students expressed an interest in the study and subsequently participated. The mean age of participants was 24.43 years ( $SD = 6.12$ ), and 13 were women.

Students who were interested in participating replied to the e-mail advertisement, including their response to two questions assessing the inclusion criteria. One asked how certain students were that they would achieve the exam results they wanted (0% certain they won't – to 100% certain they will), and the other asked how distressed they would be if they did not achieve the results they wanted (1 'not at all' to 7 'extremely'). Students reported being fairly uncertain that they would achieve the results that they wanted ( $M = 42.92\%$ ,  $SD = 15.64\%$ ) and that they would be distressed if they did not do so ( $M = 5.60$ ,  $SD = .98$ ). Students were randomly assigned to receive the PRCI ( $n = 6$ ) or the PMI ( $n = 8$ ) card. The age of students in the PRCI ( $M = 24.33$ ,  $SD = 5.65$ ) and PMI groups ( $M = 24.50$ ,  $SD = 6.85$ ) was not significantly different,  $t(12) = -.05$ ,  $p > .05$ . There was a trend suggesting that the PRCI group were more certain they would receive the results they wanted than the PMI group,  $t(12) = 1.89$ ,  $p < .10$ , but there were no significant group differences in ratings of anticipated distress,  $t(12) = -.31$ ,  $p > .05$ . No information was available about students who did not respond to the recruitment e-mail.

## *Materials*

### I. Questionnaires

Assessment comprised three phases: (1) Baseline assessment (2) Intervention (3) Intervention evaluation. The baseline assessment took place in the laboratory, eight days before exam results were due. Students read a PRCI or PMI card at least twice daily during the intervening days and completed an intervention evaluation questionnaire in the laboratory on exam results day.

*1. Baseline questionnaire.* This questionnaire enquired about students' expectations regarding their exam results with two questions (1) "What do you think your average grade will be for these exams? (percentage) and (2) "What do you believe are your chances of achieving this grade (0 – 100%). Further questions asked about various potential contributory factors that may influence these expectations, as follows: "To what extent do the following contribute to your estimate?". This question was followed by five factors (1) prior performance, (2) amount of revision, (3) performance in the exams, (4) a 'feeling' about how well you have done, (5) the difficulty of the exams, all of which were rated on five-point scales anchored 1 'not at all' to 5 'very important' (see Appendix C, page 385, for baseline questionnaire).

*2. Intervention evaluation questionnaire.* On exam results day, students completed a questionnaire evaluating the PRCI or PMI cards. The intervention evaluation questionnaire was developed for the study and contained 13 items assessing students' opinions about the effectiveness and practicality of these intervention cards. Results relating to these evaluation dimensions were presented in groups relating to (1) the practicality of the

interventions (e.g., how quick and easy the cards were to use), (2) the acceptability of the interventions (e.g., how helpful and enduring the effects were), (3) perceptions of any psychological effects of the interventions (e.g., the extent to which the interventions influenced positive thinking, or served as a distraction), and (4) women's endorsements of the cards (e.g., whether they would recommend them to others). See Table 12 (page 130) for intervention evaluation items. Responses to these items were made on 6-point scales, anchored 1 (not at all) to 6 (extremely). A further intervention evaluation item was "On the whole, how long do you think any effects of reading the card lasted?", endorsed according to five categories (0 – 20 minutes, 20 minutes – 1 hour, 1 – 2 hours, 2 – 3 hours and 3 hours+). Space was provided at the end of the questionnaire for students to write comments about the intervention cards (see Appendix D, page 386, for intervention evaluation questionnaire).

### *Procedure*

The proposal for this study was not submitted for full ethical review with the School of Psychology, Cardiff University School Research Ethics Committee. The procedure at the time (2002/3) was for the supervisor to carry out ethical review and gauge the need for full ethical review with the committee. This study did not involve vulnerable participants, participants were fully informed about the nature of the study, they gave full informed consent and were debriefed at the end of the study. Further, the manipulations received by both groups of participants were designed to increase positive psychological well-being.

**Table 12.**

*Intervention evaluation items*

<b>Practicality</b>	
1	Was the intervention card quick?
2	Was the intervention card easy?
3	Did it fit into your daily life?
4	Was it difficult to remember to read the card?
<b>Acceptability</b>	
5	How helpful was the intervention card?
6	Did any effects last long enough to be helpful?
<b>Psychological effects</b>	
7	Did the intervention card help you think about the situation differently?
8	Did the intervention help you to feel more positive?
9	Did it make you feel better about the experience of waiting for your results?
10	Did the intervention card help you to make plans for after the results?
	Did it help you to look at the experience in a more positive light?
<b>Endorsements</b>	
11	How likely would you be to use this intervention yourself while waiting for important medical test results?
12	How strongly would you recommend this intervention to people waiting for medical test results?
13	Did you think that other people would use this card?

The procedure for the (1) Baseline assessment, (2) Intervention and (3) Intervention evaluation phases of Pilot 3 were as follows:

*Phase one: Baseline.* The baseline assessment took place eight days before the results of the January exams were available to Level 3 and 4 students. At this time the researcher

explained the aims and requirements of the study and those who wished to participate signed the consent form. The participants ( $N = 14$ ) then completed the Baseline questionnaire. At this time, participants received an envelope which contained either a PRCI card (numbered 1) or PMI card (numbered 2), and a form on which they were asked to record the number of times they had read the card each day. The researcher and participants were blind as to which card was contained in each envelope.

*Phase two: Intervention.* The intervention phase comprised the seven days between Baseline and exam results day. During this time participants read the intervention card once in the morning, once in the evening, and at any other time they wished, and recorded the number of times that they had read the card each day. Participants were asked not to discuss the intervention they had received with the researcher or other students.

*Phase three: Intervention evaluation.* This session took place during the morning of exam results day. Participants completed the intervention evaluation questionnaire and an entry form for the prize draw. The prize draw was made the following week by independent colleagues of the researcher. The prize winner and unsuccessful entrants were notified of the outcome of the draw by e-mail.

#### *Data analysis*

Means and standard deviations were calculated for all baseline and intervention evaluation variables and *t*-test analyses were used to establish whether the PRCI and PMI groups differed on these variables.

## Results

The results section is divided into three sections. In Section A, the results of the baseline assessment are presented, in Section B, the results of the manipulation check are presented, and in Section C, the results of the intervention evaluation are presented.

### A. Baseline assessment of exam expectations

Around 1/3 of students in the PRCI group expected to achieve a 2<sup>nd</sup> Class, 1<sup>st</sup> Division degree (2:1) classification compared to 2/3s of the PMI group. Others expected 2<sup>nd</sup> Class, 2<sup>nd</sup> Division (2:2) awards. There was no significant association between expectations about degree classification and intervention group ( $p > .05$ , Fisher's exact test). Neither did students' estimates of the likelihood of achieving these grades differ significantly,  $t(12) = .83, p > .05$ . Students rated their performance in the final exams as the most important contributor to their estimates about degree classification, followed by the amount of revision they had done. There were no significant differences between groups in ratings of the contribution made by revision,  $t(12) = -.82, p > .05$ , performance,  $t(12) = .15, p > .05$ , exam difficulty,  $t(12) = .86, p > .05$ , or a 'feeling' about how well they had done,  $t(12) = -1.04, p > .05$ , to degree classification expectations, although there was a trend suggesting that the PMI group rated their performance in previous exams as contributing more to their expectations than the PRCI group did,  $t(12) = -1.90, p < .10$ . Figure 7 (page 133) shows mean scores for factors contributing to students' expectations about degree classification.

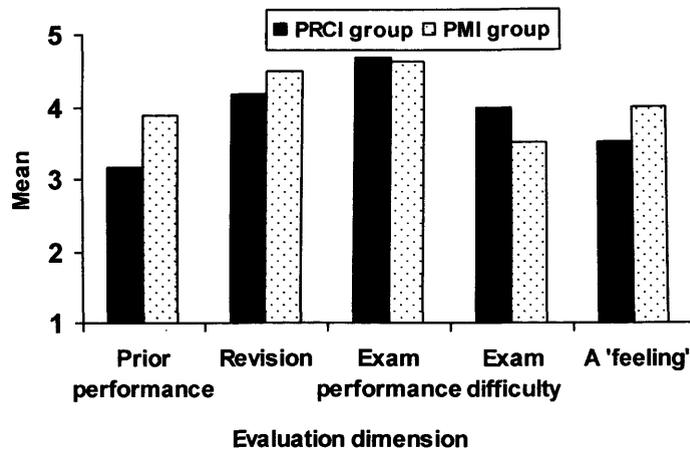


Figure 7. Mean scores for factors contributing to expectations about exam results.

### B. Manipulation check

Students had read the intervention cards the requisite number of times per day ( $M = 2.82, SD = .60$ ). The PRCI card ( $M = 2.43, SD = .61$ ) was read significantly fewer times than the PMI card ( $M = 3.11, SD = .42$ ),  $t(12) = -2.51, p < .05$ .

### C. Intervention evaluation

All students in the PRCI group recalled intervention effects as lasting  $< 20$  minutes, compared to 25% of students in the PMI group. There was a significant association between intervention groups and estimated duration of intervention effects ( $p < .01$ , Fisher's exact statistic). Figure 8 (page 134) shows mean scores for items relating to the practicality of the PRCI and PMI cards.

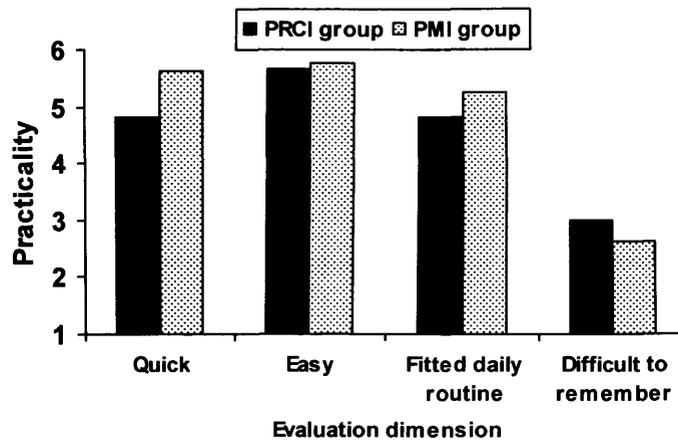


Figure 8. Mean ratings of the practicality of the PRCI and PMI cards.

Both cards were rated as quick and easy to use and as fitting into daily routines. Students also found it moderately easy to remember to read the cards. There were no significant group differences in ratings of how quick  $t(12) = -1.72, p > .05$ , and easy,  $t(12) = -.32, p > .05$ , the cards were to use, in how well the cards fitted daily routines,  $t(12) = -.76, p > .05$ , or in how easy it was to remember to read the cards,  $t(12) = .49, p > .05$ .

Figure 9 shows mean ratings for items assessing the acceptability of the PRCI and PMI cards.

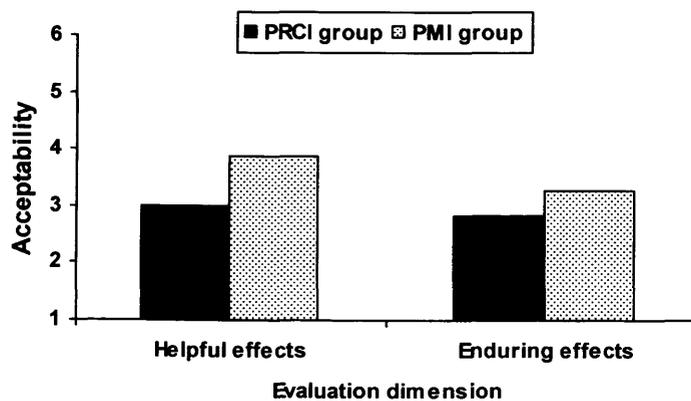


Figure 9. Mean ratings of the acceptability of the PRCI and PMI cards.

Both cards were rated as moderately helpful, and the effects as moderately enduring. There were no significant group differences in ratings of how helpful the cards were,  $t(12) = -1.56, p > .05$ , or in how enduring the effects were,  $t(12) = -.66, p > .05$ .

Figure 10 shows mean ratings for students' opinions about the psychological effects of the interventions.

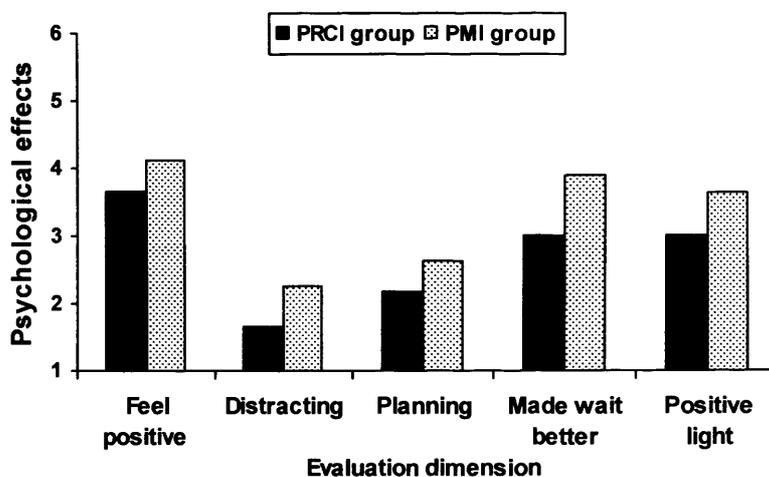


Figure 10. Mean ratings for the psychological effects of the PRCI and PMI cards

Both cards had moderate benefits in terms of helping students feel more positive and to see the situation in a more positive light, but were less effective as a distraction or in helping them to plan for the future. Students also perceived that both cards made the wait for results somewhat better. Although ratings made by the PMI group seemed higher than those by the PRCI group, there were no significant differences in students' ratings of the extent to which the PRCI or PMI cards helped them to feel more positive,  $t(12) = -.84, p > .05$ , distracted them from the situation,  $t(12) = -.91, p > .05$ , helped them plan what to do after the results,  $t(12) = -.72, p > .05$ , made the wait better,  $t(12) = -1.29, p > .05$ , or helped

them to see the situation in a more positive light,  $t(12) = -.71, p > .05$ . Figure 11 shows mean scores for students' endorsements of the PRCI and PMI cards.

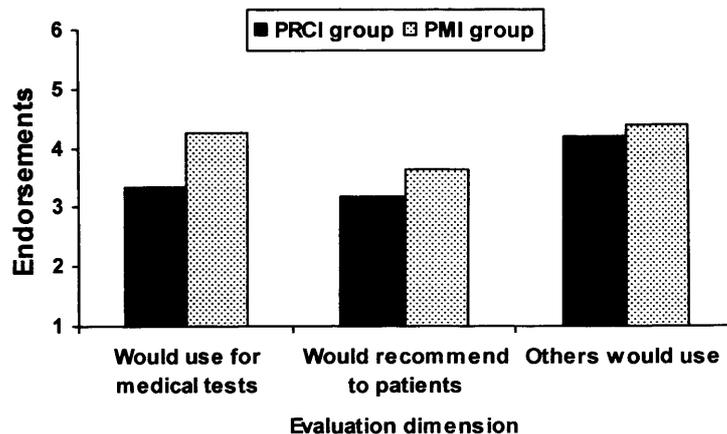


Figure 11. Mean scores for endorsements of the PRCI and PMI cards

Students would be somewhat likely to use the PRCI or PMI cards when waiting for medical test results, would be somewhat likely to recommend them to patients, and thought that others were likely to use the cards. There were no significant group differences in ratings of how likely students would be to use the cards when waiting for medical test results,  $t(12) = -1.53, p > .05$ , to recommend the cards to patients,  $t(12) = -1.0, p > .05$ , or of the extent to which others might use the cards,  $t(12) = -.45, p > .05$ .

### Discussion

The results of the present study showed that at baseline, students in both intervention groups were similar with regards to their expectations about degree classification and the likelihood of achieving those grades, although one trend suggested that the PMI group rated their performance in previous exams as contributing more to their expectations about results than the PRCI group did. Regarding the evaluations of the PRCI

cards, both were rated as quick and easy to use, as fitting into daily routines and students found it moderately easy to remember to read them. Both cards were also evaluated as moderately helpful, the effects as moderately enduring, and students perceived that the cards made the wait for results somewhat better. In terms of perceptions about the psychological effects of the cards, students rated both cards as having moderate benefits in terms of helping them to feel more positive and to see the situation in a more positive light, but as less effective as a distraction or in helping them to plan for the future. Finally, students' endorsements of the cards indicated that they would be somewhat likely to use the intervention cards if they had to wait for medical test results, would be somewhat likely to recommend them to patients, and thought that others were likely to use the cards. There were no significant differences between groups on these evaluation dimensions in the present study, although this was not surprising given that these analyses were based on very few participants.

Indeed, although these results provide some evidence that the PRCI and PMI cards were perceived as similarly (moderately) helpful and practical and as having similar, moderate effects on positive well-being, the results of the present study must be interpreted cautiously, given the very small number of participants contributing data to these analyses. Furthermore, it should be noted that the participants in the present study were a self-selected sample who represented less than 9% of the total population of final year Psychology students, and who had rated themselves as being uncertain about achieving the results they wanted and who considered that they would be distressed if they did not do so. As no data was collected for students who did not respond to the recruitment e-mail, it was not known to what extent the sample in PRCI-Pilot 3 were representative of the whole population of final year students.

One unexpected result in the present study was that the PMI group recalled the effects of the PRCI as more enduring than the effects of the PRCI, and another was that the PMI card was read significantly more often per day than the PRCI card. However, both cards were read twice daily, on average, as requested, suggesting that the intervention card method is a feasible way to deliver a coping intervention. As both cards contained positive statements, and the sample was small, it is difficult to draw firm conclusions about the reason for these unexpected results. One possible reason is that the PRCI was read less often because the statements on the card were designed to promote coping efforts rather than to directly enhance mood, and that participants were dissuaded from reading the PRCI card more frequently because the purpose of this card was less obvious than that of the PMI card. In turn, PRCI effects may have been less enduring on average than the PMI effects because the former card was read less often and did not have sufficient opportunity to have a robust influence on psychological well-being. However, such suggestions can only be speculative, especially as participants' written comments about the interventions did not suggest that they found reading the PRCI to be an arduous task. Instead, written comments suggested that participants perceived both cards to have had some benefits for this waiting experience. Comments about the PMI included:

"It was good having a card with positive statements on it...it certainly made me feel better and I was going through quite a bad patch too".

"Day to day I don't think I felt any different, but overall I'm sure that I am a lot calmer than I would normally be about the situation".

"I found the card quite nice to read and it did help me to remember to keep things in perspective and made me feel better about the situation".

Comments about the PRCI included:

"I thought the card helpful at the time of reading it to make me feel more positive".

“I believe that an individual who would be worrying about their results would find the positive motivation useful”.

Although the majority of comments about the PMI card were positive, however, two comments suggested that modifications to some PMI statements were needed:

[some statements were] “...over the top or not relevant/realistic in every day language (e.g., ‘life’s a blast’) – a phrase I would never use and not appropriate within this context”.

“The ‘life’s a blast’ statement was a bit funny...not something I’d really say”.

On the basis of this feedback, it was decided to replace the “life’s a blast” statement and modify other extreme statements before using the PMI in future research.

Overall, the results of the present study suggest that the PRCI and PMI were evaluated as helpful and suitable interventions that had moderate benefits on psychological outcomes in the post-exam waiting period. One main limitation of PRCI-Pilot 3, however, was that it did not include a control group who did not receive an intervention. It was therefore not possible to evaluate these cards against the effects of not receiving any intervention (although the results of Pilot 2 suggest that the PRCI did have had some benefits when compared to a no intervention control group). The limitation of a lack of a no intervention control will be addressed in the next stage of PRCI validation: Study 2 (page 140). In Study 2, the PRCI will be employed in a randomised controlled trial investigating the effects of the PRCI on women’s psychological and physical well-being during the IVF waiting period compared (1) to the effects of the PMI and (2) the effects of not receiving an intervention card at this time.

## Chapter 5

### **Study 2: A randomised controlled trial to evaluate the effects of the PRCI on psychological well-being during the IVF waiting period.**

#### **5.1 Introduction**

The main aim of the present study was to establish the effects of the PRCI on the psychological well-being of women waiting for a pregnancy test during IVF treatment. The psychological well-being of women who received the PRCI was compared with two control groups. One control group received the PMI, as developed in the previous study (PMI group), and the other was a routine care and assessment control group who monitored their daily reactions to the waiting period only (DMC group). Prior research (e.g., Boivin & Walker, 1997, see Figure 6, page 84) suggested that there would be significant effects of imminence on women's psychological well-being, with emotional well-being deteriorating in the latter days of the week before the IVF pregnancy test. Therefore daily monitoring methodology (e.g., Stone & Neale, 1984) was used to capture the daily effects of the PRCI on women's psychological well-being at this time.

#### *Daily monitoring*

As the name suggests, daily monitoring is a method of assessment used in longitudinal research designs to measure reactions to an ongoing experience on a daily basis. Proponents of daily monitoring methodology (e.g., Stone & Neale, 1984) argue that daily monitoring is a more comprehensive means of assessing responses to a situation than measures which require the individual to aggregate their responses over a protracted period of time (e.g., how a woman has been coping with infertility; Terry & Hynes, 1998). In

addition, daily monitoring has an advantage over pre-test – post-test experimental designs because the latter method may not capture the dynamic nature of the ongoing coping process between the two assessment points. Daily monitoring was used in the present study to repeatedly assess changes in women’s well-being during the IVF waiting period because it has previously been shown to be an efficient and sensitive way of evaluating psychological and physical well-being during IVF treatment (e.g., Boivin, 1997; Boivin & Takefman, 1995, 1996; Boivin & Walker, 1997). For example, in one study by Boivin and Takefman (1995), women reported more stress during the oocyte retrieval and embryo transfer stages of IVF treatment (when there are invasive medical procedures for the retrieval of oocytes and transfer of embryos, and when treatment may be aborted due to failed fertilisation) than in the early stages of ovarian stimulation. In addition women reported more stress, physical discomfort and fatigue during the IVF treatment cycle, especially at some stages in the treatment cycle (e.g., oocyte retrieval, embryo transfer, waiting period) than they did in daily ratings of the preceding no-treatment menstrual cycle. This evidence suggests that daily monitoring is an effective means of capturing the emotional and physical concomitants of IVF treatment.

In addition to the advantages of daily monitoring as a method of assessing reactions to the waiting period as the day of the pregnancy test approaches, daily evaluation of *intervention effects* on psychological well-being may have certain advantages over a pre-test – post-test intervention evaluation. Emotional reactivity to the embryo transfer and pregnancy test might obscure PRCI benefits if psychological well-being was assessed at these clinic appointments, because the majority of women, regardless of intervention group, were expected to be feeling positive on embryo transfer day (as successful embryo transfer is an inclusion criteria in the present study) and the majority were expected to be feeling

negative on pregnancy test day (as around 75% will not be pregnant). In light of these considerations, it was decided that daily monitoring methodology would be an effective means of assessing changes in women's reactions over the course of the waiting period, and of assessing differences in the reactions of women who received different interventions in the intervening days between clinic appointments. In the present study a version of the Daily Record Keeping sheet (DRK), adapted from that developed and employed by Boivin and colleagues (e.g., Boivin, 1997; Boivin & Takefman, 1995, 1996; Boivin & Walker, 1997) was used to assess daily reactions to the waiting period (see pages 155-163 for full information about the DRK used in the present study).

Although daily monitoring was expected to be an efficient way of assessing changes and group differences in daily reactions to the IVF waiting period, there may be some drawbacks to the daily monitoring process. One potential issue is reactivity to the daily assessment process itself (Kanfer, 1970). In other words, the very act of monitoring reactions on a daily basis may have beneficial or detrimental effects on women's well-being. Some evidence suggests that women may find daily monitoring helpful because it helps them to keep a track of the way that treatment is affecting them (Boivin, 1997). However, daily monitoring requires women to access information about their reactions to the waiting period in order that they can complete the form. Should the reactions they are experiencing and rating be predominantly and persistently negative (e.g., if it seems as though treatment has failed), a daily reminder of their negativity (and the reasons for it) when completing the DRK may serve to compound or elevate women's distress.

Even if there were no overt cues to a distressing outcome which interacted with the daily monitoring process, however, research suggests that individuals differ in their *dispositional* tendency to cope with potentially threatening events by seeking information

(i.e., monitoring) or by distracting themselves from the situation (i.e., blunting; Miller, 1987). Because daily monitoring directs women's attention to information about how the waiting period is affecting them, high blunters/low monitors who would prefer to avoid this information (Miller, 1987) are prevented from doing so. In addition, research suggests that high monitors/low blunters may seek out information about aversive experiences, but consequently experience sustained high levels of anxiety compared to low monitors/high blunters who choose to avoid threat relevant information (Miller, 1987). Evidence for these proposals has been shown during medical stressors, including gynaecological interventions. In one study involving gynaecology patients who were undergoing an uncomfortable and invasive procedure, high monitors/low blunters (as assessed before the procedure) reported more discomfort and pain after the procedure than low monitors/high blunters and took longer to recover. The high monitors/low blunters also appeared more distressed during the procedure according to their doctor (Miller & Mangan, 1983). Moreover, high blunters/low monitors who were given maximum information about the procedure showed sustained high pulse rates whereas high blunters/low monitors given minimal information showed a reduction in pulse rates by the time of the procedure. In a review of studies finding similar patterns of differences between the responses of monitors versus blunters to stressful situations, Miller (1988) asserts that the converging evidence suggests that "...in uncontrollable settings, there is a physical and emotional cost associated with monitoring for or failing to distract from threatening cues" (p. 28). Therefore, because daily monitoring may have an important impact on women's responses to the waiting period, all women in the present study completed the DRK each day as it was expected that this would ensure that reactivity to the daily monitoring process was evenly distributed between intervention groups.

As discussed by Lazarus and Folkman (1984), the imminence of a meaningful event can interact with cues that signal the likelihood of a particular outcome to influence appraisals and emotional reactions. The majority of women undergoing IVF treatment (around 75% to 80%; Macklon et al., 2002) do not become pregnant and women who are not pregnant may experience cues (e.g., vaginal bleeding) that signal treatment failure as the day of the pregnancy test approaches. Even without physical cues, prior research indicates that women's psychological well-being deteriorates during the waiting period as the day of the pregnancy test approaches (Boivin & Walker, 1997), especially in the last few days before the pregnancy test (see Figure 6, page 84). Therefore, in line with theoretical predictions (Lazarus & Folkman, 1984) and prior research (Boivin & Walker, 1997), it was expected that there would be significant decreases in women's reports of positive reactions (e.g., challenge appraisals, challenge emotions, positive reappraisal coping), and significant increases in negative reactions (e.g., threat appraisals, threat emotions, escapism) in the second week of the waiting period compared to the first in the present study. However, despite these imminence effects it was expected that the PRCI group would report more positive psychological outcomes than the PMI and DMC groups. First, compared to the PMI and DMC groups, it was expected that the PRCI group would:

1. Report more positive (i.e., challenge and benefit) and less negative (i.e., threat, harm and uncertainty) emotions.
2. Report greater use of coping strategies that theory and research suggests will be more helpful in uncertain and uncontrollable situations (e.g., positive reappraisal, emotional expression), and less of those proposed to be less effective (e.g., escapism, problem-focused coping).

3. Appraise the waiting period more positively (e.g., more controllable, more positive implications, easier to cope with) and less negatively (e.g., less stressful, threatening).

The secondary aim of the present study was to establish the effects of the PRCI on pregnancy rates and on daily experience of physical symptoms associated with stress, treatment side-effects and menstruation. Because of the link between psychological factors and various fertility outcomes (e.g., Boivin & Takefman, 1995; Demyttenaere et al., 1998; Klonoff-Cohen et al., 2001; Lancaster & Boivin, 2005; Sanders & Bruce, 1999; Smeenk et al., 2001; Stoleru et al., 1997), women were asked for consent to access their medical records in order that their biological response to this IVF cycle and pregnancy outcomes could be recorded.

Evidence suggests that the highest rate of early pregnancy loss occurs prior to implantation or in the first week of implantation, with around 30% of pregnancies failing prior to implantation and 30% after (Macklon et al., 2002). In IVF treatment, treatment failure during the waiting period (which encompasses the period pre and post implantation), could be due to problems with embryo development, uterine receptivity or a combination of both (Macklon et al. 2002). Furthermore, stress appears to compromise the processes necessary for implantation and pregnancy (e.g., uterine growth and receptivity, progesterone production; Boivin et al., 1998; Smeenk et al., 2001). The extent to which HPA activation influences these processes is not known, but evidence suggests a potential contribution of stress to luteal function in women during normal menstrual cycles. Ecological stress (e.g., increased workload) and psychosocial stressors are associated with depressed progesterone production during the luteal phase (Vitzhum et al., 2002) and with longer cycle lengths (e.g., Hjollund et al., 1999) during such experiences. Further, during

IVF treatment a prospective study showed that stress reported during the luteal phase of IVF was significantly higher than during a normal, non-treatment menstrual cycle (Boivin & Takefman, 1996). Together this evidence suggests a potential influence of stress on biological outcomes after embryo transfer, and thus any beneficial effects of the PRCI on stress may help to alleviate the negative effects of stress on implantation processes during the IVF waiting period.

Because women were randomly assigned to intervention groups *after* oocytes were retrieved and fertilised, and as the number of embryos transferred was determined by fertilisation, it was expected that biological response to IVF treatment up to and including embryo transfer would not differ between groups. However, because the intention was that the PRCI would have beneficial effects on stress during the waiting period, it was expected that more women would become pregnant in the PRCI group than in the control groups. Predictions made relating to physical outcomes during IVF were that, compared to the PMI and DMC groups:

1. More women in the PRCI group would become pregnant.
2. The PRCI group would report less of the physical symptoms associated with failed treatment and menstruation (e.g., menstrual cramps, bleeding).
3. The PRCI group would report less severe psychosomatic stress symptoms.

Women's evaluations of the PRCI, PMI and daily monitoring procedure alone (DMC group) would also be assessed at the end of the waiting period. PRCI-Pilot 3 showed that the PRCI and PMI cards were rated similarly on a number of evaluation dimensions. Both were rated as being moderately helpful and enduring, as making the wait for exam results seem somewhat better, as helping students to feel more positive, and as helping them to see the situation in a more positive light. Students in PRCI-Pilot 3 also endorsed the cards

similarly with respect to the likelihood of them recommending the cards to patients and using the cards themselves in any future medical tests. Both cards were designed to benefit psychological well-being, and the results of PRCI-Pilot 3 suggested that both cards were moderately well-received by students waiting for exam results. However, it was expected that the PRCI would be evaluated more positively than the PMI and daily monitoring alone (i.e., the DMC group) because the PRCI would have more robust and enduring effects on a wider range of psychological outcomes (i.e., appraisals, coping) than the simple mood elevation effects of the PMI. Further, as indicated previously, a simple focus on benefits was not linked to positive outcomes, whereas positive reappraisal coping was (Sears et al., 2003). It was expected that, compared to the PMI and daily monitoring alone, women receiving the PRCI would rate this intervention as more helpful and suitable, as more effective at reducing stress, as helping them to feel more positive, and as helping them to sustain efforts to cope with the waiting period. Finally, it was expected that the PRCI group would be more likely to endorse this intervention for IVF patients and other patient samples during medical waiting periods. As the direction of effects was predicted a priori, one-tailed tests were used to evaluate PRCI effects.

## **5. 2 Method**

### *Design*

The study was of a 3 (intervention group; PRCI, PMI, DMC) x 2 (week; waiting period week 1, waiting period week 2) x 7 (day; 1 – 7) mixed within-subjects factorial design with time (week, day) as the within-subjects factors. The PMI and DMC interventions were control interventions for the PRCI and women were randomly assigned to study groups. The independent variables were the interventions the women received

(positive reappraisal coping, positive mood induction, daily monitoring) and time. The dependent variables were women's psychological and physical well-being after IVF embryo transfer. Psychological well-being was operationalised as women's daily ratings of psychological reactions to the IVF waiting period (appraisals, coping, emotions) and their evaluations of the interventions at the end of the waiting period. Physical wellbeing was evaluated by women's daily ratings of physical symptoms during the waiting period (treatment side effects, menstrual cycle symptoms, physical symptoms associated with stress) and pregnancy outcomes (pregnant, not pregnant) at the end of treatment.

### *Participants*

Participants were recruited from 161 women attending the assisted reproduction unit (ARU) of a large urban hospital for embryo transfer during the study period; 123 (76.40%) of whom were interviewed as potential participants. Of the original 161 women, 38 were not interviewed because they had been sedated during embryo transfer ( $n = 5$ ), they had participated earlier in the study period ( $n = 10$ ), they were unable to participate for medical reasons ( $n = 1$ ) or they were not interested in participating ( $n = 22$ ). Of the 123 women who were interviewed, 41 (33.33%) were not included in the final sample because they did not complete all study materials ( $n = 38$ , 30.89%), did not follow study procedures ( $n = 1$ ), or had psychological ( $n = 1$ ) or language ( $n = 1$ ) issues. The final sample therefore comprised 82 women having had an embryo transfer at this ARU. Selection criteria for the study were that women had a successful embryo transfer (i.e.,  $\geq$  one embryo transferred to the uterus), had not been sedated during embryo transfer, could read and understand the study materials, and completed all study materials. The final sample represented 50.93% of patients who had embryo transfers during the study period, and 66.67% of those who

agreed to participate. Women were randomly assigned to three intervention groups at embryo transfer. Of the final sample, 28 were in the PRCI group, 27 in the PMI group, and 27 in the DMC group. Table 13 shows demographic and general health characteristics for women in the final sample.

**Table 13.**

*Demographic and general health characteristics of women in the final sample*

Variable	Intervention group			F/ $\chi^2$
	PRCI (n = 28)	PMI (n = 27)	DMC (n = 27)	
<b>Age (in years)</b>				
<i>M</i>	35.39	36.04	36.19	.34
<i>SD</i>	4.04	3.83	3.54	
<b>Years living with partner</b>				
<i>M</i>	8.43	9.46	9.78	.66
<i>SD</i>	3.90	4.10	5.52	
<b>Children living at home</b>				
<i>%</i>	28.57%	18.52%	18.52%	1.09
<i>n</i>	8	5	5	
<b>Other medical problems</b>				
<i>%</i>	21.40%	33.33%	22.20%	1.23
<i>n</i>	6	9	6	

**Note.** *df* = 2 and 79 for age and number of years living with partner. Chi-square analyses were performed on 82 participants.

There were no significant differences between intervention groups on these demographic variables (see Table 13, page 149). As shown in Table 13, women were in their mid-30s and had lived with their partners for about eight to ten years. The majority (70 – 80%) did not have children living with them, and most (70 – 80%) did not have concurrent medical problems. There were no significant differences between intervention groups on these demographic variables. Regarding other characteristics of the sample, around 90 – 95% of women in each group were employed and a similar percentage in each group were educated to  $\geq 16$  years of age. Three women in each of the PRCI and PMI groups and one in the DMC group had sought help from a mental health professional at some point in time. Of these, one woman in the PRCI and DMC groups and three in the PMI group had sought help for infertility-related issues.

The types of fertility treatment women had undergone before embryo transfer included IVF, ICSI and other treatments (e.g., donor IVF). There was no significant association between intervention group and type of treatment,  $\chi^2(4, N = 82) = 5.92, p > .05$ . Eleven women (13.41%) had frozen embryos transferred in the present study, whereas the remainder ( $n = 71$ ) had fresh embryos transferred. Five women who had frozen embryo transfers were in the PRCI group, two were in the PMI group and four were in the DMC group. As expected frequencies for women who had frozen embryo transfers were  $< 5$  in each intervention group, data violated requirements for chi-square analyses and differences between groups in the number of women having had frozen embryo transfers was not subjected to further analysis. To establish whether women who had frozen embryo transfers differed from those who had fresh embryo transfers in their expectations of becoming pregnant in that treatment cycle or of treatment outcomes, women who had frozen embryo transfers were compared with those who had fresh embryo transfers on their estimates

about becoming pregnant in that treatment cycle, their BHCG levels as assessed by the IVF pregnancy blood test, and on biochemical and clinical pregnancy rates. *t*-test analyses showed that women who had frozen embryo transfers estimated their chances of becoming pregnant in that treatment cycle as significantly lower than did women who had fresh embryo transfers,  $t(80) = -2.10, p < .05$ , but that there were no significant differences between women who had fresh or frozen embryo transfers on BHCG levels,  $t(80) = .70, p > .05$ . There were also no significant associations between type of embryo transfer (fresh, frozen) and biochemical pregnancy rates ( $p > .05$ , Fisher's exact statistic) or clinical pregnancy rate ( $p > .05$ , Fisher's exact statistic).

## *Materials*

### I. Assessment materials

Women were provided with a pack containing all materials they needed to complete the study, including stamped, preaddressed envelopes to return questionnaires completed at home. Assessment comprised four phases. Phase I: Baseline assessment materials were completed at clinic after embryo transfer (or at home the same evening if they could not be finished at clinic). The Phase II: Daily Record Keeping form was completed at home each evening until the day before the pregnancy test. PRCI and PMI groups also read an intervention card twice daily during this period. The Phase III: Intervention evaluation questionnaire was completed at home on the day before the pregnancy test. For the Phase IV: Biological assessment, the researcher collected information about women's biological response to treatment from medical records after treatment had finished. An instruction sheet was included with the materials. See Figure 12 (page 152) for a flow chart of the treatment and assessment schedules and Table 14 (page 153) for a summary of materials.

Table 14.

Materials com...

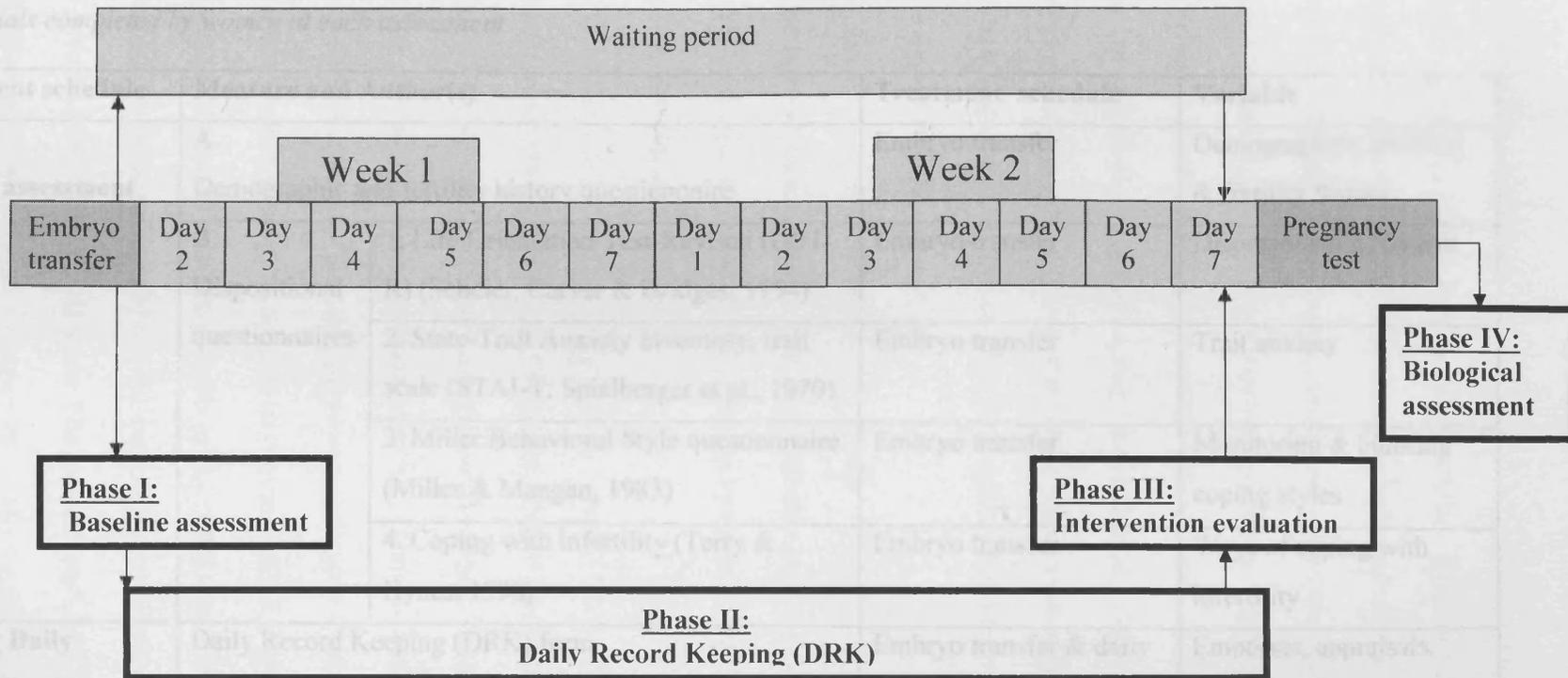


Figure 12. Flow chart showing treatment schedule (shaded areas) and assessment schedule (bold areas).

**Table 14.**

*Materials completed by women at each assessment*

<b>Assessment schedule</b>	<b>Measure and Author(s)</b>	<b>Treatment schedule</b>	<b>Variable</b>	
<b>Phase I:</b> <b>Baseline assessment</b>	A. Demographic and fertility history questionnaire	Embryo transfer	Demographics, medical & fertility history	
	B. Dispositional questionnaires	1. Life Orientation Test-Revised (LOT-R) (Scheier, Carver & Bridges, 1994)	Embryo transfer	Dispositional optimism
		2. State-Trait Anxiety Inventory, trait scale (STAI-T; Spielberger et al., 1970).	Embryo transfer	Trait anxiety
		3. Miller Behavioral Style questionnaire (Miller & Mangan, 1983)	Embryo transfer	Monitoring & blunting coping styles
		4. Coping with infertility (Terry & Hynes, 1998)	Embryo transfer	Ways of coping with infertility
<b>Phase II: Daily Record Keeping</b>	Daily Record Keeping (DRK) form (Adapted: Boivin, 1997)	Embryo transfer & daily prior to pregnancy test	Emotions, appraisals, coping & symptoms	
<b>Phase III: Intervention Evaluation</b>	Intervention Evaluation questionnaire (Adapted: Borkovek & Nau, 1972)	Day before pregnancy test	Practicality/effectiveness of interventions	
<b>Phase IV: Biological assessment</b>	Biological outcome chart	From medical charts after study	Biological response to IVF treatment	

## Phase I: Baseline assessment

*A. Demographic and fertility history questionnaire.* This questionnaire was developed for the study and was used to obtain demographic information (e.g., age, educational status), medical (i.e., comorbid medical conditions), and gynaecological history (e.g., infertility diagnosis, duration of infertility). Two other questions enquired about women's expectations regarding the outcome of the IVF treatment cycle. One asked about estimated chances of conceiving (based on an item from Litt et al., 1992) and the other asked about degree of control over the outcome. Responses were made on a scale of 0 – 100%, with 0% representing no chance/control and 100% complete chance/control (see Appendix E, page 389 for questionnaire).

*B. Dispositional questionnaires.* Two questionnaires assessing dispositional qualities that may influence emotions, appraisals, coping and physical health outcomes were completed, along with two coping measures.

*1. Dispositional optimism.* The Life Orientation Test-Revised (LOT-R; Scheier, Carver & Bridges, 1994) was used to assess dispositional optimism. The LOT-R contains six items assessing generalised outcome expectancies (e.g., “Overall, I expect more good things to happen to me than bad”). Four other items were filler items, and ratings were made on a 5-point scale, as described for the original LOT (see Study 1, page 58). The LOT-R items generated three types of measure (Scheier et al., 1994). The first assessed overall dispositional optimism (Overall LOT-R), computed by reverse scoring negatively worded items and summing scores for all items. The mean overall LOT-R score for a normative sample of medical (heart bypass) patients ( $N = 159$ ) was 15.16 ( $SD = 4.05$ ) (Scheier et al.,

1994). The other two measures assessed optimism (LOT-R optimism) and pessimism (LOT-R pessimism) separately, computed by summing the positively and negatively worded items separately (without reverse scoring negatively worded items). Higher scores indicated greater optimism or pessimism (respectively). Normative data showed that the overall LOT-R had acceptable internal consistency ( $\alpha = .78$ ), and test-retest reliabilities at 4 (.68), 12 (.60), 24 (.56) and 28 months (.79) indicated that the LOT-R was stable over time (Scheier et al., 1994), as would be expected from a dispositional measure. In the present study, Cronbach's alpha for the three measures was acceptable: overall LOT-R,  $\alpha = .83$ , LOT-R optimism,  $\alpha = .65$ , and LOT-R pessimism,  $\alpha = .85$  (see Appendix F, page 391 for the LOT-R).

2. *Trait anxiety*. The trait (STAI-T) scale of the Spielberger et al. (1970) State-Trait Anxiety Inventory was used to assess the extent to which women were prone to experience greater anxiety in stressful situations (see Study 1, page 59, for full details of the STAI-T). The reliability of the STAI-T was high in the present study ( $\alpha = .87$ ).

3. *Coping style*. The Miller Behavioral Style Scale (MBSS; Miller, 1987) was used to assess whether women differed in their dispositional tendency to cope with potentially threatening events by seeking information (i.e., monitoring) or by distracting themselves from the situation (i.e., blunting). The MBSS contains four scenarios describing hypothetical, uncontrollable, stress-evoking life-experiences. Each was followed by eight statements representing different ways in which one might cope in that situation. Women marked all statements that applied to them. The measure yielded two scores. The first was a monitoring score which indicated the extent to which women would use information-

seeking to manage stressful situations, and the second was a blunting score which indicated the extent to which they would use distraction to avoid such information. Internal consistency was reported as .75 for the monitoring score and .73 for the blunting score (Miller, personal communication, 1987). This measure was not originally included in the study protocol, but comments on a small number of intervention evaluation questionnaires returned early in the study period suggested that some women might enjoy the daily monitoring of reactions to the waiting period required in the present study whereas others might not. The implication of this was that women may differ in the extent to which they favoured monitoring rather than blunting as an approach to dealing with the potentially threatening experience of waiting for an IVF pregnancy test result. Although this difference was not anticipated when originally designing the study, the review of prior theory and research into the blunting and monitoring model (see page 142) suggested that any differences between groups in this approach to stressful situations may impact on the results obtained using the daily monitoring methodology used in the present study.

Because feedback from some participants suggested that there may be individual differences in monitoring or blunting preferences, and it was anticipated that potentially threatening cues to the pregnancy test result would be available to women during the waiting period, it seemed important to control for any group differences in monitoring/blunting coping styles when analysing the emotional reactions and physical symptoms assessed on a daily basis. The MBSS was included in the study at the first possible opportunity<sup>13</sup>, but as it was not in the original protocol, data was not available for the full sample ( $n = 55$  for this measure). It was expected that, should significant differences in coping style be found between groups, that high monitors/low blunners would

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<sup>13</sup> On receipt of appropriate approval for this addition from the NHS Research and Development committee and NHS Local Research Ethics Committee.

experience sustained or increasing levels of stress (negative appraisals, negative emotions) during the waiting period compared to low monitors/high blunters. In the present study, the reliability of the monitoring scale was acceptable ( $\alpha = .74$ ), but the blunting scale was lower ( $\alpha = .58$ ).

*4. Coping with infertility questionnaire* (Terry & Hynes, 1998). This questionnaire comprised four subscales assessing the extent to which women generally used problem-management, problem-appraisal, emotional approach and escapism when coping with their fertility problems (Terry & Hynes, 1998). Problem-management coping refers to active efforts to solve a problem, whereas problem-appraisal refers to attempts to deal with the stressful nature of an experience by, for example, attending to any positive aspects of the situation. Emotional expression refers to expressing the emotions engendered by a stressful situation, whereas escapism represents attempts to avoid the situation by daydreaming, fantasising and denying that there is a problem. Due to the reliability issues encountered in Study 1 (see page 60), which may have arisen because a different coping measure was adapted to create an approximation of the four Terry and Hynes subscales, data relating to these coping constructs in the present study was collected using the scales as intended by Terry and Hynes (1998). See Study 1 (page 60) for psychometric information relating to these coping scales presented by Terry & Hynes (1998). Cronbach's alphas in the present study were higher for three of the four subscales in the present study than they were in Study 1 and were of a magnitude considered to indicate acceptable reliability: Problem-appraisal,  $\alpha = .70$  (8 items), escapism  $\alpha = .71$  (7 items), and emotional expression,  $\alpha = .70$  (5 items). Cronbach's alpha for the problem-management scale, however, was a little lower ( $\alpha = .64$ , with 6 items), and could not be improved by removing individual problem-

management coping items. Results obtained using all four coping subscales are reported in the present study (see Appendix G, page 392, for the coping inventory used in Study 3).

### Phase II: Daily Record Keeping

*Daily Record Keeping (DRK) form.* Women rated the emotions, appraisals, coping and physical symptoms they experienced during the waiting period on a daily basis. Daily records were made on the DRK, adapted from the DRK developed and employed by Boivin and colleagues to assess daily emotional reactions, coping, and physical reactions to IVF treatment (e.g., Boivin, 1997; Boivin & Takefman, 1995, 1996). Evidence suggests that women who have used daily monitoring forms during IVF treatment have found the daily monitoring procedure to be acceptable, and that the daily monitoring forms were easy to use. Furthermore, Boivin (1997) found that daily monitoring was a reliable, valid and sensitive method of assessing daily reactions to IVF treatment. The original DRK was adapted for the present study by the addition of items assessing appraisals of the IVF waiting period.

The DRK enquired about women's experience of 46 possible reactions to the IVF waiting period, comprising 20 emotions, optimism and pessimism about pregnancy, 12 physical symptoms, five appraisals, and seven coping strategies (see Appendix H, page 393, for DRK form). The assessments of these constructs of interest were brief because asking women to complete full measures of appraisals, coping, emotions and physical symptoms on a daily basis would put onerous demands on them at an already stressful time. Women were provided with two DRK forms, each containing seven columns (one column for one day of ratings). Written instructions asked women to complete one column of the DRK each evening during the waiting period. Women receiving an intervention card (i.e.,

PRCI, PMI groups) were instructed to complete the DRK before reading the card in the evening, or otherwise to leave at least one hour between reading the card and completing the DRK, in order to limit the chance of DRK ratings being artificially and transiently influenced by completing the DRK immediately after reading an intervention card (see Appendix I and J, pages 394 and 395 for instruction sheets). Responses for each item on the DRK were made according to a four-point scale. If the woman did not experience a particular reaction, she left the box next to the item in question blank. If her experience of the reaction was mild (i.e., it did not interfere with her daily activities), she wrote '1' in the box; if it was moderate (i.e., it interfered with daily activities to some degree), she wrote '2'; and she wrote '3' if it was severe (i.e., the reaction had a markedly negative effect on how well she performed her daily tasks). After seven days of ratings, women returned the first DRK to the researcher in a preaddressed, prepaid envelope. The second DRK was returned, along with the intervention evaluation questionnaire, on the day before the pregnancy test.

To ensure that each reaction provided for women to rate on the DRK was relevant to women during the waiting period experience, a criterion for relevance was set. This criterion was that at least 30% of women must endorse the reaction on at least one day of the waiting period, following the method of Boivin (1997). Only one reaction did not meet this criterion, which was the emotional reaction 'Angry'. This emotion was not included in the harm emotions subscale described below. The following sections describe all reactions assessed by the DRK.

### *i. Emotions*

Twenty emotions were assessed on a daily basis. Women endorsed each of the 20 emotion adjectives provided on the DRK (e.g., happy, sad, anxious) according to whether, and to what extent, they had felt that way in the previous 24 hours. Nineteen of these emotions (i.e., excluding angry) were used to compute five emotion subscales. Four subscales comprised emotions that Folkman and Lazarus (1985) proposed to be the emotional counterparts of particular appraisals of a situation. Two *anticipatory emotion* subscales were computed, one comprising emotions associated with the anticipation of a positive outcome (i.e., *challenge emotions*; Folkman & Lazarus, 1985) and one comprising emotions associated with the anticipation of a negative outcome (i.e., *threat emotions*; Folkman & Lazarus, 1985). Two *outcome emotion* subscales were also computed, one comprising emotions associated with the realisation of a positive outcome (i.e., *benefit emotions*; Folkman & Lazarus, 1985) and one comprising emotions associated with the realisation of a negative outcome (i.e., *harm emotions*; Folkman & Lazarus, 1985). The fifth emotion subscale (*uncertainty emotions*; Boivin, 1997) comprised emotions that may be experienced when an individual is not able to determine whether an outcome would be positive *or* negative. The reliability of each subscale at baseline was acceptable (see Table 15, page 158, for details of emotions included in each subscale and the reliability of each emotion subscale at the baseline assessment).

**Table 15.***Emotion items and reliabilities for emotion subscales at baseline assessment.*

<b>Subscale</b>	<b>Adjectives</b>		<b>Reliability</b>
<b>Threat emotions</b>	Anxious	Tense	$\alpha = .82$
	Nervous	Worried	
<b>Challenge emotions</b>	Confident	Positive	$\alpha = .76$
	Encouraged	Hopeful	
<b>Harm emotions</b>	Disappointed	Sad	$\alpha = .79$
	Discouraged		
<b>Benefit emotions</b>	Fulfilled	Content	$\alpha = .70$
	Relieved	Happy	
<b>Uncertainty emotions</b>	Doubtful	Uncertain	$\alpha = .78$
	Unsure	Hesitant	

*ii. Appraisals*

Five appraisals were assessed on a daily basis. Four of these were based on the approach of Peacock and Wong (1990) in their development of the Stress Appraisal Measure (SAM). The SAM is a theoretically based multidimensional stress appraisal measure that measures primary and secondary appraisal (e.g., Lazarus & Folkman, 1984). SAM items were developed to be consistent with Peacock and Wong's conceptualisation of appraisal as "the person's perception of the situation at a particular point in time" (Peacock & Wong, 1990, p. 229). In the present study, the original seven-factor, 28-item SAM was reduced to four items, each assessing one appraisal, for practical reasons (i.e., time taken to

complete the DRK daily, space on the DRK). Two primary appraisals (threat appraisal, challenge appraisal) were assessed with one item each, as was one secondary appraisal (control over the waiting period). Another item assessed appraisals of overall stressfulness of the waiting period (Peacock & Wong, 1990). SAM items were adapted to refer specifically to the “waiting period” in order to ensure that women were considering the waiting period experience rather than appraising a possible positive or negative pregnancy test result. Alpha reliabilities could not be reported for the appraisal measures as single item measures were used. However, reliabilities for the original SAM subscales represented by these items were generally good  $\alpha = .66 - .79$  (challenge),  $\alpha = .65 - .75$  (threat),  $\alpha = .84 - .87$  (personal control), and  $\alpha = .75 - .81$  (stressfulness) and all original SAM items loaded  $\geq .40$  on their respective factors (Peacock & Wong, 1990). The fifth appraisal item (developed for the study) assessed women’s appraisals of their ability to cope with the waiting period.

In the present study, DRK appraisal items were presented to women as ‘Ways of thinking about the waiting period’, and women rated each according to the extent to which it represented their appraisal of the IVF waiting period each day: (1) “The waiting period could have a negative impact on me” (Primary *threat appraisal*), (2) “The waiting period could have a positive impact on me” (Primary *challenge appraisal*), (3) “I can control what happens in the waiting period” (Secondary *personal control appraisal*), (4) “I perceive that the waiting period is stressful” (appraisal of *overall stressfulness*), and (5) “I have what it takes to cope with the waiting period” (*ability to cope*).

### *iii. Coping*

Seven coping strategies were assessed on a daily basis. Because of practical limitations (i.e., time taken to complete on a daily basis, space on the DRK form), each of the following coping strategies were assessed with one item each: problem-focused coping, positive reappraisal coping, acceptance, relaxation, emotional expression, escapism and distraction. Items and item sources for coping items were as follows: Items assessing relaxation (“I did something with the implicit intention of relaxing”, distraction (“I turned my attention away from treatment by thinking about other things or doing some activity”), acceptance (“I accepted there was nothing I could do”) and emotional expression (“I expressed my emotions”) were adapted from the daily coping measure developed by Stone and Neale (1984, p. 897). The escapism item (“I wished the situation would go away or somehow be over with”) was from the wishful thinking scale developed by Folkman and Lazarus (1985, p. 157), and the problem-focused item (“I made a plan of action and followed it”) was from Holahan and Moos (1987, p. 949). Finally, the positive reappraisal coping item (“I tried to make the most of the situation”) was adapted from Terry and Hynes (1998, p. 1092).

A series of studies were conducted by Stone and Neale (1984) to develop their single-item coping measures. In one of these studies, Stone and Neale found that the coping items included above were endorsed on a checklist of strategies by participants and that participants also generated these strategies spontaneously in an open-ended assessment of the coping strategies they had used. Stone and Neale propose that this convergence demonstrates the content validity of these single item coping measures, supporting their inclusion on the DRK used in the present study. Furthermore, the positive reappraisal coping item used in the present study loaded  $> .40$  on Terry and Hynes’s problem appraisal

scale (Terry & Hynes, 1998), indicating that this item is a reliable indicator of this coping construct. Folkman and Lazarus (1985) and Holahan and Moos (1987) do not provide information about the reliability or validity of the items making up their coping constructs.

The types of coping strategies assessed in the present study were selected for the following reasons: Terry and Hynes found that in a low control infertility context, problem-focused coping aimed at managing the way one thought about the situation (e.g., positive reappraisal) and emotional-approach coping (e.g., emotional expression) was associated with better adjustment, whereas problem-focused coping aimed at managing the situation (e.g., active problem-focused coping) and emotion-focused coping aimed at avoiding the reality of the situation (e.g., escapism) was associated with poorer adjustment. Items assessing these coping constructs were included on the DRK used in the present study in line with this approach. Relaxation, acceptance, and distraction were assessed because these alternative emotion-focused strategies may be employed and found helpful by women during the IVF waiting period when nothing can be done to alter the outcome of treatment, but any emotions engendered by the stressfulness of the waiting experience would require regulation.

#### *iv. Physical reactions*

The 12 physical symptoms assessed using the DRK included eight physical stress reactions (e.g., racing heart, muscle tension) which have been reported during stressful experiences, two symptoms that are typical side-effects of medication taken during the stimulation phase of IVF and of early pregnancy (breast tenderness, abdominal bloating) and two that are associated with treatment failure (menstrual cramps and vaginal bleeding). The physical stress reactions were based on the Pennebaker Inventory of Limbic

Languidness (PILL, Pennebaker, 1982), and comprised physical symptoms associated with psychological distress (e.g., racing heart). Ratings for the experience of individual physical symptoms on the PILL are summed. Cronbach alphas range from .88 to .91 for this somatisation scale and test-retest reliabilities range from .79 to .83 (Pennebaker, 1982). Psychosomatic symptoms were assessed in the present study because a stressful experience can cause heightened autonomic nervous system reactivity, which in turn can cause physical sensations such as a racing heart, sweating and fatigue. Moreover, during a medical based stressor, the medical context may increase the extent to which individuals are aware of physical symptoms (Pennebaker, 1982) and as such these physical concomitants of stress may be more noticeable to women during IVF treatment. In addition, individuals who report more physical symptoms when they are physically healthy may be experiencing, though not necessarily reporting, more negative emotional states. For example when people are anxious they may complain of fatigue, nausea, and aches and pains (Pennebaker, 1982). A higher score on psychosomatic stress reactions in the present study may therefore indicate that women were experiencing greater psychological stress. A somatisation scale was created by summing the means for individual symptoms. The reliability of the somatisation index in the present study ranged from  $\alpha = .50$  –  $\alpha = .72$ , depending on waiting period day.

The physical symptoms associated with medication and treatment failure were assessed for two reasons. First, women's experience of these symptoms were expected to change as the waiting period progressed, with reports of symptoms associated with treatment failure (e.g., vaginal bleeding) increasing in those who were not pregnant, and reports of symptoms associated with pregnancy (e.g., breast tenderness) increasing in those who were pregnant as the day of the pregnancy test approached (Boivin & Takefman,

1996). Women's psychological well-being may also change alongside these indicators of treatment failure and success, and it would therefore be necessary to control for such physical indicators when interpreting psychological reactions to the waiting period. Secondly, should physical symptoms associated with medication and treatment failure change in predictable ways during the waiting period, this helps to support daily monitoring methodology as a method of capturing changes in reactions to the waiting period over time.

#### *Daily intervention evaluation items*

Three further items on the DRK were daily intervention evaluation items. Two questions were asked of all women. One item asked them "How did you feel after reading the card? (or completing the daily monitoring form in the case of the DRK group). Responses were made according to a three-point scale, 1 = more negative, 2 = the same, 3 = more positive. The second asked them "How long did any effects last for?" (number of minutes). The third question was a manipulation check item, asked of the PRCI and PMI groups only, which asked "How many times did you read the card today?"

#### Phase III: Intervention evaluation

*Intervention evaluation questionnaire.* This measure was adapted from the intervention evaluation measure developed for PRCI-Pilot 3 (see page 129), and contained 24 items. Questions enquiring about the helpfulness and suitability of the interventions were adapted from Borkovek and Nau (1972). On the day before the pregnancy test, women rated the PRCI, PMI, or DRK form according to their opinions about the effectiveness and practicality of these interventions. To improve the presentation of results relating to these evaluation dimensions, the results were organised into groups thought to represent (1) the

practicality of the interventions (e.g., how quick and easy the cards were to use), (2) the acceptability of the interventions (e.g., how helpful and enduring the effects were), (3) perceptions of any psychological effects of the interventions (e.g., the extent to which the interventions influenced positive thinking, or served as a distraction), and (4) women's endorsements of the cards (e.g., whether they would recommend them to others). The following description of items refers to "the intervention card", but intervention evaluation items presented to the DMC group referred specifically to "daily monitoring" (see Table 16, page 165) for the intervention evaluation items presented to the PRCI and PMI groups). Responses to the items presented in Table 16 were made on 6-point scales, anchored 1 (not at all) to 6 (extremely), with some exceptions. Item 11 was rated on 7-point scale, anchored -3 (much less stressful) to + 3 (much more stressful) (zero represented no effect), and Item 16 was rated on a 7-point scale, anchored 1 (more negative) to 7 (more positive) (4 represented no difference).

Five items not shown in Table 16 were included on the intervention evaluation questionnaire. Women were asked: (1) "On the whole, how long do you think any effects of reading the card lasted?" and they endorsed this item according to five categories (0 – 20 minutes, 20 minutes – 1 hour, 1 – 2 hours, 2 – 3 hours and 3 hours+), (2) "How anxious were you during the waiting period? and (3) "How anxious do you think you would have been if you had not received the intervention card?" and they rated these items on 10-point scales anchored 1 (not at all) to 10 (extremely), (4) "Do you think that you received the new intervention?" (yes or no). This question was not asked of women who took part at the beginning of the study period  $N = 61$  for this item). Space was provided for women to write comments about the intervention card or daily monitoring (see Appendix K, page 396 for questionnaire).

**Table 16***Intervention evaluation items for the PRCI and PMI groups*

<b>Practicality</b>	
1	Was the intervention card quick?
2	Was the intervention card easy?
3	Did it fit into your daily routine?
4	Was it difficult to remember to read the card?
5	To what extent did you find that you had memorised the items?
<b>Acceptability</b>	
6	How helpful was the intervention card that you received?
7	How suitable does this type of intervention card seem to you for this experience?
8	How confident are you that the intervention card affected the stress of waiting to take a pregnancy test?
9	Did any effects last long enough to be helpful?
10	Was it a hassle to read the card?
<b>Psychological effects</b>	
11	To what extent did the intervention card affect the stress of waiting to take a pregnancy test during IVF treatment?
12	Did the intervention card help you to feel more positive?
13	Did the intervention card help to distract you from the situation?
14	Did the intervention card help you to carry on or keep going during this experience?
15	Did the intervention card help you to think what to do after the pregnancy test?
16	Did the intervention card help you to look at the situation in a different light?
<b>Endorsements</b>	
17	Supposing that you had fertility treatment in the future, would you be willing to use this intervention card again?
18	How confident would you be in recommending this intervention card to a friend who was extremely anxious about her pregnancy test result?
19	How successful do you feel this intervention card would be in reducing anxiety about different medical test results (e.g., genetic tests, cancer tests)?
20	Do you think that other IVF patients would use this intervention card?

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#### Phase IV: Biological assessment

*Biological outcome chart.* This chart was developed for the study and was used to record information about biological response to treatment. Data collected included the number of oocytes retrieved and fertilised, the number of embryos transferred to the uterus, and type of treatment (e.g., IVF, ICSI etc.). Pregnancy outcomes were also recorded; (1) the result of the blood test at the end of the waiting period (BHCG level, biochemical pregnancy diagnosis) and (2) the outcome of the seven-week ultrasound scan result. In this ARU, a diagnosis of biochemical pregnancy was made if BHCG levels were > 100 mIU/ml, as detected by a blood test 14 days after embryo transfer (Northcott, personal communication, July 2005). Clinical pregnancy was diagnosed if a foetal heartbeat was detected in the uterus at an ultrasound scan at seven weeks of pregnancy (i.e, three weeks post blood test). This seven-week scan would also establish if the woman was no longer pregnant, due to ectopic pregnancy (where the foetus develops outside the uterus), miscarriage, or anembryonic pregnancy<sup>14</sup>.

#### II. Intervention materials

Women were randomly assigned to one of three experimental groups for the duration of the study. All women rated their emotional reactions, appraisals, coping strategies and physical symptoms on the DRK each day, and the PRCI and PMI groups also received an intervention card. The PRCI group received the Positive Reappraisal Coping Intervention card, the development of which was described in PRCI-Pilot 1 (page 97). One PRCI statement was modified. The original statement “I will learn something” was changed

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<sup>14</sup> Anembryonic pregnancy (also known as blighted ovum) occurs when the embryo does not develop after attaching itself to the lining of the womb. As pregnancy hormones are secreted, this results in an initial diagnosis of pregnancy, which is later disconfirmed by the ultrasound scan.

to “I will learn from the experience”, as this was considered to be more specific and conceptually representative of the nature of positive reappraisal coping (see Table 17 for the PRCI items used in the present study. Women in the PMI group received the positive mood induction card, the development of which was described in PRCI-Pilot 3 (page 121). Some modifications to original PMI statements were made, in order to address concerns raised in the previous study about the inappropriate or excessive nature of some statements. The original “Life’s a blast” statement was changed to “Life is great”, “I really do feel good” was changed to “I really do feel positive”, and “I can’t remember when I last felt so good” was changed to “I feel happy” (see Table 18, page 168 for the PMI items used in the present study).

**Table 17.**

*The PRCI as used in Study 2*

<i>During this experience I will:</i>
Try to do something that makes me feel good
See things positively
Look on the bright side of things
Make the best of the situation
Discover what is important in life
Focus on the positive aspects of the situation
Find something good in what is happening
Try to do something meaningful
Focus on the benefits and not just the difficulties
Learn from the experience

**Table 18.**

*The PMI as used in Study 2*

<b>During this experience I feel that:</b>
I'm energised
I really do feel positive
I'm creative
I feel good about the world
I feel completely aware
It's great to be alive
Nothing can depress me
I'm a great person
Life is great
I feel happy

### *Procedure*

This study received ethical approval from the South East Wales Research Ethics Committee (Cardiff, Wales), which receives applications for medical clinics governed by the National Health Service in the area from which participants were recruited. In addition, the researcher (the author) had an honorary contract with the hospital and was on the Human Fertilisation and Embryology Authority (HFEA) licence for that clinic, which were prerequisites for patient contact in the hospital and ARU (respectively).

On the first day of IVF treatment (approximately 14 – 21 days before embryo transfer), ARU staff provided women with an information sheet describing the objectives and requirements of the study (see Appendix L, page 399). On embryo transfer day, an embryologist asked each woman whether she would like to meet with the researcher, and the researcher met those who expressed an interest, individually, in the ARU recovery room after embryo transfer. At that time, the researcher described the study in more detail,

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explaining how and when to complete the materials. Women in the PRCI and PMI groups were shown the envelope containing the intervention card, and given the following information:

“We ask women to read this card at least twice a day – for example, once in the morning and once in the evening. However, the card is ‘this big’, [indicating size] and laminated. Therefore it’s small enough to put in a purse or pocket if you want to carry it with you and read it at other times. You may read the card as many times as you wish each day, but we do ask you to read it at least *twice* a day”.

The researcher responded to comments and queries and women who wished to participate signed the consent form (see Appendix M, page 401) and were recruited into the study.

Random assignment to the three experimental groups was made by a research colleague not affiliated with the study. Days rather than participants were randomly assigned to conditions because recruitment took place in a group recovery room, meaning that instructions (e.g., read this card) could be overheard by other women who had either just been recruited or were about to be. The researcher (the author) was blind to which of the intervention cards was given (PRCI, PMI groups) as the research associate sealed them into envelopes prior to recruitment (women opened envelopes at home). The researcher was not blind to which women were assigned to the control (DMC) group because these women did not receive an envelope containing a card and did not receive instructions about an intervention card. However, apart from instructions and references to the “the intervention card” which were omitted for the DMC group, women received identical information and

all women were told they would receive one of three interventions. The research associate informed the researcher about group assignment (PRCI, PMI groups) at the end of the study.

### *Data Analysis*

Prior to analysing data from the final sample, distributions of scores for each variable were examined to determine suitability for univariate analyses. Distributions for each intervention group were examined separately. Missing data for variables assessed once (e.g., dispositional questionnaires, biological outcomes) were replaced with mean values for these variables for the intervention group to which the cases(s) belonged. Missing values for (1) the Miller Behavioral Style questionnaire and (2) the manipulation check item were not replaced for those who had not received the measure/item. Missing data for variables assessed repeatedly (i.e., DRK variables) were replaced with means for the group to which the case(s) belonged, on the day(s) in question (i.e., five women missing 1 or 2 days of monitoring). One outlier was found ( $SD > 3.00$ ) in the distribution for the number of oocytes fertilised in the PMI group. This was set equal to the next highest value in the distribution for this group. The number of participants required for this study was based on the expectation of medium effects ( $f = .25$ ), with  $\alpha = .05$ , with 3 groups of participants, following the method of Cohen (1992). According to Cohen (1992), 52 participants per group were needed for 80% power to detect whether the PRCI had a medium effect on study outcomes.

Variables assessed only once in the study included parametric and nonparametric variables. Parametric variables were analysed using one-way Analyses of Variance (ANOVAs), and significant ( $p < .05$ ) Fs were followed up with Tukey posthoc

comparisons. Mixed between-within ANOVAs with subscale as the within-subjects variable were used to assess between and within group differences on coping with infertility subscales. Chi-square analyses were used for nonparametric variables. DRK variables were analysed using mixed between-within ANOVAs with week (2) and day (7) as the within-subjects factors. Significant interactions and main effects were followed up with comparisons, using Bonferroni corrections for the number of comparisons (Field, 2005; Hinton, Brownlow, McMurray & Cozens, 2004). In cases of sphericity violation, Greenhouse-Geisser corrected degrees of freedom were used when describing the Day main effect, the two-way interaction including the Day effect (Group by Day), the Week by Day interaction and the three-way (Group by Week by Day) interaction. Significant main effects of Day were not followed up because such effects collapsed across waiting period week (i.e., day 1 of week 1 was combined with day 1 of week 2, day 2 of week 1 with day 2 of week 2, day 3 of week 1 with day 3 of week 2 and so on). A significant effect of Day simply showed that the means of each combined pair of day 1s, 2s, 3s, 4s, 5s, 6s and 7s were not equal. In other words, should the day 5 pair be rated more positively than the day 1 pair, it would be somewhat analogous to saying that Fridays are better on average than Mondays. Such a finding would not indicate whether the latter days of the second waiting period week differed significantly from individual days in week 1, for example, and would therefore have no utility in isolating the expected imminence effects that may influence ratings of the last few days of week 2. Significant Group by Day interactions were not followed up when significant as these also collapsed across waiting period week.

Because it was likely that women who experienced more cues suggesting they were not pregnant (i.e., vaginal bleeding, abdominal bloating, breast tenderness) would experience more negative psychological reactions to the waiting period, Analyses of

Covariance (ANCOVAs) were conducted when vaginal bleeding, abdominal bloating, and breast tenderness were significant predictors of the dependent variable. There were 23 instances where one or more of the covariates were significantly related to daily psychological outcomes. Of these 23 instances, the inclusion of the covariate altered the significance of the results on only four occasions. In two cases (harm emotions, challenge emotions), including the breast tenderness or abdominal bloating covariates (respectively) strengthened marginally significant results such that they became significant. In a further two cases (harm emotions, pessimism about being pregnant), including the vaginal bleeding covariate weakened significant results so that they became marginally significant or nonsignificant. Because the inclusion of physical symptom covariates altered the significance of few results, results for DRK variables are reported without covariates, but a section has been added to the interpretation of results for the variables in question, to describe the influence of the covariate on the results presented.

### **5.3 Results**

Results are presented in two sections. Section A contains the results of analyses comparing intervention groups on (1) fertility characteristics, (2) treatment expectations and (3) psychological characteristics at baseline. Section B compares groups on psychological and physical outcomes, and provides results for (1) manipulation checks, (2) daily emotion, expectation, appraisal, coping and physical symptom variables (3) intervention evaluation variables and (4) physical outcomes. For all results presented hereafter there were 28 women in the PRCI group, and 27 in the PMI and DRK groups, unless otherwise stated.

### **A. Phase I: Baseline variables**

Of the 123 women who completed the baseline assessment, 38 were not included in the final sample because they did not complete all materials. To establish whether attrition was associated with the intervention received, those who completed all assessments were compared with those who did not, which showed that there was no significant association between intervention group and attrition,  $\chi^2 = 1.72$ ,  $df = 2$ ,  $p > .05$ . Further analyses determined whether attrition was associated with psychological or biological factors. Compared to women who completed all assessments ( $M = 36.05$  years;  $SD = 3.76$ ), those who did not ( $M = 33.75$  years;  $SD = 4.85$ ) were significantly younger,  $t(121) = 2.62$ ,  $p < .01$ . Women who did not complete all assessments also reported more uncertainty emotions,  $t(121) = -2.80$ ,  $p < .01$ , threat emotions,  $t(121) = -2.07$ ,  $p < .05$ , and muscle tension,  $t(121) = -2.06$ ,  $p < .05$ , at the baseline assessment, were more pessimistic about becoming pregnant during treatment,  $t(121) = -2.30$ ,  $p < .05$ , and thought they had less control over the outcome,  $t(121) = 3.08$ ,  $p < .01$ .

#### **1. Fertility profile**

Fertility history variables are shown in Table 19 (page 174). Women started fertility treatment approximately two and a half years after attempting to conceive naturally. The most common infertility diagnosis was female factor infertility (e.g., blocked fallopian tubes, endometriosis, anovulation). In the PRCI group, the next most common diagnosis was male factor infertility (e.g., problems with sperm count/quality/motility, previous vasectomy), whereas in the PMI and DRK groups it was unexplained infertility (i.e., no known cause of infertility). Around half of women in each group had primary infertility (i.e., had never had a pregnancy resulting in miscarriage, ectopic pregnancy, or live birth).

**Table 19.***Fertility profile of women in the final sample*

Variable	Intervention group			F/ $\chi^2$
	PRCI (n = 28)	PMI (n = 27)	DMC (n = 27)	
<b>Years infertile</b>				
<i>M</i>	6.23	6.22	7.15	.52
<i>SD</i>	4.05	3.31	4.13	
<b>Years of fertility treatment</b>				
<i>M</i>	3.61	3.60	4.39	.47
<i>SD</i>	3.20	3.30	3.73	
<b>Primary infertility</b>				
%	53.60	51.90	55.60	.08
<i>n</i>	15	14	15	
<b>Previous IVF</b>				
%	53.60	44.40	48.10	.47
<i>n</i>	15	12	13	
<b>Infertility diagnosis</b>				
<b>Unexplained</b>				
%	14.30	25.90	33.33	.08
<i>n</i>	4	7	9	
<b>Female factor</b>				
%	46.40	51.90	37.00	
<i>n</i>	13	14	10	
<b>Male factor</b>				
%	39.30	22.20	29.60	
<i>n</i>	11	6	8	

Note. *df* = 2 and 79 for years infertile and years of fertility treatment. Chi-square analyses were performed on 82 participants.

Table 19 (page 174) shows that in terms of prior IVF experience, 51.2% ( $n = 42$ ) of women had never tried IVF before, 41.5% ( $n = 34$ ) had previously had 1 – 3 attempts and 7.3% ( $n = 6$ ) had previously had 4 – 12 attempts. Because few women had  $\geq 4$  attempts, data violated requirements for chi-square, and was regrouped into two categories (previous IVF, no prior experience) and reanalysed. There was no significant association between IVF experience and intervention group.

## 2. Treatment expectations

Women's estimates about becoming pregnant in that IVF treatment cycle were rather higher than 20-25% (Macklon et al., 2002; see Table 20).

**Table 20.**

*Expectations regarding chances of pregnancy and control over treatment outcome by group (standard deviations in parentheses)*

Estimate	PRCI group	PMI group	DMC group	F (2, 79)
<b>Chance of success</b>	38.27% (18.16%)	37.31% (17.56%)	48.27% (22.67%)	2.49 <sup>t</sup>
<b>Control over outcome</b>	28.57% (22.06%)	26.30% (24.52%)	33.20% (22.12%)	.65

Note. <sup>t</sup>  $p < .10$ .

There were no significant differences between intervention groups in women's expectations about their chance of becoming pregnant, although there was a trend suggesting that women in the DMC group were more optimistic than those in the PRCI and PMI groups ( $p < .10$ ). Women in all groups thought they had little control over the pregnancy outcome and there was no significant difference in estimates of control ( $p > .05$ ; see Table 20, page 175).

### **3. Psychological characteristics**

#### **a. Dispositional optimism and trait anxiety**

As shown in Table 21 (page 177), women in all groups had more optimistic than pessimistic dispositions. However, they were less optimistic (overall LOT-R) than a normative sample of heart bypass patients reported by Carver and Scheier (1994). Table 21 also shows that there were no significant differences between intervention groups on LOT-R optimism or pessimism subscales or Overall LOT-R scores. Women in all three groups were less trait anxious than general medical patients in the Spielberger et al. (1970) normative sample, and slightly less so than women in a sample of infertile women receiving interventions in a study by Domar et al. (2000b). There were no significant differences between intervention groups in trait anxiety.

**Table 21.***Optimism, pessimism and trait anxiety scores*

Variable	Intervention group			<i>F</i> (2, 79)
	PRCI ( <i>n</i> = 28)	PMI ( <i>n</i> = 27)	DMC ( <i>n</i> = 27)	
<b>Overall LOT-R</b>				
<i>M</i>	13.93	14.07	13.67	.07
<i>SD</i>	(4.16)	(3.72)	(4.37)	
<b>LOT-R optimism</b>				
<i>M</i>	7.07	7.07	6.93	.05
<i>SD</i>	(1.98)	(2.04)	(1.92)	
<b>LOT-R pessimism</b>				
<i>M</i>	5.14	5.00	5.26	.06
<i>SD</i>	(2.73)	(2.35)	(2.94)	
<b>STAI-T</b>				
<i>M</i>	38.21	40.07	39.95	.47
<i>SD</i>	(7.70)	(9.04)	(6.97)	

**b. Coping**

Table 22 (page 178) shows mean scores on Coping with Infertility subscales and the Miller Behavioral Style questionnaire subscales. There were no significant differences between groups regarding the total coping effort they reported using to deal with fertility problems,  $F(1, 79) = .03, p > .05$ . However, there were significant differences in the extent to which women reported using each strategy,  $F(3, 237) = 23.18, p < .001$ . Regardless of group, women reported using significantly less escapist coping than any other strategy ( $p < .001$ ).

**Table 22.**

*Means and standard deviations (in parentheses) for baseline coping measures*

Variable	Intervention group			<i>F</i> (2, 79)
	PRCI ( <i>n</i> = 28)	PMI ( <i>n</i> = 27)	DMC ( <i>n</i> = 27)	
<b>Coping with infertility</b>				
<b>Problem appraisal</b>				
<i>M</i>	2.65	2.66	2.88	2.17
<i>SD</i>	(.45)	(.44)	(.48)	
<b>Problem management</b>				
<i>M</i>	2.89	2.94	2.73	1.26
<i>SD</i>	(.54)	(.41)	(.59)	
<b>Escapism</b>				
<i>M</i>	2.28	2.21	2.25	.09
<i>SD</i>	(.64)	(.62)	(.51)	
<b>Emotional expression</b>				
<i>M</i>	2.73	2.79	2.65	.32
<i>SD</i>	(.69)	(.59)	(.58)	
<b>Miller Behavioral Style</b>				
<b>Blunting</b>				
<i>M</i>	3.30	4.17	4.41	1.31
<i>SD</i>	(2.20)	(2.36)	(2.09)	
<b>Monitoring</b>				
<i>M</i>	9.10	11.11	9.00	2.53 <sup>t</sup>
<i>SD</i>	(4.10)	(2.83)	(2.12)	

*Note.* For Miller subscales PRCI group *n* = 20, PMI group *n* = 18, DMC group *n* = 17.

*Note.* <sup>t</sup> *p* < .10.

As shown in Table 22 (page 178), there were no significant differences between groups in the extent to which women employed any particular strategy. Women endorsed more monitoring than blunting strategies, There were no significant Group differences in the use of blunting compared to monitoring strategies ( $p_s > .05$ ), although there was a trend suggesting that the PMI group used more monitoring strategies than the other groups ( $p < .10$ ).

**Part B: (1) Manipulation checks (2) DRK variables (3) Biological outcomes (4)**

**Intervention evaluation**

**1. Manipulation checks**

a. On average, women had read the intervention cards the requisite number of times per day ( $M = 2.04, SD = .71$ ). The PRCI card was read a little less than twice a day ( $M = 1.88, SD = .64$ ), and the PMI card was read a little more ( $M = 2.22, SD = .74$ ), although this difference was only marginally significant,  $t(53) = -1.86, p < .10$ .

b. A chi-square analysis was used to establish the integrity of the double-blind experimental design (PRCI, PMI groups) and to ensure that participants in the DMC group were not aware that they were part of a control group.. The results showed that around 1/3 of women in each group thought they had received the new intervention. There was no significant association between intervention group and women's opinions about whether or not they had received the new intervention,  $\chi^2(2) = .67, p > .05$ .

## 2. DRK variables

For ease of presentation, significant F-values only are presented here (see Appendix N, page 402 for F-values for all DRK analyses).

### a. Emotions

The results of analyses of DRK uncertainty, threat, harm, challenge and benefit emotions are summarised in Table 23.

**Table 23.**

*Significant and marginally significant main effects and interactions for emotion variables*

Emotion subscale	Main effects		2-way interactions		3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	G x W F (2, 79)	W x D F (6, 474)	G x W x D F (12, 474)
Uncertainty		4.12*		2.44*	
Threat		5.40**		14.44***	
Harm	2.12 <sup>t</sup>	18.06***	4.30**	3.47**	
Challenge		74.12***	2.13 <sup>t</sup>	8.69***	
Benefit		61.65***		13.01***	

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

1. *Summary of time effects:* In line with expectations regarding the psychological effects of imminence on positive and negative affect, there were significant main effects of Week and Week by Day interactions on all emotion variables. Further analyses of significant Week by

Day interactions showed that regardless of intervention group, positive emotion scores were lower and negative emotion scores were higher, on some or all days of the second week of the waiting period compared to the first. Women experienced significantly more uncertainty emotions on days 5, 6, and 7 of week 2 than on days 5 – 7 in week 1 ( $ps < .05$ ). They also reported more threat emotions on embryo transfer day than on the first day of week 2, and more on days 5, 6 and 7 ( $ps < .001$ ) of week 2 than on the corresponding days in week 1. More harm emotions were reported on all but one day (day 2) of week 2 than on each corresponding day in week 1 ( $ps < .05$ ). Finally, women reported less benefit emotions ( $ps < .01$ ) and challenge emotions ( $ps < .001$ ) on each day of week 2 compared to each corresponding day in week 1.

2. *Summary of group effects:* There was a significant Group by Week effect for harm emotions (see Figure 13).

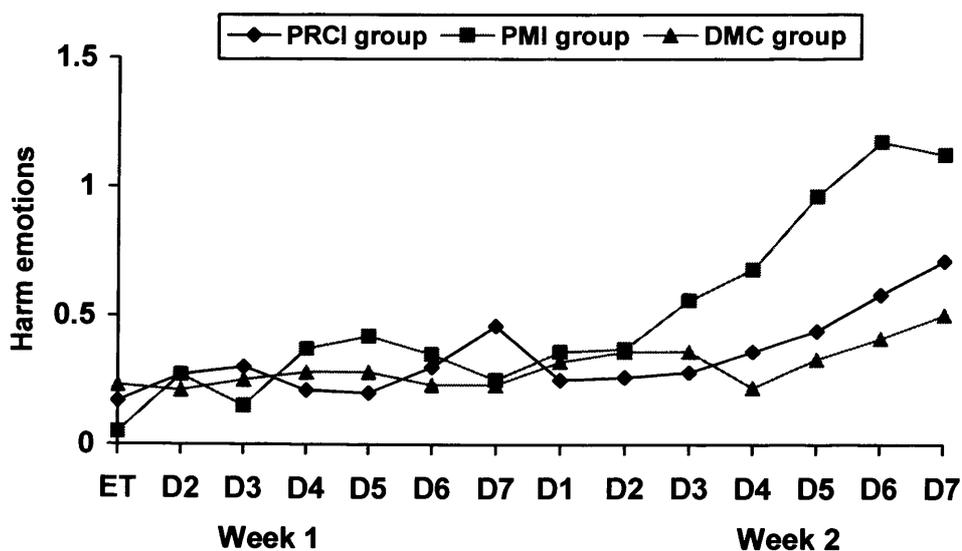


Figure 13. Mean scores for daily harm emotions during the waiting period by group

Further analysis of the Group by Week interaction on harm emotions (see Table 23, page 180, Figure 13, page 181) showed that in the PMI group, reports of harm emotions increased significantly in week 2 of the waiting period compared to week 1 ( $p < .001$ ), but not in the PRCI and DMC groups ( $ps > .05$ ).

*3. Summary of ANCOVAs on daily emotional reactions:* To establish whether differences between groups on emotional reactions remained after controlling for group differences on physical symptoms associated with pregnancy or treatment failure (vaginal bleeding, abdominal bloating, breast tenderness), these physical symptoms were entered as covariates in separate analyses. Results are presented for ANCOVAs where (1) the physical symptom was significantly related to the emotional reaction and (2) the inclusion of the covariate altered the significance of the results in Table 23 (page 180).

A. Vaginal bleeding: Vaginal bleeding was a significant predictor of harm emotions,  $F(1, 78) = 22.18, p < .001$ . Controlling for vaginal bleeding reduced the significant Group by Week effect on harm emotions to nonsignificance,  $F(2, 78) = 1.43, p > .05$ .

B. Breast tenderness: Breast tenderness was a significant predictor of harm emotions,  $F(1, 78) = 5.27, p < .001$ . Controlling for abdominal bloating increased the previously marginally significant Group effect on harm emotions to significance,  $F(2, 78) = 2.53, p < .05$ .

C. Abdominal bloating: Abdominal bloating was a significant predictor of challenge emotions,  $F(1, 78) = 5.19, p < .001$ . Controlling for abdominal bloating increased the

previously marginally significant Group by Week interaction on challenge emotions to significance,  $F(2, 78) = 2.74, p < .05$ .

In summary, negative emotions generally increased whereas positive emotions decreased from the first to the second week of the waiting period, especially when comparing days immediately before the pregnancy test to the corresponding days in week 1. The PMI group reported a greater increase in harm emotions compared to the other two groups in the second week of the waiting period compared to the first, but this significant effect did not remain when differences between groups in reports of vaginal bleeding were controlled.

#### **b. Expectations**

The results of analyses of daily optimism and pessimism about conceiving are summarised in Table 24.

*1. Summary of time effects:* Women became more pessimistic and less optimistic about being pregnant as the day of the pregnancy test drew near, shown by significant main effects of Week and Week by Day interactions on daily optimism and pessimism scores. Further analyses of the Week by Day interactions showed that, regardless of intervention group, expectations about becoming pregnant were more negative in the second week of the waiting period than the first. Women were significantly less optimistic (and more pessimistic) on every day of week 2 than on the corresponding days in week 1 (all  $ps < .05$ ).

**Table 24.**

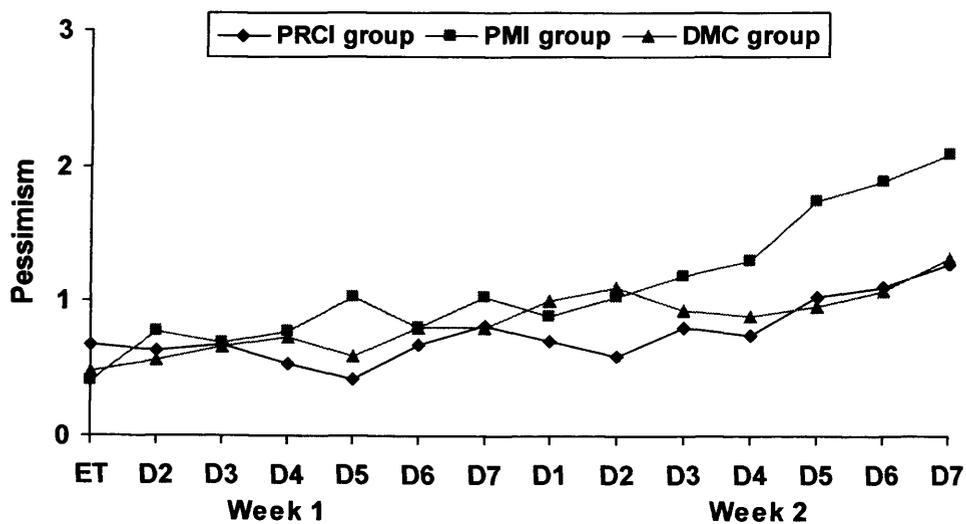
*Significant and marginally significant main effects and interactions for daily optimism and pessimism*

Expectations	Main effects		2-way interactions		3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	G x W F (2, 79)	W x D F (6, 474)	G x W x D F (12, 474)
Optimism		48.91***		2.41*	
Pessimism	1.87 <sup>t</sup>	43.96***	3.24*	2.97**	1.57 <sup>t</sup>

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

2. *Summary of group effects:* There were significant Group by Week interactions on daily pessimism about treatment outcome.



*Figure 14.* Mean scores for daily pessimism about pregnancy outcome by group

Further analyses of the significant Group by Week interaction on daily pessimism (see Table 24, page 184, Figure 14, page 184) showed that all groups were significantly more pessimistic in week 2 than week 1, but that the increase in pessimism was more marked in the PMI and DMC groups than the PRCI group (PRCI group,  $p < .05$ ; PMI and DMC groups,  $p < .001$ ).

3. *Summary of ANCOVAs on daily pessimism:* To establish whether the significant Group by Week effect on pessimism about pregnancy remained after controlling for group differences on physical symptoms associated with pregnancy or treatment failure (vaginal bleeding, abdominal bloating, breast tenderness), these physical symptoms were entered as covariates in separate analyses. Vaginal bleeding (only) was significantly related to daily pessimism in these analyses.

A. Vaginal bleeding: Vaginal bleeding was a significant predictor of pessimism,  $F(1, 78) = 6.26, p < .05$ . Controlling for vaginal bleeding reduced the significant Group by Week effect on pessimism to nonsignificance,  $F(2, 78) = 1.74, p > .05$ .

In summary, women were less optimistic and more pessimistic in the second than the first week of the waiting period, especially in the days just before the pregnancy test. The increase in pessimism in the second week was more marked in the PMI and DMC groups than the PRCI group, but this significant effect did not remain when differences between groups in reports of vaginal bleeding were controlled. .

### c. Appraisals

The results of analyses of daily appraisals are summarised in Table 25.

**Table 25.**

*Significant and marginally significant main effects and interactions for daily appraisals*

Appraisal	Main effects		2-way interactions		3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	G x W F (2, 79)	W x D F (6, 474)	G x W x D F (12, 474)
Stress		16.73***		10.04***	
Threat	1.68 <sup>t</sup>			4.42***	
Ability to cope	1.63 <sup>t</sup>	42.90***			
Personal control	3.10*	10.50***	1.60 <sup>t</sup>		
Challenge	2.58*	4.69*			1.50 <sup>t</sup>

Note. Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

Note. <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

1. *Summary of time effects:* The expected effects of imminence on appraisals of the waiting period were shown by significant main effects of Week or Week by Day interactions for most appraisals. Analysis of the main effects of Week on appraisals of ability to cope, personal control and challenge showed that appraisal ratings in week 2 seemed significantly less positive than appraisals of week 1. That is, women rated their control over the waiting period significantly lower in week 2 ( $p < .001$ ), felt less able to cope ( $p < .001$ ) and reported significantly less challenge appraisals ( $p < .05$ ). Analyses of the Week by Day

interactions for stressfulness and threat appraisals showed that some days in week 2 were appraised more negatively than the corresponding days in week 1. The waiting period was appraised as more stressful on days 5, 6 and 7 of week 2 compared to the corresponding days in week 1 ( $ps < .001$ ), and women rated days 6 and 7 of week 2 as significantly more threatening than days 6 and 7 of week 1 ( $p < .05$ ).

2. *Summary of intervention effects:* There were significant main effects of Group on personal control and challenge appraisals. Further analysis of the significant Group main effect on appraisals of personal control (see Table 25, page 186, Figure 15, page 187) showed that the PRCI group appraised the waiting period as significantly more controllable than the PMI group ( $p < .05$ ). There were no significant differences in appraisals of personal control between the PRCI group and the DMC group or the PMI group and the DMC group ( $ps > .05$ ).

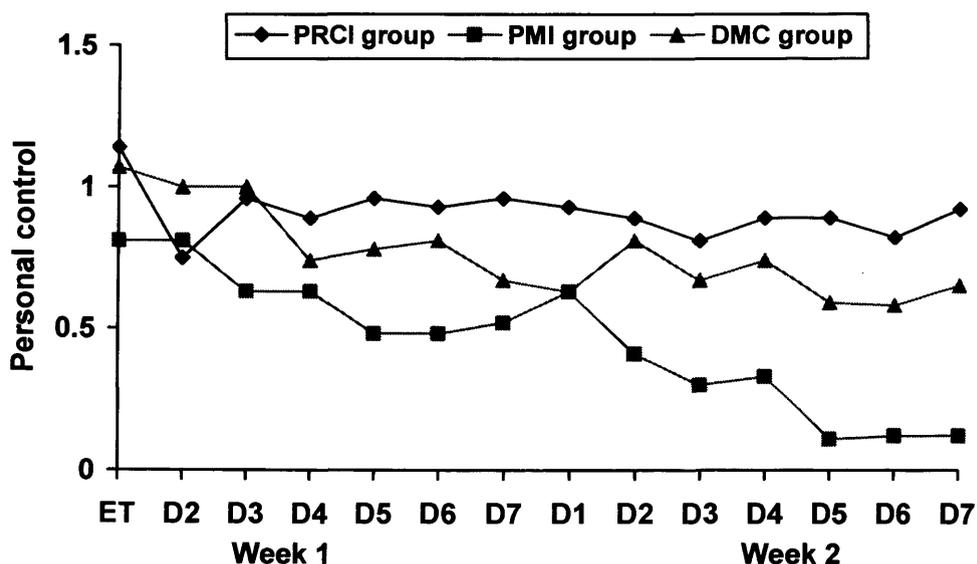


Figure 15. Mean scores for daily appraisals of personal control by group

Figure 16 shows means for the significant main effect of Group on challenge appraisals.

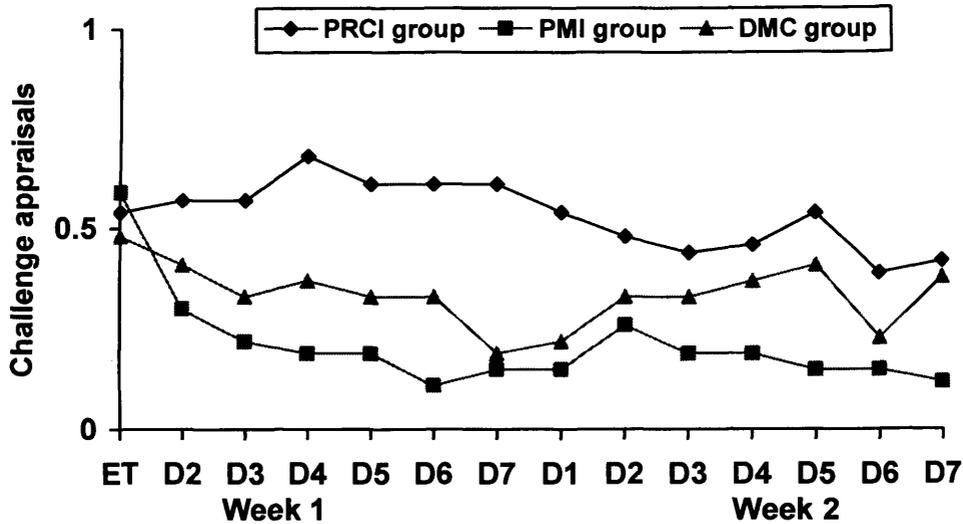


Figure 16. Mean scores for daily challenge appraisals by group

Further analysis of the significant Group main effect on challenge appraisals (see Table 25, page 186, Figure 16, page 188) showed that women in the PRCI group reported significantly more challenge appraisals than women in the PMI group ( $p < .05$ ). There were no significant differences in challenge appraisals between the PRCI and DMC groups or between the PMI and the DMC group ( $ps > .05$ ).

3. *Summary of ANCOVAs on appraisals:* To establish whether the significant Group effects on personal control appraisals and challenge appraisals remained after controlling for group differences on physical symptoms associated with pregnancy or treatment failure (vaginal bleeding, abdominal bloating, breast tenderness), these physical symptoms were entered as

covariates in separate analyses. None of these covariates were significantly related to personal control appraisals. Vaginal bleeding was significantly related to challenge appraisals,  $F(1, 78) = 4.75, p < .05$ , but including this physical symptom as a covariate did not appreciably alter Group main effect for challenge appraisals shown in Table 25 (page 186),  $F(2, 78) = 2.37, p < .05$ .

In summary, the second week of the waiting period was appraised more negatively than the first week, especially on the days immediately prior to the pregnancy test. The PRCI group perceived the waiting period as more controllable than the PMI group did, and reported more challenge appraisals than the PMI group. Differences between intervention groups in their experience of physical symptoms associated with treatment failure or early pregnancy did not explain the differences between groups on these appraisals.

#### **d. Coping**

The results of analyses of daily coping efforts are summarised in Table 26 (page 190).

*1. Summary of time effects:* Women reported using significantly less of some coping strategies on some or all days of one week than they did on the other, as shown by significant main effects of Week and Week by Day interactions for most coping strategies. Further analyses of the Week main effect for positive reappraisal showed that women used less of this strategy in week 2 than week 1 ( $p < .001$ ), whereas the reverse was true for escapism ( $p < .001$ ). Further analyses of the Week by Day interactions for emotional expression, distraction, relaxation and acceptance showed that women used significantly

less distraction coping on embryo transfer day than on day 1 of week 2 ( $p < .01$ ), but *more* distraction coping on day 6 of week 1 than day 6 of week 2 ( $p < .01$ ). Women also reported significantly more emotional expression coping on days 6 and 7 of week 2 than on those days in week 1 ( $ps < .01$ ). Less relaxation coping was reported on days 2 to 6 in week 2 than on the corresponding days in week 1 ( $ps < .05$ ), and women used more acceptance coping on day 7 of week 2 than on this day in week 1 ( $p < .001$ ).

**Table 26.**

*Significant and marginally significant main effects and interactions for daily coping*

Coping strategy	Main effects		2-way interactions		3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	G x W F (2, 79)	W x D F (6, 474)	G x W x D F (12, 474)
Positive reappraisal		23.82***	1.99 <sup>t</sup>		
Problem-focused		2.04 <sup>t</sup>			
Emotional expression	3.62*	2.78*		3.05**	
Escapism		15.44***			
Distraction	2.66*			4.54**	1.77*
Relaxation		11.51***	1.88 <sup>t</sup>	4.05***	
Acceptance		2.57 <sup>t</sup>		1.51 <sup>t</sup>	

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

2. *Summary of group effects:* There were also significant main effects of Group on emotional expression and distraction coping, and a significant Group by Week by Day interaction on distraction coping.

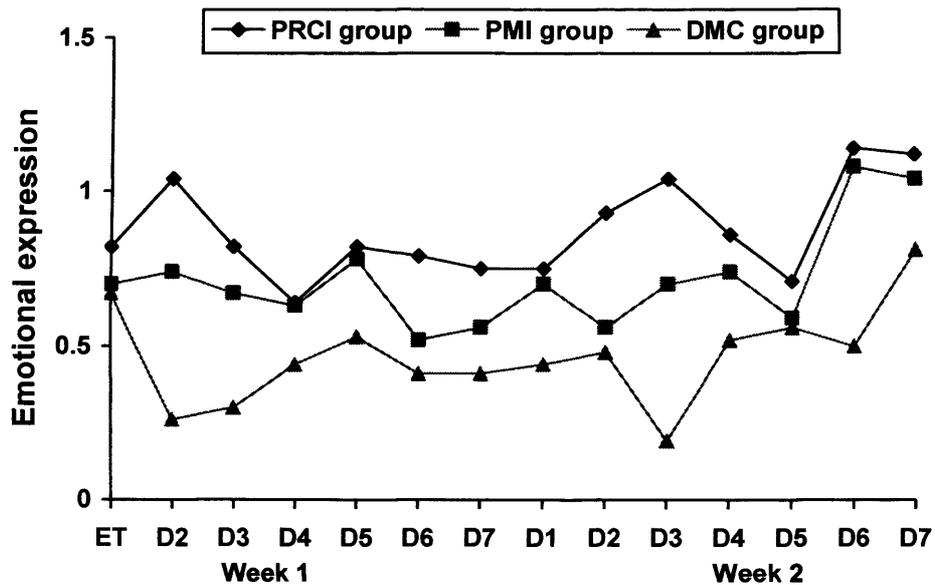


Figure 17. Mean scores for daily emotional expression coping by group

Further analysis of the significant main effect of Group on emotional expression coping (see Table 26, page 190, Figure 17, page 191) showed that the PRCI group used significantly more emotional expression coping during the waiting period than the DMC group ( $p < .05$ ). There were no significant differences between the PRCI and PMI groups or the PMI and DMC groups in reports of emotional expression coping ( $ps > .05$ ). Figure 18 (page 192) shows means scores for distraction coping during the waiting period.

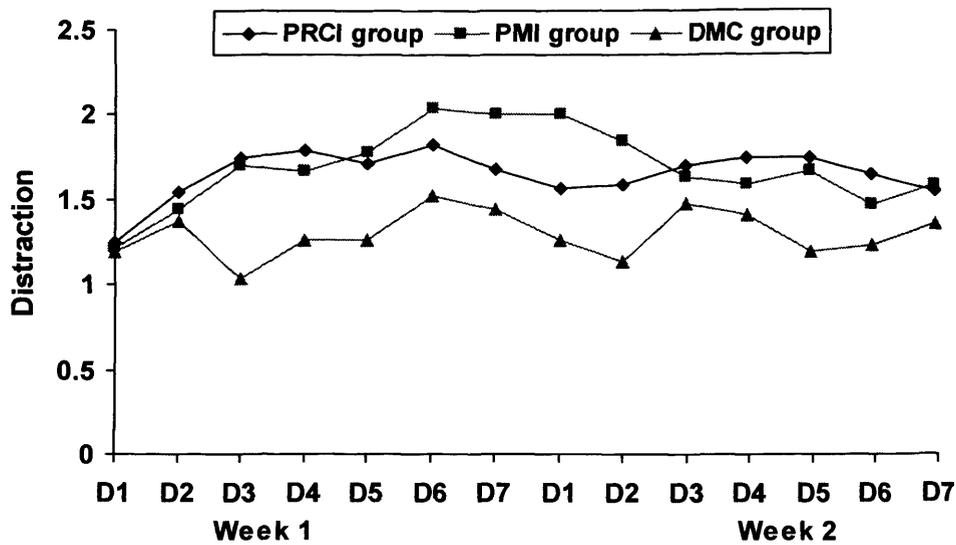


Figure 18. Mean scores for daily distraction coping by group

Further analysis of the significant Group main effect on distraction coping (see Table 26, page 190, Figure 18, page 192) showed no significant differences between groups in reports of distraction coping, although there was a trend suggesting that the DMC group reported less distraction coping during the waiting period than the PRCI and PMI groups ( $p < .10$ ). Further analysis of the significant three way interaction on distraction coping showed that the DMC group reported significantly less distraction coping on day 3 of week 1 than the PRCI ( $p < .05$ ) and PMI groups ( $p < .05$ ), and significantly less distraction coping on days 1 and 2 of week 2 than the PMI group ( $p < .05$ ).

3. *Summary of ANCOVAs on daily coping strategies:* To establish whether the significant Group effects on emotional expression and distraction coping remained after controlling for group differences on physical symptoms associated with pregnancy or treatment failure (vaginal bleeding, abdominal bloating, breast tenderness), these physical symptoms were entered as covariates in separate analyses. Vaginal bleeding was not significantly related to

emotional expression or distraction coping. Breast tenderness was related to emotional expression coping  $F(1, 78) = 5.59, p < .05$ , but not distraction coping. However, although breast tenderness was significantly related to emotional expression coping, including this physical symptom as a covariate did not change the significance of the Group main effect on emotional expression coping shown in Table 26 (page 190),  $F(2, 78) = 2.94, p < .05$ . Abdominal bloating was not significantly related to emotional expression or distraction coping.

In summary, women generally reported reduced coping efforts in week 2 compared to week 1, except for increases in the use of distraction, emotional expression and acceptance in the days immediately before the pregnancy test. Further, women reported more escapist coping in the second week than the first. Women in the PRCI group reported significantly more emotional expression coping during the waiting period than the DMC group and women in the PRCI and PMI groups reported more distraction coping than women in the DMC group on some days of the waiting period. Controlling for differences between intervention groups in their experience of physical symptoms associated with treatment failure or early pregnancy did not change the results showing differences between groups in their reports of daily coping efforts.

#### **e. Daily physical reactions**

Significant and marginally significant main effects and interactions for DRK physical symptoms are shown in Table 27 (page 194).

**Table 27.**

*Significant and marginally significant main effects and interactions for daily physical symptoms*

Symptom	Main Effects		2 way interactions		3 way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	G x W F (2, 79)	W x D F (6, 474)	G x W x D F (12, 474)
Breast tenderness			2.53*	8.62***	
Abdominal bloating	3.30*	29.39***		4.89***	
Menstrual cramps				4.59***	
Spotting / bleeding	2.44*	18.10***	3.42*	13.32***	
Somatisation	2.70*	3.42*		2.82*	

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* t  $p < .10$  \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

1. *Summary of time effects:* Significant effects of time on medication side-effects (i.e., abdominal bloating, breast tenderness), reproductive symptoms (i.e., menstrual cramps, bleeding) and somatisation were found, shown by significant main effects of Week or significant Week by Day interactions. Further analyses of Week by Day interactions showed differences in the severity of these symptoms between individual days in week 1 and the corresponding days in week 2. Women reported significantly less severe side-effects of medication in week 2 than week 1, with less breast tenderness on days 5, 6, and 7 ( $ps < .05$ ) of week 2 than on these days in week 1, and less abdominal bloating every day in week 2 than week 1 ( $ps < .05$ ). Regarding menstrual symptoms, women reported less

severe menstrual cramping on days 2, and 3 of week 2 than on the corresponding days in week 1 ( $p < .05$ ), but more on day 7 of week 2 than on that day in week 1 ( $p < .01$ ). Finally, women bled more on day 1 of week 1 than day 1 of week 2 ( $p < .05$ ), but more on days 4, 5, 6 and 7 of week 2 than on the corresponding days in week 1 ( $ps < .01$ ). In terms of physical symptoms associated with stress, women somatised more on day 1, 2, and 3 ( $ps < .05$ ) of week 1 than on these days in week 2

2. *Summary of intervention effects:* There were significant effects of intervention on reports of breast tenderness, abdominal bloating, vaginal bleeding, and physical symptoms associated with stress. Figure 19 shows means for daily reports of breast tenderness by group.

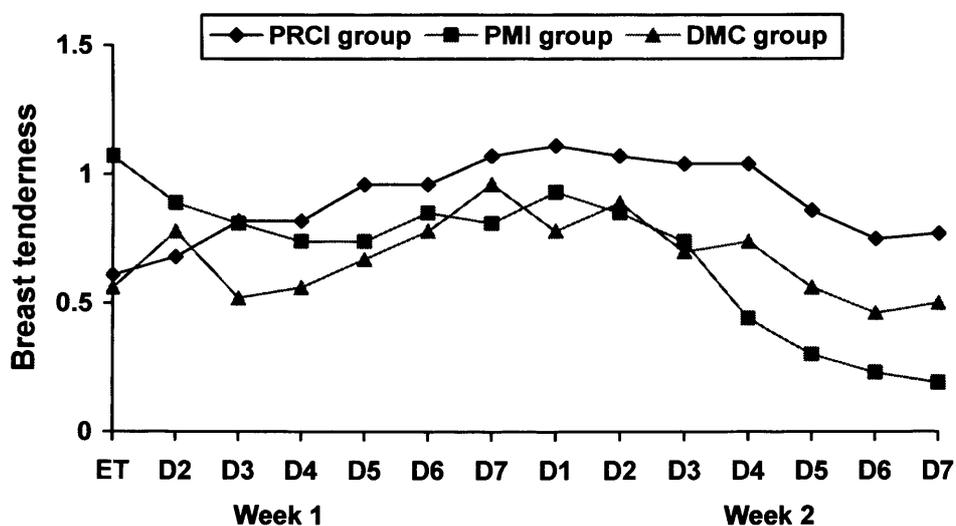


Figure 19. Mean scores for daily reports of breast tenderness by group

Further analysis of the significant Group by Week interaction on breast tenderness (see Table 27, page 194, Figure 19, page 195) showed that the PMI group reported

significantly less breast tenderness in week 2 than week 1 of the waiting period ( $p < .01$ ), whereas reports of breast tenderness did not differ significantly between weeks 1 and 2 in the PRCI and DMC groups ( $ps > .05$ ). Figure 20 (page 196) shows means for daily reports of abdominal bloating.

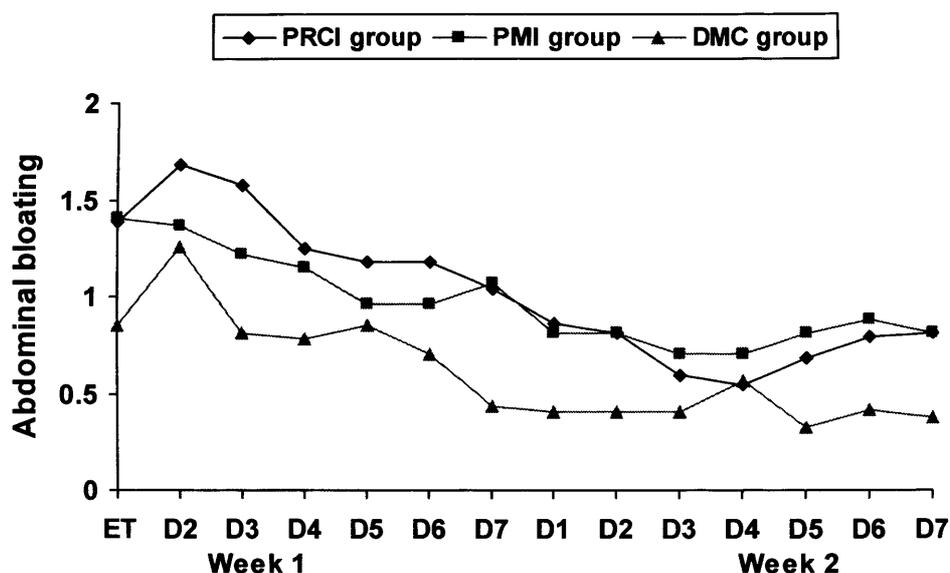


Figure 20. Mean scores for daily reports of abdominal bloating by group

Further analysis of the significant Group effect (see Table 27, page 194, Figure 20, page 196) on abdominal bloating showed that the PRCI group reported significantly more of this symptom ( $p < .05$ ) than the DMC group. Although it seemed as though the PMI group reported more abdominal bloating than the DMC group, this difference was marginal ( $p < .10$ ). Figure 21 (page 197) shows means for daily reports of vaginal bleeding.

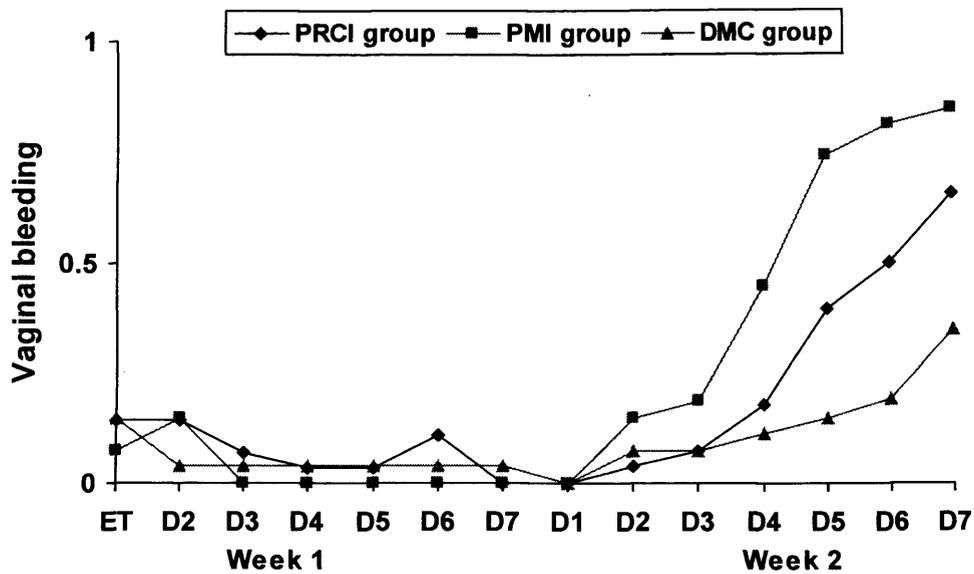


Figure 21. Mean scores for daily reports of bleeding by group

Further analysis of the significant Group by Week interaction on vaginal bleeding (see Table 27, page 194, Figure 21, page 197) showed that the PMI group reported significantly more bleeding in week 2 of the waiting period than the DMC group ( $p < .05$ ). There were no significant differences in reports of vaginal bleeding in week 2 between the PRCI and PMI groups or PRCI and DMC groups ( $ps > .05$ ). Figure 22 (page 198) shows means for daily reports of physical symptoms associated with stress.

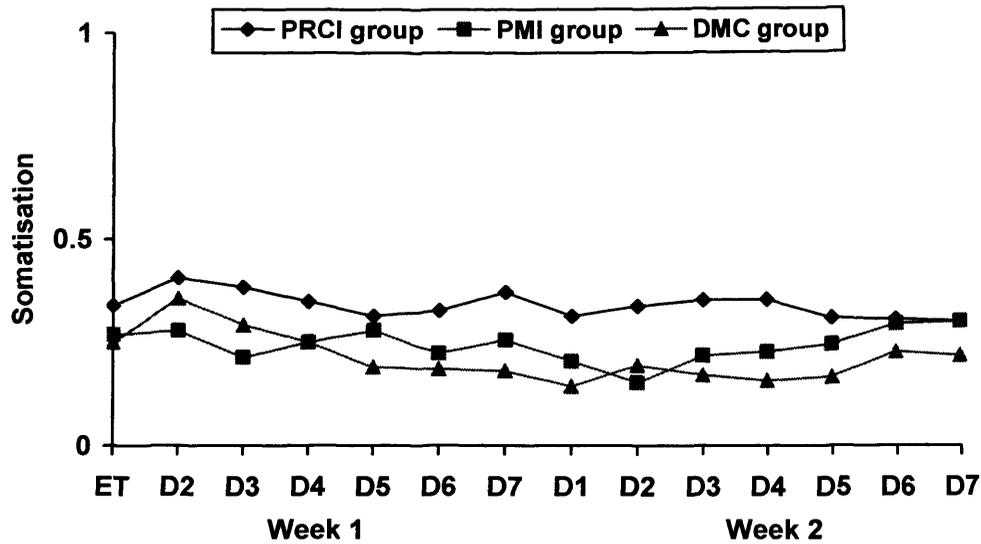


Figure 22. Mean scores for daily somatisation by group

Further analysis of the significant Group effect on somatisation (see Table 27, page 194, Figure 22, page 198) showed that the PRCI group reported more physical symptoms associated with stress than the DMC group ( $p < .05$ ). There were no significant Group differences in somatisation between the PRCI and PMI groups or between the PMI and DMC groups ( $ps > .05$ ).

#### **4. Biological variables**

##### **1. Pre-intervention biological variables**

Table 28 (page 199) shows the mean proportion of oocytes retrieved/ fertilised, and the number of embryos transferred to the uterus in each group. As shown in Table 28, there were no significant differences between intervention groups in the proportion of oocytes that had successfully fertilised ( $p > .05$ ). At least 80% of women in each group had two or

more embryos transferred to the uterus and there were no significant differences in the number of embryos transferred in each group ( $p > .05$ ).

**Table 28.**

*Proportion of oocytes retrieved/fertilised and number of embryos transferred (standard deviations in parentheses)*

Variable	Intervention group			F
	PRCI (n = 28)	PMI (n = 27)	DMC (n = 27)	
Proportion of oocytes fertilised <sup>a</sup>	.67 (.26)	.73 (.25)	.71 (.21)	.39
Number of embryos transferred	2.00 (.39)	1.96 (.59)	1.92 (.47)	.16

*Note.* <sup>a</sup> $N = 71$  because analyses exclude women who had frozen embryo transfers and thus no oocytes retrieved/fertilised in this IVF cycle (PRCI group,  $n = 23$ , PMI group,  $n = 25$ , DRK group  $n = 23$ ).

*Note.*  $df = 2$  and  $68$  for number of oocytes fertilised and  $df = 2$  and  $79$  for number of embryos transferred.

## **2. Pregnancy outcomes**

Table 29 shows BHCG levels (mIU/ml) as detected by the blood test at the end of treatment, and the number of women in each group who received a diagnosis of biochemical pregnancy based on the blood test result, and of clinical pregnancy based on the seven-week ultrasound scan.

**Table 29.**

*Pregnancy outcomes by group (standard deviations in parentheses)*

Variable	Intervention group			F/ $\chi^2$
	PRCI (n = 28)	PMI (n = 27)	DMC (n = 27)	
BHCG (mIU/ml)	65.20 (172.49)	8.83 (26.60)	34.18 (72.30)	1.81 <sup>t</sup>
Biochemical pregnancy (BHCG > 100 mIU/ml)	6 (21.40%)	2 (7.40%)	7 (25.90%)	3.38
Clinical pregnancy (foetal heart scan)	5 <sup>a</sup> (17.86%)	1 <sup>b</sup> (3.70%)	5 <sup>a</sup> (18.52%)	-

*Note.*  $df = 2$  and  $79$  for BHCG levels. Chi-square analyses were performed on  $82$  participants.

*Note.* Frequencies with different superscripts are significantly different

*Note.* <sup>t</sup> $p < .10$ .

As shown in Table 29 (page 200), there were no significant differences in BHCG levels detected by the pregnancy blood test, although there was a trend suggesting that the PRCI group had higher BHCG levels than the PRCI group ( $p < .10$ ). There was no significant association between group assignment and biochemical pregnancy rates, although there was a trend suggesting an association between group assignment and biochemical pregnancy rates in the PMI and DMC groups. Of the 15 women who were diagnosed as pregnant after the blood test, 11 were still pregnant at the seven-week ultrasound scan whereas four were not (or were no longer) pregnant. Of these four women, one had an ectopic pregnancy, one had miscarried, and two had anembryonic pregnancies. In total, 13.41% of women in the final sample had a diagnosis of clinical pregnancy after the ultrasound scan. Five of these were in each of the PRCI and DMC groups and one was in the PMI group. Few women were pregnant in each group (expected frequencies  $< 5$ ), meaning that the data violated the assumptions of chi-square. Fisher's exact statistic was therefore used to test the association between group membership and clinical pregnancy rates. Comparison of pairs of intervention groups showed that (1) the association between group membership and clinical pregnancy rate was significant for the PRCI and PMI groups ( $p < .05$ , Fisher's exact statistic), (2) the association between group membership and clinical pregnancy rate was significant for the PMI and DMC groups ( $p < .05$ , Fisher's exact statistic), and (3) the association between group membership and clinical pregnancy rate was nonsignificant for the PRCI and DMC group ( $p > .05$ , Fisher's exact statistic).

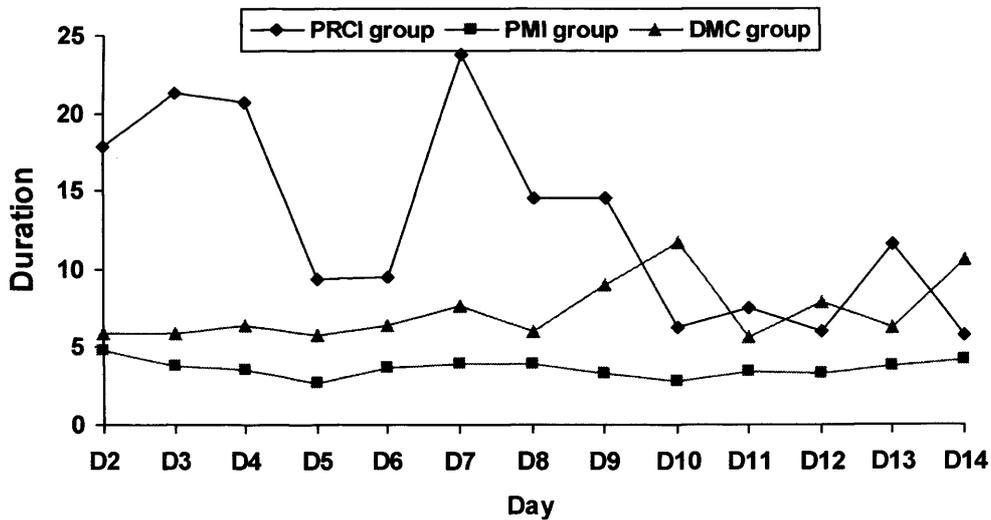
#### **4. Intervention evaluation variables**

Women's prospective (i.e., daily DRK ratings) and retrospective (i.e., recalled for the intervention evaluation questionnaire) evaluations of the interventions were examined.

## **1. Duration of intervention effects**

Women's estimates of the duration of intervention effects on a daily basis (i.e., DRK ratings; see Figure 23) and the duration of effects as recalled at the end of the waiting period (i.e., intervention evaluation ratings) were analysed.

### **a. Prospective (DRK) ratings**



*Figure 23.* Mean scores for daily estimates of the duration of intervention effects by group

As women commenced reading intervention cards the day *after* embryo transfer, the Week effect was not computed for this variable (i.e., 6 days in week 1 and 7 in week 2). Instead, a Group (3) by Day (13) mixed-between ANOVA with Day as the within-subjects factor was computed on daily estimates of the duration of intervention effects. The main effect of Day was not significant,  $F(12, 948) = 1.46, p > .05$ , but there was a significant effect of Group,  $F(2, 79) = 2.71, p < .05$ , and a significant Group by Day interaction,  $F(24,$

948) = 1.90,  $p < .05$ . Further analysis of the significant Group effect showed that the duration of PRCI effects was significantly longer than the duration of PMI effects ( $p < .05$ ), but that differences between groups on individual days of the waiting period (i.e., Group by Week effect) were not significant ( $ps > .05$ ).

## **2. Retrospective (Intervention evaluation) ratings**

Regardless of intervention group, the majority of women rated the duration of intervention effects as  $\leq 20$  minutes. A greater percentage of women in the PMI group than in the PRCI or DMC groups recalled effects as lasting  $\leq 20$  minutes, but few women endorsed categories for durations  $> 20$  minutes, violating assumptions for Chi-square analyses. Data was regrouped into two categories: (1) effects lasted  $\leq 20$  minutes and (2) effects lasted  $> 20$  minutes. Chi-square analyses on regrouped data showed no significant association between intervention group and recalled duration of intervention effects,  $\chi^2 (2) = 1.78, p > .05$ .

## **B. Other intervention evaluation dimensions**

Figures 24 – 28 (pages 204 – 209) show mean scores for intervention evaluation dimensions relating to women's opinions about the (1) practicality, (2) acceptability, (3) perceived psychological effects, and (4) endorsements of the intervention/DRK.

## 1. Practicality

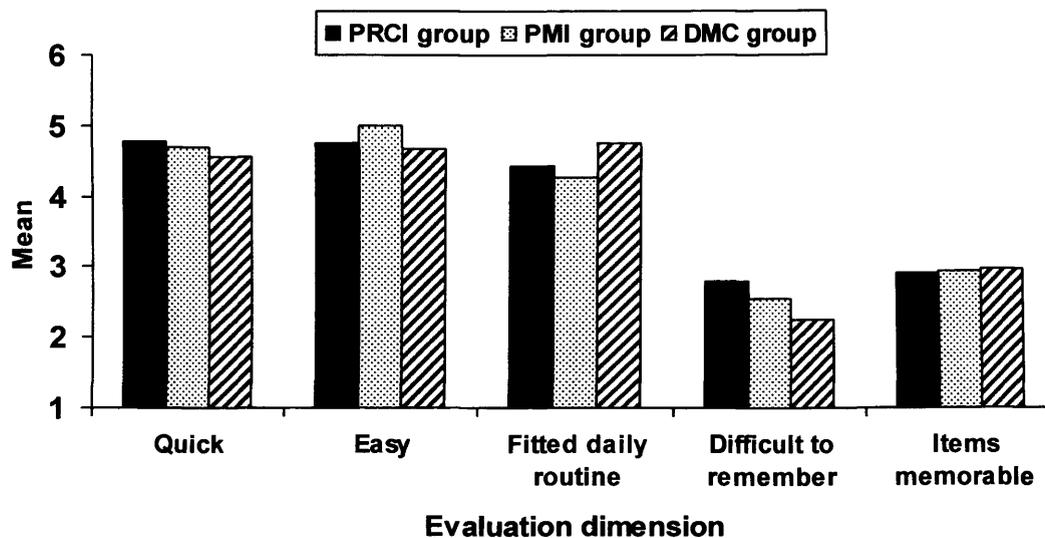


Figure 24. Ratings of the practicality of the interventions by group.

The results showed that women evaluated all interventions as quick and easy to use and as fitting into daily routines (means > 3 on a scale of 1 – 6). Women found it moderately easy to remember to use the interventions and thought that the intervention items (statements on cards, DRK items) were moderately memorable. There were no significant differences in opinions about how quick and easy the interventions were,  $F(2, 79) = .28, p > .05$ , and  $F(2, 79) > .05$ , respectively, nor in the extent to which the interventions fitted into daily routines,  $F(2, 79) = 1.08, p > .05$ . Neither did groups differ in opinions about how difficult it was to remember to use the interventions,  $F(2, 79) = .86, p > .05$ , or how memorable the items were,  $F(2, 79) = .019, p > .05$ .

## 2. Acceptability

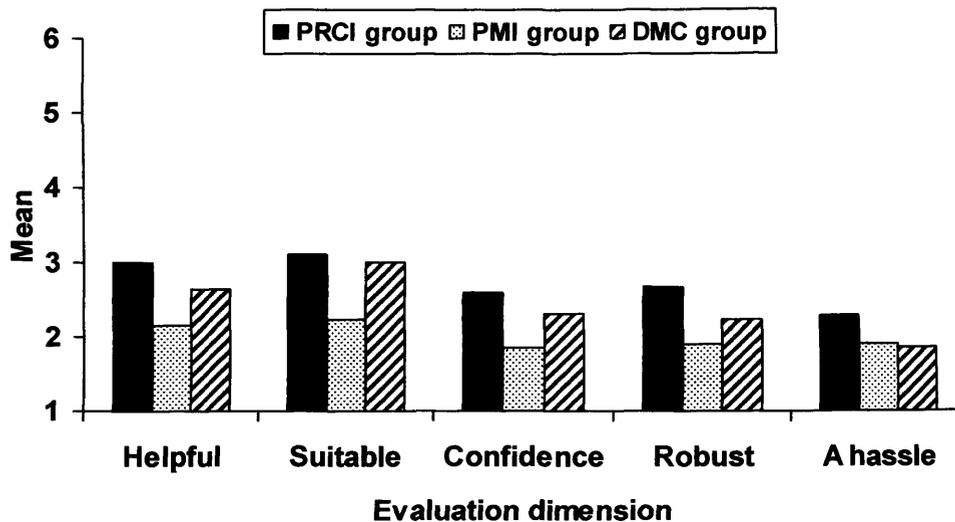


Figure 25. Ratings of the acceptability of the interventions by group

The PRCI group rated the PRCI as somewhat helpful and suitable for the experience of waiting for an IVF pregnancy test. There were significant differences in ratings of how helpful,  $F(2, 79) = 3.48, p < .05$ , and suitable,  $F(2, 79) = 3.94, p < .01$ , the interventions were. Tukey posthoc comparisons showed that ratings of the helpfulness ( $p < .01$ ) and suitability ( $p < .05$ ) of the PRCI were significantly higher than those of the PMI, as was the helpfulness of the DMC ( $p < .05$ ). Further, there were significant differences in women's ratings of confidence that the interventions had affected the stressfulness of the waiting period,  $F(2, 79) = 2.75, p < .05$ , and in the extent to which intervention effects were enduring enough,  $F(2, 79) = 2.68, p < .05$ . Compared to the PMI group, the PRCI group were more confident that their intervention had affected the stress of the waiting period ( $p < .05$ ), and the PRCI was rated as having more enduring effects ( $p < .05$ ). Women did not consider the interventions to be a hassle (mean scores  $< 3$ ), and neither were there significant differences between groups on this dimension,  $F(2, 79) = 1.15, p > .05$ .

### 3. Perceived psychological effects

Women's perceptions of the psychological effects of the interventions on a daily basis (i.e., DRK ratings; see Figure 26) and as recalled at the end of the waiting period (i.e., intervention evaluation ratings) (see Figure 27, page 207) were analysed.

#### a. Prospective (DRK) ratings

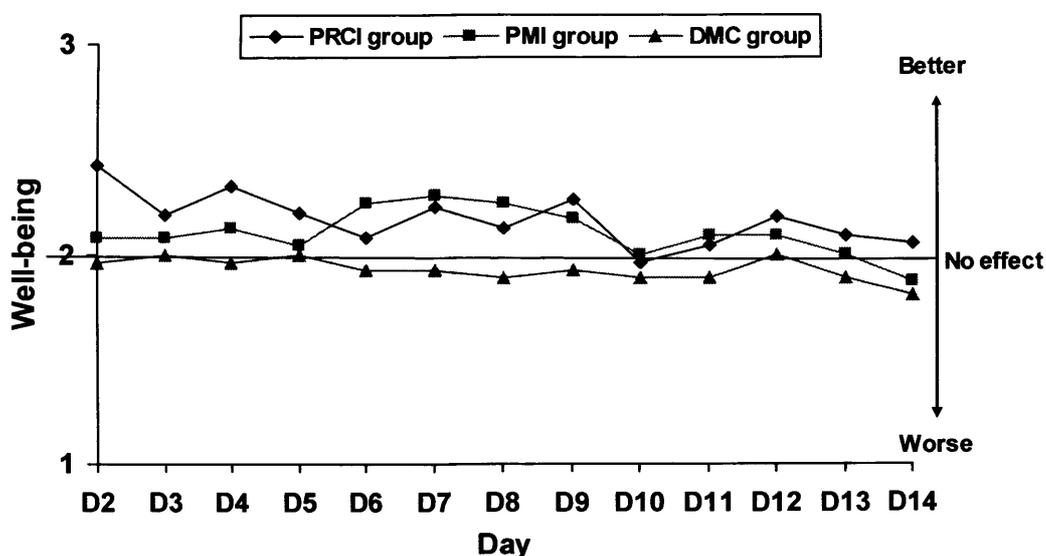


Figure 26. Daily ratings of the psychological effects of the interventions by group

The PRCI and PMI cards were generally rated as having a slightly positive effect on the way women 'felt' each day, whereas the DMC rated daily monitoring as having no effect or a slightly detrimental effect. A Group (3) by Day (13) mixed ANOVA with Day as the within-subjects factor was computed on women's ratings of how they felt after using the intervention cards/DRK. There were significant main effects of Day,  $F(12, 948) = 3.23$ ,  $p < .001$ , and Group,  $F(2, 79) = 6.49$ ,  $p < .001$ , but the Group by Day interaction was only marginal,  $F(24, 948) = 1.33$ ,  $p < .10$ . Further analysis of the significant effects showed that

women reported feeling better after using the intervention cards/DRK on day 2 than on days 10 or 14 ( $p < .05$ ), and on day 12 than day 14 ( $p < .05$ ). The PRCI ( $p < .001$ ) and PMI ( $p < .05$ ) groups both reported feeling better after reading the intervention cards than the DMC group did after completing the DRK.

**b. Retrospective (Intervention evaluation) ratings**

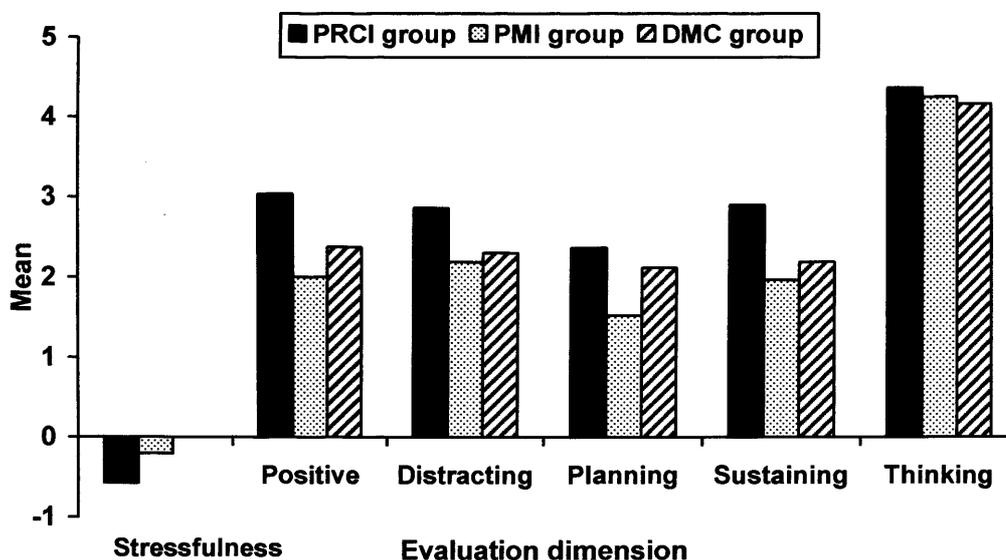


Figure 27. Ratings of perceived psychological effects of the interventions by group

The results showed a significant differences in the extent to which women perceived the interventions to have affected the stress of the waiting period,  $F(2, 79) = 3.21, p < .05$ . As with prospective (DRK) ratings, the DMC group evaluated the DRK as having ‘no effect’ on the stressfulness of the waiting period, whereas the PRCI was rated as having reduced stress to the greatest extent. Tukey posthoc analyses showed that the PRCI group reported a significantly greater reduction in stress than the DMC group ( $p < .05$ ). There was

also a significant difference in ratings of intervention effects on psychological well-being during the waiting period,  $F(2, 79) = 5.03, p < .01$ . The PRCI group reported feeling significantly more positive than the PMI group ( $p < .01$ ), but the difference between the PRCI and PMI groups on this dimension was only marginally significant ( $p < .10$ ).

Significant differences were also found on women's ratings regarding other effects of the interventions on psychological outcomes (see Figure 27, page 207). First, there was a significant difference in the extent to which women thought the interventions had helped them to carry on or keep going during the waiting period,  $F(2, 79) = 4.23, p < .01$ . The PRCI group rated their intervention as helping them to carry on/keep going significantly more than the PMI ( $p < .01$ ), or DMC group ( $p < .05$ ) did. Second, significant differences were found on opinions regarding the extent to which the interventions had helped women to think about what to do after the pregnancy test,  $F(2, 79) = 3.30, p < .05$ . The PRCI was rated as helping with planning significantly more than the PMI was ( $p < .05$ ). Although the PRCI seemed to offer more of a distraction to women than the PMI, this difference was only marginal,  $F(2, 79) = 1.78, p < .10$ . There were no significant differences in the extent to which the interventions helped women to see the situation in a different light,  $F(2, 79) = .19, p > .05$ .

### **Estimated anxiety with and without intervention**

Regardless of intervention group, women were anxious during the waiting period and thought they would have been anxious without an intervention. There was no significant main effect of Group on estimates of anxiety with,  $F(1, 79) = .07, p > .05$ , or without an intervention,  $F(1, 79) = .36, p > .05$ . Neither did estimated anxiety differ according to the intervention received,  $F(2, 79) = .04, p > .05$ .

#### 4. Endorsements

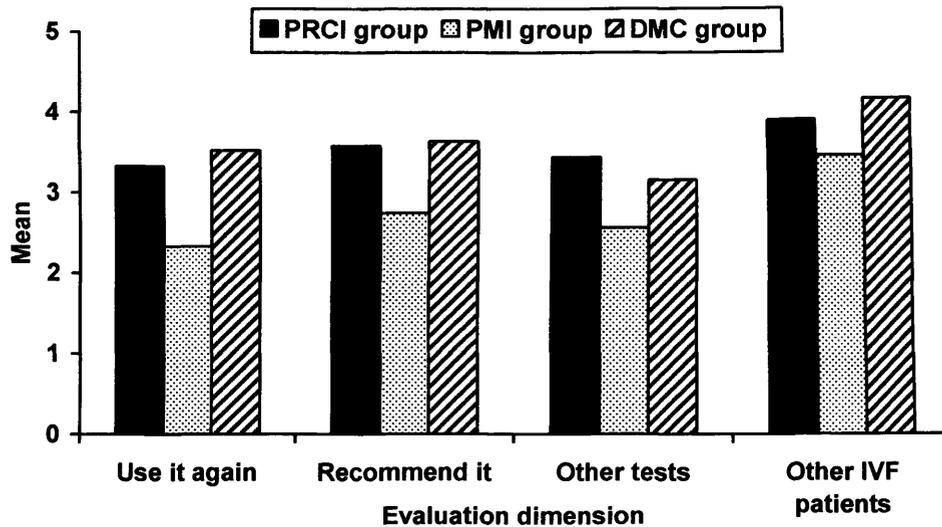


Figure 28. Endorsements of the interventions by group

There were significant differences in the extent to which women would use their respective interventions again,  $F(2, 79) = 6.13, p < .01$ . The PRCI and DMC groups said they would be significantly more likely to use their interventions again than the PMI group said they would be to use theirs ( $ps < .01$ ). There were also significant differences in women's confidence about recommending the interventions to others having fertility treatment,  $F(2, 79) = 4.07, p < .01$ . The PRCI and DMC groups were significantly more likely to recommend their interventions than the PMI group was to recommend theirs ( $ps < .05$ ). Further, there were significant differences in the extent to which women thought the interventions would reduce the stress of other medical waiting periods,  $F(2, 79) = 2.77, p < .05$ . The PRCI was thought likely to be more successful than the PMI ( $p < .05$ ). Finally, groups differed significantly in the extent to which women thought that other IVF patients would use these interventions,  $F(2, 79) = 2.36, p < .05$ . The DMC group was more sure

that other IVF patients would use the DRK than the PMI group was that other IVF patients would use the PMI ( $p < .05$ ).

In summary, groups did not differ significantly regarding their opinions about the practicality of the interventions, but the PRCI was rated more favourably than the DRK on other dimensions. Compared to the DRK, the PRCI was evaluated more favourably in terms of reducing the stress of the waiting period, helping women to feel more positive, and helping them to 'carry on or keep going' during the waiting period. Prospective (DRK) ratings of psychological effects showed that the PRCI and PMI groups reported feeling significantly better after reading the intervention cards than the DMC group did after completing the DRK. Regarding the duration of intervention effects, prospective ratings showed that women perceived PRCI effects to have lasted longer than the control groups did regarding their own interventions. Finally, the PRCI received more favourable ratings than the PMI on several evaluation dimensions relating to acceptability, endorsements for future use and influence on coping efforts.

#### **5.4 Discussion**

The main aim of Part II of this Thesis was to develop a positive reappraisal coping intervention card (PRCI) to be used by women waiting for the results of IVF treatment. Chapter 4 (page 80) summarised the validation process for the PRCI and control PMI intervention cards, and the present study (Study 2) established the effects of the PRCI on women's psychological well-being during the 14 day waiting period between IVF embryo transfer and pregnancy test. In the present study, all women monitored psychological and physical reactions daily during the waiting period, and psychological and physical outcomes in women who received the PRCI were compared with those of a control group

who received a positive mood induction intervention (PMI group) and a group who simply completed the daily monitoring form (DMC group).

Research and theory suggests that positive reappraisal coping, which can be understood as efforts to “control the meaning of the problem” (Park & Folkman, 1997, p. 124), by focusing on positive aspects of the situation or “selectively perceiving or interpreting a stressor’s implications as positive” (Goodhart, 1985, pg. 217) has beneficial effects on psychological outcomes during periods of unresolved stress and uncertainty (e.g., Folkman, 1997; Folkman & Greer, 2000; Folkman & Moskowitz, 2000; Moskowitz et al., 1996, Sears et al., 2003; Terry & Hynes, 1998). In the present study it was predicted that manipulating positive reappraisal coping via the PRCI would have positive effects on women’s appraisals, emotional well-being and physical stress symptoms during the waiting period, and that women who received the PRCI would employ more coping strategies proposed to be helpful in low control stressors (Terry & Hynes, 1998). Secondly, because of the link between psychological factors and various fertility outcomes (e.g., Boivin & Takefman, 1995; Demyttenaere et al., 1998; Klonoff-Cohen et al., 2001; Lancaster & Boivin, 2005; Sanders & Bruce, 1999; Smeenk et al., 2001; Stoleru et al., 1997), PRCI effects on pregnancy rates were examined, with the expectation that more women in the PRCI than in the PMI and DMC groups would become pregnant.

Contrary to expectations for the present study, there were no significant differences between groups in reports of positive reappraisal coping. However, the results showed a trend suggesting differences between groups in reports of positive reappraisal coping between the first and second week of the waiting period, with women who did not receive the PRCI (PMI, DMC groups) reporting less positive reappraisal coping in the second week of the waiting period compared to the first week, whereas there was no difference in

positive reappraisal coping between the first and second week in the PRCI group. The purpose of the PRCI was to prompt, promote, reinforce or increase positive reappraisal coping efforts during stressful medical waiting periods. In the present study, women in all groups reported positive reappraisal coping efforts on embryo transfer day, suggesting that the PRCI did not stimulate or prompt positive reappraisal coping. Neither did the PRCI promote or increase positive reappraisal coping, as reports of this strategy in the PRCI group did not increase over time. However, as reports of positive reappraisal coping did not decrease between the first and second week of the waiting period in the PRCI group (only), the PRCI may have helped to *sustain* positive reappraisal coping when women may otherwise have used less of this strategy as the day of the pregnancy test approached (i.e., PMI, DMC groups).

#### *Imminence and psychological well-being*

The strongest and most consistent effects on psychological well-being seen in the present study were imminence effects (Lazarus & Folkman, 1984). In line with the findings of Boivin and Walker (1997) regarding the IVF waiting period and others (e.g., Harkness et al., 2003; Lebel et al., 2003) regarding other medical waiting periods, the results of the present study showed that women's psychological well-being deteriorated as the day of the pregnancy test drew near. Regardless of intervention group, negative psychological reactions (e.g., threat emotions, pessimism, stress appraisals, escapist coping) were higher and positive reactions (e.g., challenge emotions, optimism, ability to cope, positive reappraisal coping) were lower, in the second compared to the first week of the waiting period. As discussed by Lazarus and Folkman (1984), the imminence of a meaningful event can interact with cues that signal the likelihood of a particular outcome, to influence

appraisals and emotional reactions. Further, Folkman and Lazarus (1985) propose that “As an event unfolds and information is added, there is less ambiguity, and the significance of the encounter for well-being should become clearer ...the more an encounter unfolds, the more firmly the person should be making either a negative (harm) or a positive (benefit) appraisal at the outcome” (pg. 154). In the present study, the majority of women were not pregnant. Cues to this unwanted outcome (e.g., menstrual cramps, bleeding) increased in the last few days before the pregnancy test, meaning that women received advance warning that they were probably not pregnant. The consistent and robust effects of the imminent pregnancy test on appraisals and their emotional counterparts (Folkman & Lazarus, 1985) were therefore expected and entirely understandable.

#### *The effects of the PRCI on psychological well-being and physical outcomes*

Although a negative effect of imminence on psychological well-being was expected and in line with prior theory and research, it was also expected that the PRCI would have positive effects on psychological well-being, compared to PMI and daily monitoring controls. The results provide some support for this hypothesis. Where there was differentiation between groups on daily psychological outcomes and evaluations of the interventions, the PRCI group generally showed the most positive reactions, as predicted. However, what was not expected was that the *DMC* group showed a more favourable response than the PMI group on several variables. Because the DRK was completed by *all* groups it had been expected that the PMI would have benefits over daily monitoring alone. This discussion considers outcomes in the PRCI group compared to both control groups. However, it is emphasised that the most important differences relating to PRCI effects

concern those between the PRCI and DMC groups, as the latter were taken as an approximation of routine care in the present study.

Evidence of differentiation between intervention groups was found on the daily coping efforts women employed to cope with the waiting period. Women in the PRCI group used more emotional expression and distraction coping than those in the DMC group. There were also trends suggesting that women in the PRCI group sustained their use of positive reappraisal and relaxation coping through the waiting period, whereas reports of these strategies by the DMC and PMI groups were lower in the second week of the waiting period than the first. These PRCI effects on coping were supported by retrospective intervention evaluations, which suggested that women in the PRCI group perceived the PRCI to have helped them to 'carry on and keep going' significantly more than women in the DMC group did about daily monitoring. This combination of prospective and retrospective ratings suggests that the PRCI had achieved what it was designed to do, i.e., that it had helped women in the PRCI group to sustain their efforts to cope with the waiting period. This is a main principle of meaning-based coping (see Figure 1, page 6), i.e., that it helps to sustain the coping process when there is no resolution to a stressor. That there was some evidence that the PRCI influenced coping during the IVF waiting period is therefore an important finding. Further, the differences between the PRCI and DMC groups on coping were found on strategies proposed to be effective and adaptive in uncertain and uncontrollable stressful situations (e.g., emotional expression, Stanton et al., 2002; Terry & Hynes, 1998, and positive reappraisal, Folkman, 1997; Sears et al., 2003; Terry & Hynes, 1998), with the PRCI group reporting more of these than the DMC group. The findings with regards to PRCI effects on other psychological outcomes were few, although the PRCI group recalled that the PRCI helped to reduce the stressfulness of the waiting period, and

that they had felt more positive, compared to the DMC controls. Attention will be paid to the lack of expected PRCI effects on emotional well-being in due course, but first each type of coping influenced by the PRCI will be discussed, to demonstrate the benefits of each for the IVF waiting period.

Research suggests that expressing emotions (positive *and* negative) is associated with positive outcomes during stressful health experiences (e.g., cancer treatment, Stanton et al., 2002; failed fertility treatment, Terry & Hynes, 1998), when the outcome of the experience cannot be changed or controlled by the individual. Positive outcomes associated with emotional expression in prior research include better task performance (Terry & Hynes, 1998), and fewer physical symptoms and medical appointments (Stanton et al., 2002). Emotional expression may be a particularly beneficial strategy during the low-control IVF waiting period because expressing emotions could help to release psychological tension that might otherwise lead to greater distress, increase physical stress responses, and interfere with cognitive processing required to effectively evaluate and employ strategies to help deal with the stressful waiting period (e.g., Gross & Levenson, 1997; Lazarus & Folkman, 1984; Terry & Hynes, 1998). That the PRCI group reported more emotional expression *and* other coping strategies than the control groups provides some support for the proposal that expressing emotions may free up psychological resources such that other coping strategies can be employed (e.g., Lazarus & Folkman, 1984).

Although distraction represents an avoidant-type emotion-focused strategy, which research has shown to be concurrently and prospectively related to poorer adjustment to a low control stressor such as IVF treatment (Terry & Hynes, 1998), the PRCI and PMI groups reported more of this strategy than the DMC group. Other studies also suggest that

distraction is used and may be helpful during uncontrollable waiting periods, however. Women waiting for another potentially threatening medical procedure (i.e. assessment of cancer risk) reported using distraction coping and thought it was helpful at controlling their worries about genetic testing (Phelps et al., 2006), and 75% of women waiting for the results of tests for breast cancer reported using diversion strategies every day during this time (Poole et al., 1999). It may be that avoidant strategies such as distraction, and distancing (Folkman & Lazarus, 1985) are popular and helpful during waiting experiences when nothing can be done to change the outcome and all that can be done is to regulate emotions at that time. That both the PMI and PRCI groups reported more distraction coping than the DMC group may suggest that one effect of these cards above daily monitoring is that they served as a distraction from the forthcoming pregnancy test. However, as the PRCI group also reported more of other coping strategies whereas the PMI group did not, suggests that the PRCI has more pervasive effects than simply providing a distraction.

Finally, although the effects were not significant, there was a trend suggesting that the PRCI group sustained their relaxation coping efforts through the waiting period more than the DRK and PMI groups. This is important because relaxation was recommended to women informally and on written information at the ARU. Staff advised women to “rest”, “relax”, “put your feet up”, “let him [your partner] look after you” and so on, and the in-house IVF guide states that “There are no ‘do’s’ or ‘don’ts’ following Embryo Transfer, but it is wise to take things easy and it is a good excuse to ‘spoil yourself’” (CARU, 2005, p. 7). At embryo transfer women appreciated such advice as a concrete example of something they could ‘do’ to help themselves during the waiting period and looked forward to the opportunity to relax after the stressful round of oocyte retrieval, fertilisation and embryo transfer. Because one proposed effect of the PRCI it that it primes individuals to focus on

positive aspects of an experience, women receiving this intervention may have focused more on the benefits derived from relaxation than the control groups did, which may have encouraged the PRCI group to carry on “taking it easy” as the pregnancy test drew near.

Regarding PRCI effects on other psychological outcomes, the PRCI group showed less of an increase in pessimism over time than both control groups, and in keeping with an intervention that encourages women to focus on the positive aspects of a difficult experience, appraisals of the waiting period were more positive in the PRCI group on a number of appraisals although significantly so for challenge and personal control appraisals only. Finally, the PRCI group reported feeling better on a daily basis after reading the PRCI than the DMC did after completing the DRK, especially on some days of the waiting period. However, controlling for differences between groups in vaginal bleeding reduced the differences between groups on pessimism about the pregnancy test result to nonsignificance, suggesting that differences in this cue to imminent failed fertility treatment rather than the interventions received were responsible for the group differences in pessimism about achieving a pregnancy.

It was evident from these results that the PRCI did not have ‘blanket benefits’ on all psychological outcomes assessed in the present study, but the PRCI benefits observed provide some evidence that the PRCI had helped to sustain positive reappraisal coping and other coping efforts during the waiting period. Further, the differences between the PRCI and PMI groups were important because they indicate that PRCI benefits were not due to the effects of reading positively toned statements per se. A number of differences were found between the PRCI and PMI groups. Compared to women in the PRCI group, women in the PMI group appraised the waiting period more negatively, were more pessimistic, reported more negative and less positive emotions over time, and reported less coping effort

as the pregnancy test drew near. However, as differences between groups on pessimism and harm emotions were removed when controlling for group differences in reports of physical symptoms associated with treatment failure or pregnancy, this suggests that physical symptoms rather than differences between the PRCI and the PMI were responsible for the group differences on harm emotions and pessimism during the waiting period. However, retrospective intervention evaluations showed that the PMI card was evaluated more negatively than the PRCI card on numerous dimensions relating to the acceptability, psychological effects, and endorsements of the cards. Retrospective evaluations of the PMI compared to daily monitoring alone (i.e., DMC group) were also more negative, suggesting that the PMI group evaluated the PMI as less helpful than daily monitoring, and were less likely to endorse the card or use it again.

These differences between the PMI and other groups suggest that the PMI group experienced more negative psychological outcomes on a daily basis during the waiting period and evaluated the PMI more negatively. Importantly, the differences between the PRCI and PMI groups suggest that PRCI benefits were not due to demand characteristics or genuine effects engendered by reading positive statements, but that PRCI effects were specific to the content of the ten positive reappraisal statements and superior to the effects of the ten positive mood induction items. However, that the PMI had negative effects on variables compared to the routine care effects of daily monitoring alone was unexpected and a cause for concern.

Given that PMI items were based on a reputable positive mood induction procedure, which has been widely used to good effect as a method of elevating positive mood (Frost & Green, 1982; Jennings et al., 2000; Raps et al., 1980; Riskind et al., 1982; Velten, 1968), reasons for the ineffectiveness of the PMI in the present study were considered further,

especially as it seems unlikely that differences were due to unique characteristics of women in the PMI group. There were no significant differences between intervention groups on any demographic, fertility history, dispositional, state or physical variables at baseline, making it unlikely that women in the PMI group differed from those in other groups in some way that had a negative influence on their reactions to the PMI. Another potential explanation for differences between groups was that participants in the PRCI group were somehow aware that they had received the 'new' intervention whereas the PMI and DMC groups knew that they had received control (and hence potentially less effective) interventions. However, the results do not seem to support this explanation. First, there were no significant group differences in women's responses to the intervention evaluation item asking whether they thought they had received the new intervention, suggesting that women in the PMI and DMC groups were not aware that they had received a control intervention. Furthermore, although the researcher *did* know which women were assigned to the DMC group because these women were not given an intervention card (which could explain differences between the DMC group compared to the PRCI and/or PMI groups), neither the researcher nor the participant knew whether a participant who had received a card was assigned to the PRCI rather than the PMI card group. Therefore, where the results suggested that the PRCI *but not the PMI* had benefits above daily monitoring alone this was despite the researcher and patient not knowing which card was received. It is therefore possible to conclude that expectations about the effectiveness of the PRCI versus the PMI were not communicated to women in these two groups.

Another explanation for the more negative responses of women in the PMI group is that these reflect the impact of the greater cues to treatment failure experienced by the PMI group compared to the PRCI and DMC groups. However, from 23 analyses controlling for

group differences in daily psychological reactions to the waiting period, physical symptoms associated with potential treatment failure were only significantly associated with the outcome *and* altered the significance of the results in a few instances, namely results relating to harm emotions and pessimism. Therefore, although these covariate analyses provide some evidence that physical cues to treatment failure explained the more negative responses of the PMI group, it cannot be asserted that the PMI did not have any detrimental effects on women's psychological well-being during the waiting period. It is recommended that evidence is obtained that this modified positive mood induction procedure has actual benefits on psychological well-being in naturalistic stressors before providing the PMI card to patient samples or other vulnerable participants. Furthermore, the differences in the psychological effects of reading one set of positive statements compared to reading a different set of positive statements raises questions about the potential costs and benefits of different types of positive thinking, which will be discussed in more detail in the General Discussion (Chapter 7).

The above results suggest that the PRCI had some benefits on psychological well-being during the IVF waiting period over and above the effects of daily monitoring alone. However, prior research consistently shows that both positive reappraisal coping (e.g., Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996) and emotional expression (e.g., Stanton et al., 2002; Terry & Hynes, 1998) are associated with higher positive and lower negative affect. The lack of differentiation between groups on emotional well-being in the present study is therefore surprising, given that only the PRCI group received a positive reappraisal coping intervention and that this group also reported more emotional expression coping than the control groups. The most parsimonious explanation for the lack of PRCI effects on emotions would be that the PRCI did not influence positive

reappraisal coping in this study, and as the PRCI group did not report significantly more positive reappraisal coping than the control groups, this explanation received some support. However, there was some evidence that positive reappraisal coping efforts were better sustained in the PRCI group than in both of the control groups and other study results (e.g., sustained coping efforts, feeling more positive) were consistent with those expected should positive reappraisal coping have been promoted.

Another possible explanation for the lack of group differences on all outcomes relates to the small sample size in the present research. According to Cohen (1992), this study required 52 women per group for sufficient power to detect significant differences ( $p < .05$ ) between groups, but data for only 82 women was retained in analyses. Although the PRCI group always showed a more positive emotional response to the waiting period than the control groups did, effect sizes for emotion variables were rather smaller (i.e.,  $f = .10 - .22$ ), than those for coping variables where significant differences *were* found (i.e.,  $f = .25 - .33$ ). As such differences between groups on emotion variables may have been found with appropriate power to detect them. On a related point, attrition amongst those initially recruited into the study meant that a self-selected sample contributed data to study analyses. Those who selected themselves (by completing all assessments) differed from those who did not, because noncompleters reported higher levels of aspects of neuroticism (e.g., Eysenck & Eysenck, 1975) or negative affectivity (e.g., Watson & Clark, 1984). However, as examination of baseline levels of trait anxiety for all women recruited into the present study ( $N = 123$ ) showed that trait anxiety was in the range reported by Spielberger et al. (1970) for a sample of general medical patients, and as no differences in trait anxiety for those who completed and those who did not complete were found ( $p = .42$ ), it is not thought

that the results of the present study would differ markedly if all women recruited had contributed data to the analyses.

The strength of imminence effects may also help to explain the absence of PRCI effects on emotional well-being. Theory predicts that the approach of a significant event, combined with uncertainty about the event outcome and personal investment in that outcome is a powerful stressor, and negative effects of imminence on psychological well-being during waiting periods for IVF pregnancy tests and cardiac catheterisation were reported by Boivin and Walker (1997) and Harkness et al. (2003), respectively. The psychological effects of imminence may therefore lead to a 'strong situation' that overrides the effect of efforts to think positively on emotional well-being, especially as the day of the medical event draws near. In addition, physical symptoms that can be cues to pregnancy or treatment failure (i.e., vaginal bleeding, breast tenderness, abdominal bloating) were significantly related to daily psychological outcomes in 23 covariate analyses in the present study. Controlling for these symptoms did not alter the significance of the results for daily appraisals or coping strategies, but did change the significance of results for harm and challenge emotions and daily pessimism. Notably, controlling for differences between groups in vaginal bleeding reduced the significant differences between groups on harm emotions and pessimism about treatment outcome to nonsignificance. This strongly suggests that these overt cues to treatment failure were responsible for the significant differences between groups on the harm emotions associated with a negative outcome (Folkman & Lazarus, 1985) and pessimistic expectancies about pregnancy, rather than it being the case that these differences were due to differential effects of the interventions received.

As a related point, it is interesting that Lebel et al. (2003) propose that breast cancer patients should be told exactly *when* the day of their breast biopsy and diagnosis will be, because it is expected that this information would improve patient's quality of life and reduce the distress engendered by uncertainty. Indeed, this seems sensible when considering the proposed benefits of anticipatory coping (Folkman & Lazarus, 1984). However, deterioration in the psychological well-being of infertile women and heart catheterisation patients as the day of their respective procedures approached suggests that knowing precisely when a potentially threatening event will occur may be something of a mixed blessing in terms of its effects on psychological well-being.

Another issue to consider is whether the 14 day IVF waiting period was too brief for full PRCI benefits to become evident. Other studies showing beneficial effects of positive reappraisal coping on positive affect and mood states were of considerably longer durations than the IVF waiting period (3 months and 12 months, Sears et al., 2003; 2 years, Folkman, 1997). Further, these studies considered associations between positive reappraisal coping *that was already happening* and emotional well-being. It may be that manipulating positive reappraisal coping does not have instant, concurrent benefits on emotional well-being but that effects take time to fully develop, perhaps after the results of the pregnancy test were known (i.e., Terry & Hynes, 1998). In the present study, psychological well-being on the pregnancy test day and thereafter was not assessed, because the effects of the PRCI on psychological well-being during the waiting period (only) were of interest. Therefore it is not possible to evaluate whether there were PRCI effects on emotional well-being after the pregnancy test results were known. It is also worth considering that it may be somewhat unfair to promote a coping strategy that may or may not be in the patient's coping repertoire at a time when coping demands are likely to be at a premium. A familiar way of

dealing with the stressor may be more comforting than getting to grips with a new approach at a difficult time. In future research, it may be of benefit for women to receive the PRCI at an earlier stage of IVF treatment in order that positive reappraisal coping efforts might be more helpful during the later waiting period.

A methodological consideration that may explain the lack of differentiation between the PRCI and DMC groups on emotional well-being during the waiting period is that reactivity to the daily monitoring process obscured PRCI effects. Reactivity is defined as “the extent to which the measuring operations affect the observed event” (Kanfer, 1970, p. 148), or in other words, the extent to which completing the DRK each day had benefits on psychological well-being above not doing so. Focusing on, identifying and rating the emotions they experienced may have helped women to process their emotions in a way that had beneficial or detrimental effects on their psychological well-being. When designing Study 2, the challenge was to evaluate the effects of the PRCI on the *interim days between clinic appointments* (as these were the days when women had no scheduled opportunity (e.g., clinic appointments), at which they could receive support or feedback from medical staff. The best way to track whether and how the PRCI had influenced a natural pattern of changes (e.g., Boivin & Walker, 1997) in psychological well-being over this 14 day time period was to monitor the women’s reactions on a daily basis. As previously stated, when Study 2 was designed the DMC group (daily monitoring alone) was included as an approximation of a routine care and assessment control group. All three groups received this daily monitoring form and therefore it was expected that any influence of the daily record items on psychological well-being should be evenly distributed between groups. It was expected (and indeed some results showed) that any unique benefits of the PRCI would be revealed as differences between the DMC and PRCI groups. However, it is not possible

to ascertain whether the PRCI had an effect on psychological well-being over and above routine care (in the case of the IVF waiting period this would mean 'going about one's daily business' with no contact with medical staff).

Daily monitoring may have influenced psychological reactions to the waiting period by providing women with an outlet to express thoughts and feelings during the waiting period, and research suggests that this may be beneficial in itself. Indeed, in a study of the effects of written emotional expression by women living with breast cancer, Stanton et al. (2002) found that women who expressed their emotions about living with breast cancer had fewer medical appointments for cancer-related problems (e.g., breast symptoms, suspected recurrence) than those who wrote factually about their experience with breast cancer. Further, those who revealed positive *and* negative emotions showed a significant decline in physical symptoms compared to the factual group.

Monitoring emotions using the DRK approach differs from such written emotional expression paradigms because it involves simply monitoring (theoretically derived) thoughts and feelings rather than free writing, and emotionally expressive writing tasks are also generally more retrospective exercises that may involve recall over a period of days, weeks or months (Smyth & Stone, 2003). However, women's written comments about the daily monitoring process (regardless of intervention group) suggested that they perceived daily monitoring to have had positive effects in terms of helping them to identify and express their feelings. One or two also welcomed the idea that the emotions they were rating were based on those endorsed by other women during IVF treatment, which went some way towards normalising their thoughts and feelings. Normalisation of psychological reactions may be important and have therapeutic effects for infertile women because it

reassures them that they are not 'going mad' when they feel sad or anxious (e.g., McNaughton-Cassill et al., 2000).

The issue of how to track reactions to days of unresolved uncertainty without reactivity from the tracking process itself is certainly a vexed one, but one solution may be to remove any influence of the 'routine', end of day daily monitoring process by using electronic devices (e.g., pagers, palm-top computers) to prompt women to report on psychological outcomes at random times (see Smyth and Stone, 2003, for a review of ecological momentary assessment applications). This method may prevent aggregation, processing or reorganising reactions for a routine DRK session and hence reduce reactivity to the daily monitoring process. Alternatively, future research could evaluate PRCI effects on psychological well-being using a Solomon 4 design, which is an appropriate design for cases where there is cause for concern about possible carryover effects of an assessment on an outcome (Campbell & Stanley, 1963). In the present case the assessment of concern is daily monitoring. A variant of the Solomon 4 design would involve four groups of women. One group of women would receive the *intervention alone*, and a second would receive the *intervention plus daily monitoring*. A third group would *monitor reactions without an intervention* and the fourth would receive *neither intervention nor monitoring*. This final group would be the routine care group. Should the PRCI have a unique effect on psychological well-being, this would be shown by a significant main effect of intervention on psychological well-being (i.e., the two groups who received the intervention would report greater psychological well-being than the two groups who did not). However, having spoken of the possible drawbacks of daily monitoring, the results of the present study showed that DRK ratings reflected the changes in psychological well-being expected as the pregnancy test approached, and changes in physical symptoms associated with IVF

treatment, treatment failure and pregnancy (e.g., breast tenderness, vaginal bleeding). These results strongly validate the DRK as a sensitive method of capturing nuances of change in psychological and physical reactions over time in this context.

One final point to be made here about emotional well-being during the waiting period relates to a possible dissociation between prospective, daily ratings of emotions and recollections of emotions after the fact. In a study by Boivin and Takefman (1995), women recalled the stress of the IVF waiting period as significantly more stressful than they reported it to be on a daily basis, regardless of whether or not they were pregnant. Boivin and Takefman suggested that this dissociation may indicate that daily coping efforts suppressed ongoing daily ratings of negative emotions. In the present study, emotional expression coping was significantly higher in the PRCI than the DMC group, which may indicate that the DMC group was suppressing negative emotions. In that case, the lack of differentiation in emotional reactions between these groups may be because the PRCI helped to *reduce* negative emotions whereas the DMC group simply *suppressed* them. An a posteriori analysis was carried out to investigate this hypothesis. Daily ratings of positive emotions and negative emotions were summed (separately) for the 14 day waiting and compared with retrospective ratings of the waiting period on (1) an item asking women how positive they had felt during the waiting period and (2) an item asking how anxious they had felt (after standardising all variables). A Group (3) by Assessment (2; prospective, retrospective) mixed ANOVA with Assessment as the within-subjects variables was computed, which showed no significant effects for negative affect. However, the Group by Assessment interaction on positive emotions showed a trend for women in the PRCI (but not PMI or DMC) groups to recall the waiting period as more positive than they had rated it at the time ( $p = .08$ ). This suggests that there was some possible dissociation between

ongoing ratings of positive emotions and that the PRCI group recalled the waiting period more positively rather than more negatively as was found by Boivin and Takefman (1995). This result suggests that there may have been some positive PRCI effects on emotions not observed through daily monitoring data in the present study.

The secondary aim of Study 2 was to establish whether the PRCI had a beneficial effect on physical outcomes, namely daily physical symptoms associated with stress and pregnancy outcomes. Regarding daily ratings of physical symptoms, the PRCI group reported significantly more somatising than the DMC group, which was contrary to predictions. Although this may suggest that women in the PRCI group were more stressed than those in the DMC group, and had reported their distress as greater physical symptoms rather than greater negative emotions than the DMC group (Stanton et al., 2002), analyses of psychological outcomes in the present study showed that the PRCI group reported more *positive* psychological well-being than the DMC group on a number of dimensions *and* more emotional expression coping, which seems to disconfirm this hypothesis. An alternative explanation is that women in the PRCI group were expressing, but not *experiencing*, more of the negative physical concomitants of IVF than the DMC group, in the same way that they expressed their emotions more. An a posteriori analysis of the relationship between total emotional expression coping and total somatisation during the waiting period showed that the relationship between emotional expression coping and somatising was significant,  $r(81) = .28, p < .01$ , suggesting that greater emotional expression coping *was* associated with greater somatisation. However, any reasons for this relationship can only be speculative. It may be that one effect of the PRCI is to help women to express both emotional and physical concomitants of this stressful experience more

freely. Or it may simply indicate that women who were more symptomatic *needed* to express more of the emotions engendered by their delicate physical state.

In terms of pregnancy rates, there were few clinical pregnancies (14.64%,  $n = 18$ ) amongst the 123 women initially recruited into this study, regardless of whether or not they completed the study, although the clinical pregnancy rate for women in the final sample was as would be expected (13.41%,  $n = 15$ ) given the age of women in the final sample (e.g., 12.5% for women aged  $\geq 36$  years; Stolwijk et al., 2000). Regarding group differences on pregnancy outcomes, the PMI group showed a poorer response to treatment than the PRCI and DMC groups, with more vaginal bleeding, lower BHCG levels, and lower pregnancy rates. Because there were no significant differences between groups in biological IVF outcomes recorded *prior* to embryo transfer, no reasons relating to medical treatment can be offered to explain the less positive physical outcomes *post* embryo transfer in the PMI compared to the PRCI and DMC groups. However, women in the PMI group reported significantly more vaginal bleeding than those in the DMC group and controlling for this difference removed significant group effects for harm emotions and pessimism about pregnancy. Therefore the results suggest that this advance warning of treatment failure explained the PMI group's more negative emotional state during the waiting period and the lower pregnancy rates in this group. Finally, in line with the majority of studies included in Boivin's (2003) review of psychosocial interventions for infertility, no significant differences were found between the PRCI and DMC groups on BHCG levels or pregnancy rates. Hence it can be concluded that the PRCI did not have beneficial effects on pregnancy outcomes compared to routine care.

### *Limitations*

One limitation of the present research is that it was not possible to analyse the full complement of measures for all women in the present study, because incomplete data was available for 38 women (30.89%). Comparisons between women who were included in analyses and those who were not showed that the latter group of women differed from the former group. At embryo transfer, women with incomplete data reported more negative emotions, were more pessimistic and thought they had less control over the pregnancy outcome than those who completed all assessments. In addition to these differences, it must be stressed that women who opted to take part in this research were volunteers and no data is available for women who declined participation. Therefore it could not be established whether women who participated differed from those who did not wish to take part. It must therefore be acknowledged that the sample contributing data to analyses in the present study may have differed in some degree to the population of women attending this ARU, and the generalisability of the findings of the present study to all women undergoing IVF treatment in this clinic may therefore be limited.

It should also be borne in mind when considering the results of the present study that for practical reasons (e.g., time pressures, participant burden), it was not possible to include measures for all factors that may influence a woman's psychological reactions to the IVF waiting period. In any research it is important to control for potential mediators and confounds in order that claims of causality between an intervention or a psychological characteristic are not erroneous or exaggerated (e.g., Robbins, Spence & Clark, 1991). For example, previous research has shown that some infertile men and women meet clinical criteria for the diagnosis of an anxiety disorder or depression (Demyttenaere et al., 1998; Litt, Tennen, Affleck & Klock, 1992; Lord & Robertson, 2005). Furthermore, marital

relationships can be affected by the demands of fertility treatment. Patients may be required to abstain from sexual intercourse at certain times, each partner may witness the distress of the other if treatment fails, and the ongoing financial costs of private IVF treatment may mean economic pressures are exerted on the couple's daily life. Such factors were not assessed in the present study to minimise the demands made of patients at this stressful time. However it may be the case that, despite random assignment to conditions, groups differed on one or more variables that were not assessed. It is not known to what extent these variables may have influenced the associations observed in the present study.

### **5.5 Conclusions and future directions**

The results of the present study suggest that the PRCI had beneficial effects on some but not all (notably emotional) outcomes assessed daily during the IVF waiting period. Positive PRCI effects mainly involved the sustained use of coping strategies proposed to be more adaptive in low control stressors, along with retrospective evaluations that the PRCI had helped women to carry on or keep going, helped them feel more positive, and helped to reduce the stressfulness of waiting for the IVF pregnancy test. Because such effects are in line with the benefits that would be expected from positive reappraisal coping efforts, the PRCI seems a worthwhile addition to the routine care offered to women waiting for the results of an IVF pregnancy test. A number of reasons for the lack of PRCI effects on emotions in the present study were considered, and it may be that the waiting period was too short and stressful a time to introduce a coping intervention and expect to see positive effects on emotional reactions. Further, reactivity to the daily monitoring process may offer at least a partial explanation for failure to demonstrate PRCI effects on all daily outcomes.

One of the key strengths of the present research was that positive PRCI effects were observed despite stringent experimental control. The integrity of the double-blind design with respect to the PRCI and PMI conditions allows the conclusion that demand characteristics did not account for instances where the PRCI group showed a more favourable response than the PMI group. Moreover, PRCI benefits were observed even though women were not trained in the use of the PRCI, or informed about the expected benefits of positive reappraisal coping, which means that PRCI effects on coping were uncontaminated by women's expectations that this intervention *should* influence the ways in which they coped with this experience.

One proposed direction for future research involving the PRCI involves manipulating the personal relevance of this intervention to the patients who receive it. Because the intention was that the PRCI should be relevant to all populations of patients during medical waiting experiences, PRCI statements are necessarily generic. However, the perception of what aspects of a situation are positive may differ between individuals (e.g., Goodhart, 1985). One IVF patient may think that a positive aspect of IVF treatment is that her partner has been supportive and their relationship strengthened, another may welcome the opportunity to resolve the issue of infertility, and another may appreciate the availability of IVF as an opportunity to conceive a child. The point is that there are no right or wrong answers about the aspects of an experience that *are* positive – the important point is whether the individual believes them to be so. A fruitful manipulation of PRCI effects could involve increasing the personal relevance of the PRCI to its recipients by explaining the nature and benefits of positive reappraisal coping and encouraging them to develop their own, personally salient PRCI statement(s), which could be added to the card. Such a manipulation would be in line with the recommendations of Sears et al. (2003), who

proposed that people should be actively helped to make use of benefit-related information by asking them about the benefits *they* perceive in an experience before pursuing how positive reappraisal coping may help their mood and health. Indeed, one aspect of a distraction coping intervention perceived to be particularly helpful by women waiting for genetic testing was that they were encouraged to relate the techniques described to their own experience, a process which they said made the intervention more helpful and relevant (Phelps et al. (2006). Such a manipulation of the ‘pure’ effects of the PRCI observed in the present study may help to ensure that patients gain maximum benefit from positive reappraisal coping in the future.

# **Part III**

## **Disposition and positive (re)appraisal of the situation**

“The nature of a stressful encounter and its cognitive [re] appraisal influence the way in which people cope with it” (Schwarzer & Schwarzer, 1996, pg. 127).

## **Chapter 6**

### **The development and application of an Unresolved Stressor Paradigm (USP).**

#### **6.1 Introduction**

Part III of this Thesis describes the generation, development, revision, and validation of an experimental paradigm emulating a stressful experience that persists over time without resolution. The paradigm was developed in order that factors which may influence how the coping process evolves over time can be investigated in the laboratory. This unresolved stressor paradigm (USP) comprises a series of scenarios describing a sequence of events that might occur after a road traffic accident in which a loved one was seriously injured. To begin with, Part III presents 3 Pilots (USP-Pilots 1 – 3; page 252 – 278) which describe the development of seven scenarios designed to emulate an experience that was (1) unresolved over time, (2) characterised throughout by uncertainty about mutually exclusive outcomes (i.e., favourable, unfavourable), and (3) evaluated as consistently stressful, uncontrollable, uncertain, and so on. Each scenario was designed to be as demanding as each other in the extent to which it emulated situation properties proposed to contribute to perceptions of an event as stressful (Lazarus & Folkman, 1984), in order that changes in reactions to USP events in future experimental manipulations would not be due to between-scenario differences in the valence of events. The USP-Pilots are followed by Studies 3, 4, and 5 which validate the paradigm. The aim of Study 3 (page 279) was to establish whether each scenario was as stressful as each of the others. The aim of Study 4 (page 284) was to establish whether, and in what ways, (re)appraisal and emotional reactions to the events described in the USP changed over time. The USP was then employed in Study 5 (page 307), with the aim of determining whether situational

(re)appraisals or dispositional coping style determined how individuals coped with this unresolved and stressful situation. With regards to the relationship between the research presented in Part III of this Thesis and the theoretical model of the coping process (Folkman, 1997; Lazarus & Folkman, 1984) discussed in Chapter 2 (pages 4 – 23), Part III thus focuses on the influence of *appraisal* and (re)appraisal of the *event* on situational *coping* and *emotion outcomes*.

#### *Laboratory paradigms and the coping process*

The relative virtues of examining responses to stressful events in laboratory versus real-life contexts are hotly debated. Lazarus and Folkman (1984) argue that laboratory paradigms are too simple, too brief, are ethically constrained and are ultimately under the control of the participant (who can terminate the study, and hence the stressor, at any time), and Folkman (2000) urges researchers to employ real-life stressors as the context for their research. However, experimental paradigms have been extensively employed in research because of benefits that may not be available during real-life stressors, including the potential to test hypotheses on large numbers of people in conditions that allow control and manipulation of specific factors (e.g., Kennedy & Hughes, 2004), which improves internal validity (e.g., Schwarzer & Schwarzer, 1996). A further advantage of laboratory paradigms is that baseline assessments of variables (e.g., dispositional characteristics) can be made in advance of the stressful event, which allows evaluation of the influence of stable person characteristics (see Figure 1, page 6) on the evolution of the coping process. It may not be possible to do this in advance of a naturalistic stressor such as illness (which may have an insidious onset) or accident (which would be unexpected). Furthermore, a measure of

dispositional coping style made after the onset of a naturalistic stressor may not reflect an accurate baseline measure as it is likely to be confounded with existing coping.

Before developing the USP, literature regarding laboratory stressor paradigms was reviewed to establish whether there were existing laboratory paradigms designed to examine the evolution of coping over time. To this author's knowledge, no such laboratory paradigm has so far been developed. Of existing laboratory paradigms which examine reactions to stress, these can be broadly classified into two main types; those that involve a manipulation designed to 'cause stress' and assess how participants respond to the manipulation *at that time*, and those that require participants to predict how they *would* respond in the context of an analogy of a real-life stressor. The types of manipulations employed in the former class of paradigms include event uncertainty (e.g., Greco & Roger, 2003), and uncontrollability (e.g., Raps et al., 1980; Rosenbaum & Ben-Ari, 1985), achieved by means of taxing mental arithmetic tasks (Kennedy & Hughes, 2004), noncontingent tasks (Rosenbaum & Ben-Ari, 1985), uncontrollable noise (Raps et al., 1980), and images of various emotional valence (Greco & Roger, 2003). The outcomes of interest encompassed physiological reactions (Greco & Roger, 2003; Kennedy & Hughes, 2004), anxiety (Greco & Roger, 2003), depressive symptoms (Raps et al., 1980), and cognitive task performance (Rosenbaum & Ben-Ari, 1985). However, these paradigms have some limitations as parallels of stressful events in real life, because naturalistic stressors are considerably more complex (Lazarus & Folkman, 1984) and have more meaningful consequences for the individual (Folkman, 2000) than whether or not they can control an unpleasant noise (Raps et al., 1980), or whether the next image they see will be distressing (Greco & Roger, 2003). None of these paradigms were considered suitable for the aims of the present research.

Another class of laboratory-based research examining responses to stressful experiences often involve the use of scenarios (vignettes) that emulate a particular stressful situation. Participants are asked to respond *as if* they were experiencing that stressor in real-life. This use of hypothetical situations and predicted rather than actual responses may seem a major drawback of the use of scenarios (Lanza & Carifio, 1992). However, Robinson and Clore (2001) report high correlations ( $> .9$ ) between the appraisals and emotions of participants who *actually viewed* various emotion eliciting images, and the appraisals and emotions of those who simply read *descriptions* of those images and predicted how they would respond if they *had* viewed the images. This convergence between reactions to actual events and reactions predicted on the basis of written descriptions of the same events supports the validity of scenario methodology. There are also other important reasons why scenarios are used in research examining reactions to stressful situations. First, an analogy of a naturalistic stressor can be studied, without the constraint of waiting for that event to happen (Lanza & Carifio, 1992). Second, experiences that occur infrequently and cannot be produced (ethically) in real life can be studied (Deck & Jamieson, 1998). Third, all participants consider identical information when rating scenarios (van Zuuren, de Groot, Mulder & Muris, 1996), which circumvents the issue of participants reporting coping for naturalistic stressors of varying magnitudes (Holmes & Rahe, 1967) as the context for their responses. Fourth, if participants are asked to recall how they reacted to an actual stressor in the past (another method used to assess coping with stressful events), their responses may be affected by factors such as the accuracy of their memories and the coping that has been employed to recover since that that event. Finally, scenarios afford opportunities for *manipulation* (Lanza & Carifio, 1992), of coping process variables (e.g., appraisals) which may not be possible outside of the laboratory.

In scenario studies of coping, researchers develop their own scenarios according to the aims of their research. Drapkin, Wing and Shiffman (1995) developed several scenarios, each describing a different hypothetical high risk situation that may pose a challenge to weight loss efforts (mealtime celebration, argument, television, workplace tension). At baseline, participants were asked to consider what they would think or do in these situations to prevent themselves from overeating in response to these challenges. Drapkin and colleagues found that the ability to generate coping responses to more of these hypothetical situations at baseline made a significant contribution to the prediction of successful weight loss up to 12 months later. Other researchers have used scenarios as a means of manipulating appraisal. In one such study, Deck and Jamieson (1995) manipulated specific situation properties (e.g., high or low severity) in the scenarios they created, in order to establish whether such manipulations would influence appraisals of scenario events, and found that their manipulations were differentially effective depending on the life-domain of the scenario. For example, high severity versions of financial and interpersonal events were rated as more severe than the low severity versions, but there were no significant differences in appraisals of severity for the high versus low severity versions of health events. Moreover, Deck and Jamieson (1995) found that manipulations of predictability also influenced appraisals of controllability, suggesting that their experimental manipulations were not as specific to a particular factor as intended. Manipulations of primary appraisals of threat, loss and challenge by Bjorck and Cohen (1993), were more effective, however. Bjorck and Cohen (1993) found that participants predicted coping differently with events they appraised as more of a threat, loss, or challenge (compared to each other appraisal). As expected, when participants predicted how they would cope with a hypothetical *challenge* (e.g., a scholarship), participants

reported more problem-solving coping, and less social support, wishful thinking, and religious coping than they did when predicting how they would cope with a loss (e.g., their father being killed). Together, the studies by Bjorck and Cohen (1993) and Robinson and Clore (2001) suggest that scenarios elicit comparable reactions to real-life experiences, and that scenarios are therefore a valid means of assessing coping. However, the study by Deck and Jamieson (1995) suggests that it is important that the researcher checks that the scenarios developed for a study actually emulate the situation properties and elicit the appraisals the researcher intended them to.

None of these scenario paradigms were considered suitable for the aims of the present research. Although several versions of scenarios were developed for each study, these all described different events, and none were designed to examine coping over time in response to the same stressor. The aim of USP-Pilots 1 – 3 was to develop a scenario paradigm emulating a sequence of events *over time within the same stressful event*, for this purpose.

### *The USP*

The USP developed for the present research comprised a series of scenarios which described a sequence of events after a road traffic accident in which a loved one was seriously injured. As discussed earlier, a central goal for the development of the USP was that the events described in each scenario should be equivalent in the extent to which they emulated situation properties common to stressful situations. The process by which this aim was achieved is described in USP-Pilots 1 – 3 (pages 252 – 278) and Study 3 (page 279).

### *Coping with unresolved stress over time*

According to Lazarus and Folkman (1984) the duration of a stressful event is an important factor determining how the coping process evolves over time, because as a stressful event persists without resolution, the individual will need to sustain his or her efforts to cope (see Figure 1, page 6). As discussed in Chapter 2 (page 4), sustaining the coping process begins with (re)appraisal. (Re)appraisal of an unresolved event may be influenced by factors such as new information about the event and emotional reactions, and these may change primary (re)appraisals of the implications of the event for well-being and secondary (re)appraisals of ways of coping and whether these efforts might be effective. Because (re)appraisal precedes coping in the theoretical model of the coping process, it would therefore be expected that (re)appraisal of an unresolved stressor may be associated with changes in coping over time.

The results of Study 2 (page 180 – 198) support proposals that (re)appraisals of an unresolved stressor change over time, as analyses of daily appraisals of the IVF waiting period showed that women's (re)appraisals of the waiting period became more negative as the waiting period progressed. Negative stress and threat (re)appraisals increased and positive challenge, personal control and ability to cope (re)appraisals decreased from one week of the waiting period to the next, especially in the last few days before the pregnancy test. Proposals that (re)appraisals of the situation will be associated with changes in coping also received some support from the results of Study 2, as women reported less problem-focused, positive reappraisal, and relaxation coping, but more escapism and emotional expression coping in the second week of the waiting period. These results suggest that problem-focused efforts directed at managing the situation or managing appraisals of the situation decreased and emotion-focused efforts aimed at regulating emotions increased, as

(re)appraisals of the situation became more negative. Moreover, women reported significant increases in negative emotions and decreases in positive emotions in the second week of the waiting period than the first. As discussed in Study 2, it is likely that changes in (re)appraisals, coping and emotional well-being were defined by the imminent IVF pregnancy test, which suggests that *knowing when* the outcome of an important event will be revealed can have detrimental effects on (re)appraisals, coping and emotional well-being.

Although it seems as though knowing at what time a resolution to uncertainty about possible pregnancy will occur seems a potent stressor for women during the IVF waiting period, some researchers suggest that patients waiting for resolution to other stressful medical experiences should be given clear information about when this resolution will occur, because this information would reduce distress (Lebel et al., 2003). The results of Study 2 seem somewhat at odds with this proposal, but it is important point to stress is that the IVF waiting period, although very stressful, is time limited. Patients in the research by Lebel et al. (2003) were waiting without any indication of when they might receive the assessments and diagnosis for which they were waiting. Reactions to such an event would not be influenced by imminence, but would reflect both event and temporal uncertainty (Lazarus & Folkman, 1984). In other words, the individual would not know *if* or *when*, a particular outcome they were waiting for would occur. For all he or she knows, the stressor might persist indefinitely and as such he or she may need to sustain coping efforts until such point as resolution does occur. The USP developed and validated in USP-Pilots 1 - 3 was deliberately designed to describe an experience emulating such temporal and event uncertainty. None of the scenarios making up the USP described any resolution to the uncertainty about whether or not the patient would die, and neither do any suggest a time

when the reader would know which of these outcomes will occur. It was therefore not expected that imminence would influence psychological reactions over time in response to the events described in the USP. The aim of Study 4 (page 284) was to establish whether, and in what ways, (re)appraisals and emotional reactions changed over time in response to this combination of event and temporal uncertainty.

With regards to the *ways in which* reactions to a stressful event may change over time, Lazarus and Folkman (1984) propose that a persistently stressful event can influence psychological (e.g., Seligman, 1975), physiological (e.g., Selye, 1976) and behavioural responses to that event. According to Selye's proposals about physiological responses to persistent stress (known as the General Adaptation Syndrome; Selye, 1976), physiological reactions advance through three stages (Alarm, Resistance, Exhaustion) in a predictable chronological order. In the first stage, stress hormones are secreted in response to the onset of a stressful event. Should the stressor continue the secretion of these hormones decreases and other hormones (e.g., cortisol) are released, which control and preserve the level of glucose in the blood, make fats available for energy and increase blood flow. These reactions help the body to resist the effects of physiological stress. As the stressor persists this "acquired adaptation" to the stressor can be lost (Selye, 1976, pg. 38), resulting in physiological exhaustion. In extreme cases, exhaustion can lead to death. However, Selye (1976) proposes that only the most severe stressors lead to exhaustion, and that although a stressor may initially shock an individual, he or she will *habituate* (get used to) the stressor over time. In contrast, according to learned helplessness theory (Seligman, 1975), people will respond with apathy, depression and anxiety to a stressful event once they have learned that the event outcome is not contingent on their efforts to change or control it. Over time, as they are repeatedly reminded that their efforts to change the outcome are in vain, learned

helplessness theory suggests that people will give up trying to deal with the situation. Indeed, even laboratory based helplessness training has been shown to lead to increases in depressive symptomology, (e.g., Raps et al., 1980). However, as the USP is brief and describes a hypothetical stressor it cannot be predicted that the participants would necessarily habituate to the events described in the scenarios or that they would develop signs of helplessness depression. Furthermore, appraisals and emotions, not physiological reactions and depressive symptomology will be assessed in Study 4.

Therefore, the aim of Study 4 (page 284) was to establish whether, and in what ways, (re)appraisals and emotional reactions naturally changed over time in response to the combination of event and temporal uncertainty emulated by the USP. Should the USP be effective in the way it emulates an ongoing, unresolved and stressful event, the onset of the USP should result in a significant increase in negative appraisals and negative emotional reactions, compared to Baseline ratings. With regards to further changes in (re)appraisals and emotional reactions over the time course of the USP, Lazarus and Folkman (1984) propose that continued appraisal and (re)appraisal in an uncontrollable, uncertain, and unresolved stressor can lead to distress, and that distress can, in turn, lead to more negative (re)appraisals of the situation. Therefore it was predicted that Study 4 would show that there were further increases in negative emotions and appraisals (decreases in positive emotions and appraisals) over the time course of the USP.

#### *Dispositional and situational influences on situational coping*

As shown in Figure 1 (page 6), appraisal/(re)appraisal precedes coping, and hence it would be expected that situational appraisals should influence the coping strategies that are employed to deal with a stressful situation. However as Figure 1 also shows, person

characteristics precede coping, and hence it would be expected that dispositional characteristics should influence the coping strategies that are employed to deal with a stressful situation. The first application of the USP as a means of evaluating hypotheses about why people cope as they do will be to examine whether dispositional coping style or situational appraisal determines situational coping during the unresolved stressor emulated by the USP.

It is often proposed that the degree to which a situation is amenable to control is of vital importance in determining the coping strategies that individuals employ to cope with that situation. Further, the *match* between situational appraisals of control and the coping strategies employed in that situation is proposed to determine the helpfulness of the strategy and hence psychological well-being. In its simplest form, this “goodness of fit” hypothesis predicts that problem-focused coping will be more evident (Folkman, 2000) and more helpful when the situation is controllable (i.e., when something *can* be done to change the situation for the better), whereas emotion-focused coping would be more likely and more likely to help when the situation cannot be changed or controlled, but the negative emotions elicited by the stressor require regulation (Park et al., 2001). As discussed in Chapter 2 (pages 14 – 16), however, it may be too simplistic to propose that goodness-of-fit relates to a simple delineation between the relative use and costs and benefits of problem-focused coping versus emotion-focused coping (Terry & Hynes, 1998). Instead, certain emotion-focused strategies (e.g., escapism) may be unhelpful in low-control situations whereas some problem-focused strategies may be more helpful (e.g., problem-appraisal; Terry & Hynes, 1998).

Proposals that (1) situational appraisals of controllability influence the coping strategies people employ and (2) that the match between the coping strategies employed

and the controllability of the situation explains adjustment to the situation have received some support in the literature. In a longitudinal study investigating coping and adjustment in the HIV+ caregiving partners of men with AIDS, Park et al. (2001) assessed appraisal, coping, and depressed mood in the caregivers at two monthly intervals. At each assessment, caregivers were asked to recall how controllable the most stressful event they had experienced that week had been, and how they had coped with that event. Park et al. (2001) found that appraisals of personal control were related to more active problem-focused strategies and less distancing in the caregivers, and that employing more problem-focused coping in more controllable situations predicted less depression at a later assessment, whereas employing more emotion-focused coping in more controllable situations predicted more depression. Further, as discussed previously, Terry and Hynes (1998) found that greater problem-focused efforts to manage the situation and greater escapism were related to poorer adjustment to a low-control stressor (failed fertility treatment), whereas problem-focused efforts directed at managing appraisals of the situation and emotional expression were related to better adjustment. In addition, Forsythe and Compas (1987) showed that students who reported that they had used more problem-focused coping during situations they appraised as uncontrollable were more distressed, whereas emotion-focused coping was associated with greater distress when the situation was controllable.

However, the evidence is not completely consistent with regards to the importance of situational appraisals as a determinant of coping and adjustment. In a study involving samples of psychiatric patients, counsellors and participants who were dealing with physical health problems or family stress, Vitaliano et al. (1990) found that their proposal that more problem-focused efforts would be reported in a changeable stressor was only supported with respect to one of the samples studied (suicidal patients), and their proposal

that less emotion-focused coping would be reported during a changeable stressor was only supported by the results from the suicidal sample and the counsellors. These findings do not provide consistent support for the first proposal of the goodness-of fit hypothesis.

Moreover, neither did the second proposal receive full support from this study. For non-psychiatric (but not psychiatric) samples, negative correlations between reports of problem-focused coping and depression during stressful life-experiences were significantly greater in changeable than in unchangeable situations, as predicted by Vitaliano and colleagues. However, the difference in the positive relationship between emotion-focused coping and depression in changeable compared to unchangeable situations was not significant (for psychiatric or other samples). Such evidence provides somewhat weak support for proposals that situational appraisals of controllability influence the coping strategies employed and that the match between coping strategy and situational appraisals explains psychological well-being.

Indeed there is not complete agreement about whether people *do* actually appraise each new situation they experience and that situational appraisals *always* determine situational coping, or whether people have preferred ways of coping that they bring to every situation and employ again (Carver et al., 1989) regardless of how controllable the situation might be. Another way of understanding the ways people cope with stressful situations is that situational coping is predetermined by dispositional coping style (e.g., Carver et al., 1989; Carver & Scheier, 1994). In other words, that people can be effectively categorised into problem-focused or emotion-focused copers on the basis of the coping strategies they *generally* employ, and their situational coping can be predicted on this basis. Such dispositional coping styles may over-ride situational appraisal to determine situational

coping in circumstances that conflict with the individual's preferred way of coping (Forsythe & Compas 1987).

Some evidence supports proposals that dispositional coping style predicts situational coping. In one study, students completed the Coping Operations Problems Experienced inventory (COPE; Carver & Scheier, 1994) framed in dispositional terms and at the same time completed the Ways of Coping questionnaire (Folkman & Lazarus, 1988) with respect to the ways in which they were actually coping with academic difficulties (Bouchard, Guillemette and Landry-Léger, 2004). In this study, Bouchard and colleagues showed that dispositional problem-focused coping and dispositional distancing-avoidance coping were significantly related to their situational counterparts, despite the fact that the dispositional and situational constructs were assessed with different measures. Furthermore, Carver and Scheier (1994) showed numerous significant relationships between students' reports of dispositional coping strategies, assessed prospectively at the beginning of an academic semester, and the coping strategies students later reported during different stages of an exam period. However, Carver et al. (1989) found that students reported less of a number of different coping strategies when recalling how they had dealt with a specific stressor, compared to the ways they reported generally coping with stressful events. Thus, as with proposals that situational appraisal dictates situational coping, the evidence to support proposals that dispositional coping style determines situational coping is not completely consistent.

Moreover, the relative importance of situational control appraisals and dispositional coping style in explaining situational coping is further complicated when the influence of other dispositional characteristics on the evolution of the coping process are considered. Trait characteristics such as dispositional optimism (Scheier & Carver, 1985) and

neuroticism are proposed to have a potential influence on primary appraisals of a situation, with dispositional optimism leading to a predisposition to recognise the challenge implications in a given situation, and neuroticism predisposing the individual to recognise the threat implications (Park & Folkman, 1997), although Chang (1998) showed that dispositional optimism was related (concurrently) to secondary but not primary appraisals. Research also suggests that optimism may predispose individuals to problem-focused coping styles (Carver et al., 1989; Carver & Scheier, 1994; Lobel et al., 2000; Scheier et al., 1986, 1989), and shared variance between dispositional optimism, trait anxiety, and escapism was shown in Study 1 of this Thesis. Finally, neuroticism was significantly related, both concurrently and prospectively, to greater distress (as was dispositional distancing-avoidance coping, Bouchard et al., 2004). Together, such evidence suggests that dispositional characteristics may have a pervasive influence on the evolution of the coping process, from appraisal to emotion outcome, as might be expected given that Figure 1 (page 6) shows person characteristics as an influence that lies between the situation and appraisals of that situation.

Research also suggests that trait characteristics might influence *situational* coping. In a study involving heart bypass patients, Scheier et al. (1989) found that dispositional optimists reported more problem-focused coping strategies pre- and post-operatively, and Chang (1998) showed that dispositional optimism accounted for a significant amount of variance in the coping strategies reported by exam students over and above gender, primary and secondary appraisal, and a significant amount of variance in life satisfaction, depression and physical symptoms after controlling for all of these *and* coping. In addition, Bouchard et al. (2004) showed that neuroticism was positively associated with situational distancing-avoidance coping, but negatively associated with situational problem-solving

coping, although trait factors and situational coping were assessed concurrently in the studies by Chang (1998) and Bouchard et al. (2004), which means that conclusions about the direction of causality between dispositional variables and situational coping cannot be drawn. Finally, a study by Scheier et al. (1986) showed that optimistic students reported more problem-focused strategies, positive reinterpretation, and acceptance, and less denial and distancing than pessimists when recalling how they had coped with a recent stressor. However, optimism was associated with students' recollections that they had used more acceptance coping in situations they recalled as having been uncontrollable, suggesting that both trait *and* situational influences might help to determine how they had generally coped with different stressful situations.

Consideration of the evidence regarding the role of situational appraisals, dispositional coping styles, and other trait characteristics suggest that situational appraisals of personal control may be important as an explanation of the coping strategies that people employ in a given situation, but that these might not be entirely independent of trait characteristics or dispositional coping style (which itself may be determined by traits). Indeed, the relationship between dispositional optimism and secondary appraisals of a situation, and between dispositional optimism and coping after controlling for secondary appraisals cannot be ignored (Chang, 1998).

One issue that may confound efforts to determine whether dispositional or situational factors are the key influence on situational coping is the disparate methodologies employed in the studies described. These variously employed patients, psychiatric samples, students, and caregivers, who reported coping with current stressors or those they recalled, using prospective, correlational, or retrospective designs, and assessing different types of problem-focused and emotion-focused strategies. Neither did every study assess every

aspect of the coping process from event onset to outcome (including both disposition *and* appraisal). To this end, when the goodness-of-fit hypothesis is fully supported in the study by Forsythe and Compas (1987), but not in the one by Vitaliano et al. (1990), it cannot be known whether this is because this hypothesis is flawed, or because methodological differences between studies (e.g., different samples) makes comparison of results more complicated than it may at first seem.

Determining the relative importance of situational versus dispositional factors on the evolution of the coping process over time may be particularly difficult outside of the laboratory. For example, baseline measures of dispositional coping style may be influenced by existing coping with an illness that has brought a patient to hospital, and baseline measures of situational appraisals at the start of treatment may actually reflect (re)appraisals of the ongoing health stressor. The major advantage of the USP above naturalistic research examining the ways in which people cope with stressful situations is the degree of experimental control the USP affords. When using the USP, the researcher is able to assess dispositional variables that may influence situational coping prospectively and is also able to assess situational appraisals of personal control before the person actually encounters the stressful event. Further, any manipulation of situational appraisals would be objectively the same for all individuals, and hence any differences in situational coping seen as a result could not be due to differences *in the degree to which* the situation was controllable. Therefore, the USP is an ideal experimental paradigm with which to test proposals about the influence of dispositional coping style and situational appraisals on situational coping. The first experimental application of the USP was therefore in a study which examined whether dispositional or situational factors were the key determinant of situational coping during an unresolved stressor (see Study 5, page 307).

## **6. 2 USP-Pilot 1: Generation and evaluation of a stressful situation to be developed further for the USP**

The first aim of USP-Pilot 1 was to identify one experience that would be particularly stressful and distressing if it happened in real life. This was important because an experience that did not fulfil these criteria may be appraised as benign or irrelevant, and in that case would not elicit stress appraisals or influence emotions (Folkman & Moskowitz, 2000; Lazarus & Folkman, 1984; Park & Folkman, 1997). After identifying an appropriate experience, a series of scenarios was written, based on that experience. The second aim of USP-Pilot 1 was to validate the scenarios, in terms of (1) content and (2) quality. Content was assessed in terms of the extent to which the scenarios emulated important properties of stressful situations (e.g., uncertainty, lack of resolution), as discussed by Lazarus and Folkman (1984), and the extent to which they were appraised as stressful, threatening, and uncontrollable, and so on. The quality of the writing was assessed with respect to whether the scenarios were easy to read, understand and imagine, and importantly whether the events described were plausible (Lanza & Carifio, 1992).

### **Phase I: Generation of stressor**

To identify an experience that would be particularly stressful and distressing if it happened in real-life, a group of postgraduate students ( $N=5$ ) participated in a focus group facilitated by the researcher. The topic of the focus group discussion was stressful life-experiences, and each student was asked to propose five life-experiences they thought would be particularly stressful or that they had found to be particularly stressful. Of these 25 experiences, participants agreed that 13 were the most stressful. These represented events in seven life domains, including personal difficulties, interpersonal difficulties, and

achievement difficulties (Goodhart, 1985), health problems (Schwarzer & Schwarzer, 1996), and legal and financial stressors (e.g., Holmes & Rahe, 1967). Each of the 13 life-experiences generated in the focus group (see Table 30) was then evaluated to determine which one would be developed further for the scenario series. No hypotheses were generated regarding which life-experience would be evaluated more negatively than the others.

**Table 30.**

*Life-experiences generated by focus group members*

<b>Life experience</b>
You had an argument with a friend several days ago and he (she) is not speaking to you.
You have an important examination tomorrow and you have not done enough revision.
You have forgotten to pay the electricity bill (final demand) and the electricity company have cut off your electricity supply.
You have been ill this term and are struggling to manage your university coursework.
You are having problems settling into university and are feeling homesick.
You have not received your student loan payment yet and your bank account is empty.
A close friend has been arrested and charged with a crime. He (she) is due in court next week.
A loved one has been in an accident and is seriously injured. The doctors aren't sure whether he (she) will survive.
A family member has been ill for a long time and his (her) doctor wants to run tests to find out what the problem is.
You return from a weekend at home to find that your flat has been burgled.
Your flatmate is depressed and nothing you say or do cheers him (her) up.
You think you must have done something to upset a group of friends, because they are avoiding you.
You have just found out that your boyfriend (girlfriend) has been cheating on you with another girl (boy).

## **Phase II: Evaluation of stressor**

### **Method**

#### *Design*

This study used a survey design, in which participants evaluated the 13 life-experiences shown in Table 30 (page 253), with respect to the extent to which they would find each stressful, distressing, meaningful and uncontrollable, and the extent to which each could have important consequences for themselves.

#### *Participants*

Undergraduate Psychology students ( $N = 50$ ) participated in the study as part of course requirements and were awarded course credit for taking part. The mean age of participants was 19.74 years ( $SD = .97$ ) and 42 were women. Inclusion criteria were that participants read and understood English sufficiently well to complete study materials.

#### *Materials*

*Life-experiences questionnaire.* Each of the 13 life-experiences was briefly described (e.g., “you had an argument with a friend several days ago and he (she) is not speaking to you”). Below each description were five questions assessing the extent to which the experience would be stressful “How stressful would you find this experience?”, distressing “How unhappy would you be about this experience?”, meaningful “How meaningful would this experience be to you?”, uncontrollable “To what extent could you control what happens in this situation?”, and would have important consequences for the individual “Would this experience have important consequences for you?” Ratings were made on seven-point scales anchored 1 (not at all) to 7 (extremely). A lower score on the evaluation dimension

of controllability indicated a more negative evaluation. A mean score  $< 4$  was arbitrarily taken to indicate that an event was sufficiently uncontrollable to be developed further. Higher scores on other evaluation dimensions indicated a more negative evaluation, and a mean score  $> 4$  was taken to indicate that an event was sufficiently meaningful, stressful, etc., to be developed further for the USP (see Appendix O, page 404, for the USP-Pilot 1 questionnaire).

### *Procedure*

The proposals for the focus group and survey study in USP-Pilot 1 were not submitted for full ethical review with the School of Psychology, Cardiff University School Research Ethics Committee. The procedure at the time (2002/3) was for the supervisor to carry out ethical review and gauge the need for full ethical review with the committee. These studies did not involve vulnerable participants, participants were fully informed about the nature of the study, they gave informed consent and they were verbally debriefed at the end of the study. Participants took part in the present study individually. The researcher explained that the purpose of the study was to find out how people might feel about certain experiences if they happened in real life, and those who wished to take part signed a consent form. The first experience was preceded by the following instructions (adapted from Smith & Lazarus, 1993, p. 243), which encouraged participants to imagine themselves experiencing the events described:

“Read through the description of the event and picture the situation that is described to you in your mind as best you can. Pretend that you are actually living through this experience. Try to mentally create the thoughts and feelings you would have if you were actually in this situation. When you are

experiencing the thoughts and feelings the situation evokes, please answer the questions that follow”

Participants then rated the 13 life-experiences, after which they were verbally debriefed, thanked for participating and awarded course credit.

### Results

Table 31 (page 257) shows means and standard deviations for each evaluation dimension for each experience. As shown in Table 31, participants rated all experiences as stressful, meaningful and distressing and as having important consequences (mean scores > 4), and rated about half of the experiences as ones they would have little control over (mean scores < 4). The two experiences that received the majority of the most negative evaluations were (1) an accident/serious injury to a loved one and (2) a cheating boy/girlfriend and *t*-tests were used to decide which one of these most negative life-experiences would be developed further for the scenario series. The results showed that compared to the cheating boy/girlfriend experience, the accident experience was rated as significantly more stressful,  $t(49) = 4.83, p < .001$ , meaningful,  $t(49) = 3.34, p < .01$ , and distressing,  $t(49) = 3.20, p < .01$ . It was also rated as having more important consequences,  $t(49) = 4.31, p < .001$ , and as less controllable,  $t(49) = -5.15, p < .001$ . These results suggest that an accident causing serious injury to a loved one was a suitable experience to be developed further for the scenario series.

**Table 31***Means for life-experience evaluation dimensions (standard deviations in parentheses)*

	Experience	Evaluation dimension				
		Stress	Distress	Meaningful	Important consequences	Controllable
1	Serious argument with a friend	5.50 (.89)	5.72 (.83)	5.00 (1.17)	4.72 (1.36)	4.94 (1.02)
2	Lack of exam preparation	6.32 (.77)	5.90 (.89)	5.52 (1.27)	5.92 (1.10)	5.04 (1.62)
3	Electricity disconnected	5.22 (1.20)	5.16 (1.20)	4.12 (1.42)	4.47 (1.37)	5.78 (1.09)
4	Loved one seriously injured	7.00 <sup>a</sup> (.20)	6.90 <sup>a</sup> (.36)	6.71 <sup>a</sup> (.90)	6.69 <sup>a</sup> (.46)	1.89 <sup>a</sup> (1.22)
5	Problems managing coursework	5.80 (.81)	5.67 (.93)	5.14 (1.26)	5.78 (1.11)	4.69 (1.46)
6	Feeling homesick at university	5.42 (.95)	5.78 (.84)	5.20 (1.17)	4.84 (1.25)	5.14 (1.34)
7	Not receiving student loan cheque	5.40 (1.24)	5.44 (1.20)	4.16 (1.71)	4.66 (1.70)	3.44 (1.58)
8	Arrest of a close friend	5.30 (.93)	5.16 (1.09)	4.74 (1.40)	4.06 (1.25)	1.86 (1.29)
9	Sick family member	5.56 (1.11)	5.38 (1.46)	5.40 (1.11)	5.36 (1.32)	2.14 (1.24)
10	Your home is burgled	6.32 (.59)	6.38 (.67)	5.22 (1.40)	5.62 (1.24)	2.52 (1.63)
11	Depressed flatmate	5.10 (.89)	5.20 (.93)	4.40 (1.07)	4.26 (1.25)	4.10 (1.39)
12	Friends avoiding you	6.08 (.75)	6.10 (.91)	5.50 (1.09)	5.22 (1.18)	4.40 (1.40)
13	Boy/girlfriend cheating	6.60 <sup>b</sup> (.57)	6.56 <sup>b</sup> (.70)	6.20 <sup>b</sup> (1.17)	5.96 <sup>b</sup> (1.27)	3.56 <sup>b</sup> (2.03)

Note. Only life-experiences 4 and 13 were compared. Means with different superscripts

were significantly different in these comparisons.

### 6.3 USP-Pilot 2: Development of the USP scenarios

A series of scenarios was developed, describing a possible sequence of events after a road traffic accident in which a loved one was seriously injured. Although USP-Pilot 1 suggested that participants would evaluate such an experience as stressful, distressing, meaningful and uncontrollable experience in its own right (in other words that what the *event was about* would be stressful) the intention was that the scenarios would emulate other situation properties that Lazarus and Folkman (1984) and Folkman (1997) proposed to be common to stressful situations. The impact of uncontrollability, uncertainty, and lack of resolution on psychological well-being was discussed in Study 2 (page 81 – 84). In addition, Lazarus and Folkman (1984) propose that a *relatively novel* experience (i.e., one that is neither so novel that associations between the event and possible consequences cannot be made, nor so familiar that responses reflect mere habit or routine) can contribute to the experience of stress. Relative novelty may be stressful because it precludes accurate prediction of what might happen next. Unpredictability in turn can be stressful because a lack of warning about possible (but not definite) negative events means that it is not possible to mentally prepare or ‘psych oneself up’ for these events. The aim of USP-Pilot 2 was to develop and evaluate a series of scenarios emulating events that may occur over a period of time after a road traffic accident in which a loved one was seriously injured. It was expected that that scenarios would be equivalent in the extent to which they were uncertain, uncontrollable, unresolved, unpredictable and relatively novel, and so on (Folkman, 1997; Lazarus & Folkman, 1984), thus emulating a period of sustained and persistent stress.

## Method

### *Design*

The experiment used a within-subjects design. Participants rated all seven scenarios in sequence. The independent variable was the scenario being evaluated (i.e., Scenario 1 – 7) and the dependent variables were participants' evaluations of scenario content on 14 dimensions (e.g., uncontrollability, uncertainty, stressfulness) and scenario quality as assessed on four dimensions (e.g., readability, plausibility).

### *Participants*

Participants ( $N = 11$ ) were recruited from the Psychology postgraduate population and the university participation panel. Postgraduate participants ( $n = 7$ ) were volunteers and those recruited from the participation panel were paid for taking part. The mean age of participants was 24.82 ( $SD = 6.42$ ) and six were women. Inclusion criteria were that participants spoke English sufficiently well to read and understand study materials and that they did not have personal experience of an accident causing serious injury to themselves, a partner, family member or friend. The latter criterion was set to firstly avoid causing unnecessary distress to individuals who had experienced such a traumatic event and secondly to ensure that participants appraised the hypothetical scenarios rather than recalling appraisals of a specific past experience.

## *Materials*

### A. Scenarios

The series comprised seven scenarios, all entirely fictitious and based on information from the media, books and hospital-based television dramas such as “Casualty”, “Holby City” and “ER”. The first scenario in the series described the initial event which would initiate the appraisal and coping process (see Figure 1, page 6). Readers imagined themselves waiting for their partner to come home when they received a telephone call informing them that their partner had been seriously injured in a road traffic accident. Six further scenarios followed, each describing developments in the situation over an unspecified period of time. It was intended that each scenario would promote (re)appraisal and that this stage methodology would permit the assessment of coping at multiple points in time in future research (Schwarzer & Schwarzer, 1996).

Each scenario deliberately communicated that the event was not resolved (i.e., that the partner was still critically ill). In this way the scenario series emulated an *ongoing* situation (i.e., persisting over time without a favourable resolution). Readers were presented with the information about events in separate scenario ‘instalments’, thus preventing reading ahead to establish what events happened next. As evaluations of each scenario were made without the reader knowing what would happen in the next scenario, *unpredictability* was maintained. The focus of each scenario was on *uncertainty* regarding the injured partner’s survival. The scenarios communicated that the possible outcomes to this experience were mutually exclusive (i.e., their partner might live or die) and that either outcome was equally likely (i.e., there was maximum uncertainty about which outcome would occur). Uncertainty was communicated in comments made by doctors and nurses in the scenarios, for example, “your partner’s chances of surviving surgery are about 50/50”,

“it is touch and go whether your partner will survive”. It was expected that the events described would be evaluated as relatively novel as the inclusion criteria ensured that participants would not have direct, personal experience of a road traffic accident (i.e., not entirely familiar), but that most people would have some vicarious experience of such events (e.g., from the media or books) (see Appendix P, page 406, for USP-Pilot 2 scenarios).

### B. Questionnaire

To assess evaluations of scenario content (e.g., uncontrollability, uncertainty, lack of resolution etc.), 14 questions were included beneath each scenario. Eight were based on items from the Stress Appraisal Measure (SAM; Peacock & Wong, 1990). Each of the SAM primary appraisal dimensions of threat, challenge and centrality (meaningfulness) were assessed with one item, as was secondary appraisal dimension of personal control over the situation, control by others and uncontrollability. Two other questions assessed stressfulness. Six further items were developed for the study, assessing the extent to which each scenario was novel, unpredictable, distressing, uncertain and unresolved and the extent to which individuals perceived they would be able to cope with the events (see Table 32, page 262) for questionnaire items assessing scenario content).

**Table 32.** Scenario content evaluation dimensions

Evaluation dimension
How familiar is the situation described in this scenario? (include experience from television programmes such as “Casualty” and “ER”, books etc).
To what extent can you predict what will happen in this situation?
To what extent do you feel that you would be able to cope with this situation?
How threatening would this situation be to your well-being?
To what extent would you find this situation a challenge to you?
How much control would you have over what happens in this situation?
How much control would others have over what happens in this situation?
To what extent would this situation be controllable by anyone?
To what extent would this situation tax or exceed your coping resources?
How stressful would this experience be for you?
How distressing would this experience be to you?
Would this situation have important consequences for you?
How certain are you about whether your partner will live or die?
Do you think this experience has reached a satisfactory conclusion?

Questions were rated on six or seven-point scales. Six-point scales were used for the majority of evaluations in order to force a choice about whether a scenario was unpredictable, uncertain and so on. An even number of scale points meant that participants could not endorse a mid-point suggesting that they were indecisive or unsure an aspect of scenario content. A seven-point scale was used for the question assessing uncertainty about the partner’s survival, with a mid-point response indicating maximum uncertainty. A higher score on the majority of dimensions indicated a more negative evaluation of the situation (e.g., more stressfulness), and a mean rating  $> 3$  was arbitrarily chosen as indicating that this aspect of scenario content was satisfactory (e.g., the scenario was stressful enough). In

the case of lack of resolution, challenge, controllability, and predictability, a lower score indicated a more negative evaluation (e.g., less predictability), and a mean rating < 4 was arbitrarily chosen to indicate that this aspect of scenario content was satisfactory (e.g., the scenario was unpredictable enough). Seven-point scales were used for questions assessing uncertainty and novelty. In these cases, a mid-point response (i.e., a mean between 3.5 and 4.5) was chosen by the author to indicate maximum uncertainty or relative novelty (respectively), and thus that these aspects of scenario content were satisfactory (see Appendix Q, page 408, for questionnaire). The quality of the scenarios was assessed with four questions, which asked about the extent to which each scenario was easy to read and understand, imaginable and plausible (see Table 33) for quality evaluation dimension items).

**Table 33.**

*Scenario quality intervention evaluation dimensions*

<b>Evaluation dimension</b>
How 'easy to read' was this scenario?
How difficult was it to imagine yourself in this situation?
How believable is this situation?
How easy was it to understand this scenario?

Responses were made on 6-point scales, and a mean score > 3 for each item was taken to indicate that the quality of writing was satisfactory (see Appendix Q, page 408, for USP-Pilot 2 questionnaire).

### *Procedure*

Experiments using this scenario paradigm received generic approval from the School of Psychology, Cardiff University, School Research Ethics Committee. Participants took part in the study in groups of two or three. The researcher explained the purpose of the study and participants read an information sheet outlining the nature of the scenario content and advising them that the scenarios may be upsetting. Participants were reminded that that they should not participate if they or a family member, friend or loved one had personal experience of a serious accident. No participants had such experience, and all agreed to participate and signed the consent form. Written instructions advised participants that they should read the scenarios in order and rate each scenario as a discrete incident (i.e., without letting ratings of earlier scenarios influence ratings of later ones). Participants read the Smith and Lazarus (1993) paragraph (page 255) before completing study materials. The researcher then conducted a group debriefing, in which participants discussed reasons why they had rated any scenario(s) differently to any other (see Appendix R, page 410 for discussion questions). Participants were thanked for participating and those from the participation panel were paid.

### *Data analysis*

Means and standard deviations were calculated for each evaluation dimension for each scenario. Within-subjects ANOVAs with scenario as the within-subjects factor were used to establish whether scenarios differed on evaluation dimensions. As shown in Table 34 (page 266), most of the means for evaluation dimensions relating to the content of each scenario met criteria, indicating that they satisfactorily emulated the intended situation properties. All scenarios were rated as sufficiently meaningful, distressing, stressful and

threatening (mean scores >3) and most were rated as sufficiently unpredictable, uncontrollable and unresolved (mean scores < 4). Mean scores for the uncertainty dimension were between 3.50 and 4.50, as intended. However, the mean score for unpredictability in Scenario 1 was 4.00 (i.e., too predictable). Mean ratings for ability to cope were also higher than expected for Scenario 7 (i.e., > 4), and all means for challenge (i.e., > 3) and novelty (i.e., > 4.5) were unsatisfactory.

## Results

Table 34 (page 266) shows the results of analyses comparing scenarios on content dimensions. Table 34 also shows that there were significant differences between scenarios in ratings of unpredictability, stressfulness, distress, ability to cope, personal control over the situation and control of the situation by others. Scenarios also differed with respect to participants' ratings of uncertainty about the outcome. In many cases, means for Scenarios 6 and 7 were markedly different than those for earlier scenarios. The data was reanalysed excluding these scenarios. Significant differences remained only for the evaluation dimensions of predictability,  $F(4, 40) = 6.59, p < .001$ , and control by others,  $F(4, 40) = 3.27, p < .05$ .

**Table 34.***Means and F-values for scenario content dimensions (standard deviations in parentheses)*

Evaluation dimension	Scenario							F (6, 60)
	1	2	3	4	5	6	7	
Novelty	4.82 (1.17)	4.91 (1.14)	4.91 (1.38)	5.27 (1.27)	4.55 (1.57)	4.73 (1.56)	4.73 (1.35)	1.14
Unpredictability	4.00 (1.55)	2.73 (1.27)	2.73 (1.35)	3.00 (1.34)	2.45 (1.37)	3.00 (1.55)	3.00 (1.18)	4.66***
Ability to cope	3.55 (1.37)	3.18 (1.17)	3.55 (1.37)	2.91 (1.38)	3.18 (1.40)	3.73 (1.56)	4.27 (.79)	2.01
Threat	4.64 (1.21)	4.91 (1.14)	4.73 (.79)	4.82 (1.25)	5.09 (.83)	4.64 (1.36)	4.36 (1.03)	.91
Challenge	4.73 (1.35)	4.82 (.87)	4.64 (1.03)	5.18 (.75)	5.00 (1.00)	4.91 (4.64)	4.64 (.92)	.48
Personal control	2.18 (.87)	1.91 (1.04)	2.09 (1.51)	1.73 (1.27)	2.09 (1.51)	3.27 (1.62)	2.82 (1.66)	4.95***
Control by others	3.73 (1.27)	3.55 (1.04)	2.91 (1.22)	2.73 (1.49)	3.36 (1.21)	2.82 (1.08)	2.55 (1.44)	3.49**
Uncontrollability	3.27 (.91)	3.18 (.87)	2.73 (1.19)	2.73 (1.19)	3.09 (1.14)	3.36 (1.29)	3.09 (1.38)	1.84
Tax/exceed coping resources	4.27 (1.42)	4.36 (1.43)	4.45 (1.44)	4.55 (1.21)	4.45 (1.29)	3.82 (1.40)	4.00 (1.18)	2.53*
Stressfulness	5.45 (.69)	5.55 (.52)	5.36 (.81)	5.73 (.470)	5.45 (.93)	4.91 (.83)	4.55 (1.21)	4.77***
Distress	5.73 (.47)	5.73 (.47)	5.64 (.67)	5.91 (.30)	5.73 (.65)	5.00 (.89)	4.91 (1.14)	7.53***
Meaning	5.27 (.65)	5.36 (.81)	5.27 (1.01)	5.55 (.69)	5.36 (.81)	5.27 (.91)	5.18 (.87)	.65
Uncertainty	4.18 (.98)	3.82 (.41)	4.27 (.64)	3.91 (.70)	3.82 (.98)	4.36 (.81)	4.45 (.82)	2.61*
Resolution	2.27 (1.19)	2.09 (.94)	2.18 (1.17)	1.82 (1.08)	1.82 (1.82)	2.18 (1.08)	2.18 (1.17)	1.07

Note. \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$ .

Table 35 shows mean scores for evaluation dimensions relating to the quality of the writing in each scenario.

**Table 35.**

*Means and F-values for scenario quality dimensions (standard deviations in parentheses)*

Evaluation dimension	Scenario							F (6, 60)
	1	2	3	4	5	6	7	
<b>Readable</b>	5.00 (1.18)	5.09 (1.30)	5.09 (1.38)	5.27 (1.01)	5.00 (1.00)	5.00 (.89)	5.09 (.94)	.25
<b>Imaginable</b>	4.36 (1.21)	4.91 (1.14)	4.73 (1.35)	4.36 (1.21)	4.27 (1.10)	4.45 (1.21)	4.18 (1.25)	1.21
<b>Plausible</b>	5.09 (.70)	4.82 (1.08)	4.73 (1.19)	4.82 (.87)	4.45 (1.37)	4.73 (1.35)	4.73 (1.19)	.71
<b>Understandable</b>	5.45 (.69)	5.45 (.93)	5.18 (1.17)	5.18 (.87)	5.27 (1.01)	5.18 (.75)	5.36 (.81)	.52

As shown in Table 35, means for all quality dimensions were satisfactory (i.e., > 3) and there were no significant differences between scenarios on any quality dimension.

## **Discussion**

The results of USP-Pilot 2 indicate that on the whole, the scenarios satisfactorily emulated situation properties common to stressful experiences (e.g., Lazarus & Folkman, 1984) and that the scenarios were appraised as stressful, threatening, and so on. The results also show that the quality of the scenarios was satisfactory. Together these results suggest that this series of scenarios is a valid paradigm to employ when examining reactions to an ongoing and uncertain, stressful situation. However, the results also suggest issues with scenarios which must be addressed before they are employed in future research. First,

scenario events were unexpectedly evaluated as familiar and had higher ratings than expected for challenge appraisals, meaning that the scenarios did not meet criterion for these evaluation dimensions. There were also significant differences between scenarios on around half of the scenario content dimensions, suggesting that scenarios were not consistently stressful, distressing, uncontrollable and uncertain as was intended.

To establish reasons for the unexpected ratings on the novelty and challenge dimensions, the group debriefing was examined. This suggested that participants understood the challenge item (“To what extent would you find this situation a challenge to you?”) to be asking about how arduous and demanding the situation was, rather than about potentially positive implications. A lack of clarity in the wording of this item may explain the unexpectedly high challenge ratings. Participants also said that the novelty question (which referred specifically to “Casualty” and “ER” television programmes) prompted recollections of particular episodes of these programmes. This question item may account for the unexpectedly high familiarity ratings. It was therefore decided to revise the novelty and unpredictability questionnaire items.

Scenarios 6 and 7 generally received more positive evaluations than earlier scenarios and excluding these scenarios from analyses removed significant between-scenario differences on most evaluation dimensions. This suggests that Scenarios 6 and 7 accounted for many of the significant differences between scenarios. Two reasons why Scenarios 6 and 7 were generally rated more positively than earlier scenarios were considered. The first was that differences were due to *scenario content effects*. In other words, if the content of Scenarios 6 and 7 was objectively ‘better’ than earlier scenarios (in the same way that finding money is better than losing it), then these scenarios would receive more positive ratings every time the scenario series was employed in the future. It

would be important to identify and remedy factors causing such scenario content effects before employing the scenarios in future research. Otherwise changes in reactions over time may be erroneously attributed to an experimental manipulation when they were instead caused by differences in the psychological impact of scenario content.

The second reason for different evaluations of Scenario 6 and 7 is *scenario position effects* (i.e., differences occurred because these scenarios were at the end of the series).

Position effects can be separated into those that fit with the aims of the present series of studies (i.e., how people cope with an ongoing period of unresolved stress) and those that are not. Unwanted position effects that could influence ratings of later scenarios include boredom or disengagement, that participants realised the study was nearly over, or that participants were responding to an implicit pressure to change their ratings over repeated assessments. Such influences may have led to arbitrary ratings of Scenarios 6 and 7 rather than proper evaluation of their content. In terms of the position effects that *were* of interest, ratings of Scenarios 6 and 7 may have been more positive because cognitive processes such as efforts to redefine the situation more positively resulted in more positive evaluations of Scenario 6 and 7. To try and differentiate between scenario content effects and position effects as an explanation for the different ratings of Scenarios 6 and 7, the results were examined further, according to the following rationale: If unwanted position effects (e.g., disengagement) were responsible for the more positive evaluations of Scenarios 6 and 7 it would be expected that these unwanted effects would influence *all* ratings. In other words, if participants were bored or disengaged at the end of the scenario series, there should be significant between-scenario differences on *all* evaluation dimensions, and this was not the case. Differences between the seven scenarios were found on only half of the scenario content dimensions and on none of the scenario quality dimensions. It seems probable

therefore, that the more positive evaluations of Scenarios 6 and 7 were either due to scenario content effects or to the position effects of interest.

Differentiation between scenario content effects on the one hand and scenario position effects of interest on the other was not possible using the numerical data obtained in the present study, and the group debriefing was therefore examined further. Participant feedback suggested that the content of Scenarios 6 and 7 may account for the different ratings of these scenarios. The partner's parents arrived at the hospital in Scenario 6 and some participants said they would "feel better" because of the potential for mutual support afforded by this development. The injured partner's eyes opened and he (she) squeezed the participant's hand in Scenario 7, and some participants said they would feel more hopeful that their partner would recover and thus less distressed in response to this development. This feedback suggested that the last two scenarios differed from earlier ones in the extent to which they were distressing and communicated the opportunity for social support. It was decided to revise Scenarios 6 and 7, removing references to social support and overtly positive developments in the partner's condition.

In terms of the scenario position effects of interest (e.g., (re)appraisal processes), feedback suggested that these may also have influenced ratings of the last scenarios. Although participants were instructed to rate each scenario independently, it was evident that participants had compared scenarios. One participant said "When the alarms went off and the doctors rushed into the room, [Scenario 4] it was far more stressful than when he [the partner] opened his eyes at the end [Scenario 7]". This suggests that (re)appraisal of the last two scenarios changed in light of event history and reactions to earlier developments. However, it is not possible to conclude that (re)appraisal processes were the only

explanation for the different evaluations of Scenarios 6 and 7 because of the potential influence of scenario content effects.

In summary, the results and feedback suggested that unexpected ratings on the novelty and challenge dimensions were due to issues with those questionnaire items, and that differences between scenarios may be due to scenario content or to scenario position effects. Therefore it was decided to: (1) revise questionnaire items (i.e., novelty, challenge) (2) revise Scenarios 6 and 7, and (3) revalidate the revised scenario series using a between-subjects design. This experimental design would allow differentiation between effects of scenario content and position. That is, if different scenarios were evaluated by different individuals, there could be no effect of scenario position on ratings and any differences between scenarios *must* be due to scenario content effects. It was expected that, in light of amendments to the scenarios, there would be no significant differences between individual scenarios.

#### **6.4 USP-Pilot 3: Revision and revalidation of scenarios**

##### **Method**

###### *Design*

The experiment used a between-subjects design, with participants randomly assigned to receive one of Scenarios 2 – 7. The independent variable was the scenario being evaluated and the dependent variable was participants' evaluation of scenario content on 14 dimensions (e.g., uncontrollability, uncertainty, stressfulness) and scenario quality as assessed on four dimensions (e.g., the extent to which scenarios were easy to read, imaginable).

## *Participants*

Participants ( $N = 48$ ) were recruited from the undergraduate Psychology population ( $n = 41$ ), the Psychology postgraduate population ( $n = 5$ ) and the university participation panel ( $n = 2$ ). Participants were volunteers in the case of the postgraduates or received payment if they were recruited from the participation panel. Undergraduate student participants participated as part of course requirements and received course credit. The mean age of participants was 21.02 years ( $SD = 3.63$ ) and 31 were women. Inclusion criteria were as stated on page 259.

## *Materials*

### A. Scenarios

Scenarios 1 to 5 were as employed in USP-Pilot 2 (see Appendix P, page 406). Scenarios 6 and 7 were re-written, ensuring that they did not communicate the availability of social support or marked improvements in the partner's condition. These revised scenarios are henceforth called Scenario 6r1 and Scenario 7r1 (see Appendix S, page 411, for revised scenarios).

### B. Questionnaire

Questionnaire items were as before, except for the items assessing novelty and challenge. Reference to specific television programmes was removed from the novelty question, and the question assessing challenge was revised to ask specifically about the "positive implications" of the situation (see Appendix S, page 411, for USP-Pilot 3 questionnaire items).

### *Procedure*

Experiments using this scenario paradigm received generic approval from the School of Psychology, Cardiff University, School Research Ethics Committee. The procedure was as described for USP-Pilot 2, pages 259 - 264, except that participants took part in the study individually and rated only two scenarios. All participants rated Scenario 1 first (because it contained information needed to make sense of any other scenario) and were randomly assigned to rate one other scenario. The procedure took ten minutes, after which participants were thanked for participating and awarded course credit (undergraduates) or payment (participant panel).

### *Data analysis*

Means and standard deviations were calculated for each evaluation dimension for each scenario. Paired *t*-tests were used to establish whether Scenario 1 differed from the other scenario it was paired with on any evaluation dimension. Oneway ANOVAs with scenario as the between-subjects factor were used to establish whether there were significant differences between (1) the set of seven scenarios and (2) Scenarios 2 – 7r1 (which were all rated by different participants). In the latter analysis, differences between scenarios could not be influenced by scenario position and must be due to scenario content effects. Significant between-subjects effects were followed up with Tukey posthoc comparisons.

## **Results**

Section A summarises results of analyses comparing scenarios in each pair. Section B presents the results of ANOVAs comparing Scenarios 1 – 7r1 and Scenarios 2 – 7r1.

### A. Comparison of scenario pairs

Table 36 shows a summary of *t*-test analyses comparing scenarios on content dimensions.

**Table 36**

*Summary of significant differences between scenario pairs on content dimensions*

Evaluation dimension	Scenario pair					
	1 vs. 2 <i>t</i> (7)	1 vs. 3 <i>t</i> (7)	1 vs. 4 <i>t</i> (7)	1 vs. 5 <i>t</i> (7)	1 vs. 6r1 <i>t</i> (7)	1 vs. 7r1 <i>t</i> (7)
Novelty						
Unpredictability						
Ability to cope						
Threat						2.65*
Challenge						
Control over situation					-2.78*	
Control by others						
Uncontrollable						
Tax/exceed coping resources			-5.23***	-2.65*		
Overall stressfulness						
Distress						
Meaningfulness						
Uncertain			2.38*			
Unresolved					-2.93*	

Note. \*  $p < .05$       \*\*\*  $p < .001$

As shown in Table 36 (page 274), there were significant differences between some scenario pairs on some evaluation dimensions. Compared to Scenario 1, Scenarios 4 and 5 taxed coping resources more, and participants were more certain that their partner would die in Scenario 4. Scenario 6r1 was rated as more controllable than Scenario 1, and as reaching a more satisfactory conclusion. Finally, Scenario 7r1 was less threatening than Scenario 1. There were no significant differences between scenario pairs on scenario quality dimensions.

### **B. Comparison of the scenario series**

Table 37 (page 276) shows the results of between-scenario analyses comparing Scenarios 1 – 7r1 and Scenarios 2 – 7r1 on scenario content dimensions. As shown in Table 37 (page 276), scenarios satisfactorily emulated important characteristics of stressful situations in most cases. The scenarios were also now evaluated as being relatively novel (means 3.5 – 4.5) and as having few positive (challenge) implications (means < 4). Analyses comparing the seven scenarios showed significant differences between Scenarios 1 – 7r1 on the evaluation dimensions of threat and ability to cope. Tukey posthoc analyses showed no differences between individual scenarios on the ability to cope dimension ( $ps > .05$ ), but Scenarios 4 and 5 were significantly more threatening than Scenario 7r1 ( $ps < .05$ ). When data was reanalysed excluding Scenario 1, differences between scenarios on the threat dimension remained ( $ps < .05$ ), and Tukey posthoc analyses showed that ratings for ability to cope for Scenario 7r1 were significantly higher than ratings for Scenarios 2 and 4 ( $ps < .05$ ).

**Table 37***Means, standard deviations (in parentheses) and F-values for content dimensions*

<b>Evaluation dimension</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6r1</b>	<b>S7r1</b>	<b>S1-7r1 F(6,89)</b>	<b>S2-7r1 F(5,42)</b>
<b>Novelty</b>	3.75 (1.31)	3.63 (2.07)	3.00 (1.51)	4.00 (1.77)	4.13 (1.73)	3.75 (1.04)	3.88 (1.46)	.49	.48
<b>Un-predictability</b>	3.02 (1.19)	2.88 (1.64)	2.50 (1.41)	1.88 (.84)	2.50 (1.51)	3.13 (.99)	3.13 (1.13)	1.32	1.11
<b>Ability to cope</b>	2.92 (1.05)	2.00 <sup>a</sup> (1.07)	2.63 (1.06)	2.00 <sup>a</sup> (.76)	2.75 (1.17)	2.88 (.99)	3.50 <sup>b</sup> (.33)	2.38*	2.59*
<b>Threat</b>	4.65 (1.00)	4.75 (1.39)	4.75 (1.04)	5.38 <sup>a</sup> (.74)	5.38 <sup>a</sup> (.52)	4.63 (1.06)	3.75 <sup>b</sup> (.89)	2.51*	3.01*
<b>Challenge</b>	1.67 (.98)	1.38 (.52)	1.88 (1.36)	1.50 (1.41)	1.13 (.35)	1.63 (.52)	2.00 (.54)	.82	1.05
<b>Control over situation</b>	1.88 (.91)	1.38 (.74)	2.38 (1.60)	1.50 (.54)	1.88 (.99)	2.50 (1.41)	2.63 (1.06)	1.95	1.83
<b>Control by others</b>	3.73 (1.32)	3.13 (1.89)	3.25 (1.17)	3.00 (1.31)	3.88 (1.13)	3.38 (.52)	4.13 (.84)	1.00	1.07
<b>Un-controllability</b>	3.40 (.92)	3.13 (1.46)	3.13 (.99)	2.50 (1.07)	3.75 (1.04)	3.50 (.93)	3.75 (.89)	1.59	1.58
<b>Tax coping resources</b>	4.52 (.92)	5.00 (1.31)	5.00 (.54)	5.38 (.74)	5.00 (.93)	4.75 (.71)	4.75 (.37)	1.42	.51
<b>Overall stressfulness</b>	5.52 (.68)	5.38 (.92)	5.63 (.52)	5.88 (.35)	5.75 (.46)	5.00 (.76)	5.25 (.46)	1.73	2.34
<b>Distress</b>	5.63 (.61)	5.63 (.74)	5.75 (.46)	5.88 (.35)	5.75 (.46)	5.25 (.71)	5.25 (.71)	1.37	1.66
<b>Meaning</b>	5.21 (.80)	5.38 (.92)	5.50 (.54)	5.63 (.74)	5.38 (1.06)	5.25 (.71)	4.75 (1.28)	.91	.90
<b>Uncertainty</b>	3.98 (.60)	3.88 (.84)	3.50 (1.07)	3.38 (.74)	3.88 (.84)	3.88 (1.13)	4.00 (.19)	1.13	.65
<b>Unresolved</b>	2.10 (1.24)	1.50 (1.07)	1.75 (1.04)	1.75 (1.04)	2.25 (1.23)	2.50 (1.07)	2.75 (.89)	1.19	1.69

*Note.* Scenario 1 ( $n = 48$ ), Scenarios 2 – 7r1 ( $n = 8$ ). Across scenarios, means with different superscripts differed significantly in Tukey post hoc comparisons. \*  $p < .05$ .

Table 38 shows the results for comparisons on scenario quality dimensions.

**Table 38**

*Means, standard deviations (in parentheses) and F-values for comparisons of scenarios on quality dimensions*

<b>Evaluation dimension</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6r1</b>	<b>S7r1</b>	<b>S1-7r1 F(6,89)</b>	<b>S2-7r1 F(5,42)</b>
<b>Readable</b>	4.81 (1.07)	5.13 (1.13)	4.75 (.89)	4.75 (.89)	4.50 (1.51)	4.88 (.84)	4.38 (1.06)	.44	.49
<b>Imaginable</b>	4.15 (1.48)	4.38 (1.06)	4.00 (1.60)	3.50 (1.31)	3.88 (1.46)	4.38 (.92)	3.88 (.99)	.58	.58
<b>Plausible</b>	4.79 (.92)	4.88 (.64)	4.75 (1.04)	5.00 (.76)	4.75 (1.04)	4.88 (.84)	4.63 (1.30)	.13	.15
<b>Understandable</b>	5.17 (.91)	5.63 <sup>a</sup> (.74)	5.13 (.99)	5.13 (.84)	5.38 (.92)	5.25 (.71)	4.25 <sup>b</sup> (1.04)	1.83	2.26 <sup>t</sup>

*Note.* Scenario 1 ( $n = 48$ ), Scenarios 2 – 7r1 ( $n = 8$ ).

*Note.* <sup>t</sup>  $p < .10$ .

As shown in Table 38, there were no significant differences between scenarios on scenario quality dimensions.

## **Discussion**

The aim of the present study was to address issues with study materials and re-evaluate the revised scenarios. Feedback from participants in USP-Pilot 2 (see pages 268 – 270) suggested that questionnaire wording may have led to unexpected ratings on novelty

and challenge dimensions. Feedback from participants in USP-Pilot 2 also suggested that the original Scenarios 6 and 7 may have been rated differently than earlier scenarios because of issues with scenario content. In the present study a third issue, that of a potential influence of scenario position on ratings, was removed by using a between-subjects design to re-evaluate the scenario series. The results of the present study showed that the scenarios generally met criterion regarding the content and quality of the scenarios. Further, in most cases the seven scenarios did not differ significantly in content or quality. Overall, the results suggest that revisions to questionnaire items and scenarios have remedied unexpected ratings on the novelty and challenge dimensions and have reduced the number of differences between scenarios.

However, despite revisions to Scenarios 6 and 7, some differences between these and other scenarios remained. Analyses of scenario pairs showed that (compared to Scenario 1), participants rated Scenario 6r1 as more controllable and more resolved, and Scenario 7r1 as less threatening. Furthermore, significant differences between scenarios were found in analyses of Scenarios 2 – 7r1. In these cases Scenario 7r1 was generally evaluated more positively than one or more other scenarios. Importantly, because no two scenarios were rated by the same individual in these analyses, differences could not have been due to scenario *position* effects (i.e., boredom, (re)appraisal). Instead, the more positive ratings of Scenario 7r1 must have been due to scenario *content* effects. In addition, the results of the present study showed that Scenario 4 was rated more negatively on the uncertainty and coping resources dimensions than Scenario 1. Together, these results suggest that Scenarios 4, 6r1 and 7r1 differed from at least one other scenario on more than one evaluation dimension. These scenarios were examined by the researcher to establish why these scenarios differed.

In Scenarios 6r1 and 7r1, the reader realises that the partner's parents must be contacted, and endeavours to do so. The focus of these scenarios was therefore on actions the reader took that could potentially alter the course of events. This differed from the focus of earlier scenarios (which was primarily on the injured partner's progress). As the reader was now making efforts to 'do something' about the situation, this may explain why Scenario 6r1 was rated as more controllable and Scenario 7r1 as easier to cope with. Moreover, secondary appraisals of what can be done to offset the negative implications of a situation, as well as feeling able to cope, may make the situation seem less threatening (Lazarus & Folkman, 1984), which may explain why Scenario 7r1 was rated as less threatening. Regarding differences between Scenario 4 and other scenarios, examination of this scenario showed that it described more dramatic and ominous developments in the situation, as a resuscitation team rushed into the partner's room to help the patient who had stopped breathing. In retrospect, this scenario had more dramatic and overtly negative connotations than other scenarios.

In light of these observations, it was decided that Scenarios 4, 6r1 and 7r1 should be revised, to make the implications of the information they contained more similar to that of other scenarios. Scenarios 6r1 and 7r1 were rewritten so that they did not present the reader with 'coping opportunities' and instead focused primarily on the injured partner's progress. References to resuscitating the partner were removed from Scenario 4. The scenario series was then re-evaluated with a larger sample in Study 3. It was expected that there would be no significant differences between individual scenarios in Study 3.

## 6.5 Study 3

### Method

#### *Design*

The experiment used a between-subjects design, with participants randomly assigned to receive one of Scenarios 2 – 7. The independent variable was the scenario being evaluated and the dependent variable was participants' evaluation of scenario content on 14 dimensions (e.g., uncontrollability, uncertainty, stressfulness) and scenario quality as assessed on four dimensions (e.g., the extent to which scenarios were easy to read, imaginable).

#### *Participants*

Participants ( $N = 128$ ) were recruited from the undergraduate Psychology population ( $n = 115$ ), the psychology postgraduate population ( $n = 6$ ) and the university participation panel ( $n = 7$ ). Participants were volunteers in the case of postgraduate students, undergraduate students received course credit, and participants from the participation panel received payment. The mean age of participants was 20.83 years ( $SD = 4.32$ ) and 98 were women. Inclusion criteria were as stated in USP-Pilot 2 (see page 259).

#### *Materials*

##### A. Scenarios

Scenarios 1, 2, 3 and 5 were as used in USP-Pilots 1 – 3. Scenarios 4, 6r1 and 7r1 were re-written. References to resuscitation were removed from Scenario 4 (now Scenario 4r1) and Scenarios 6r1 and 7r1 were rewritten to focus on the injured partner's progress (now Scenario 6r2 and 7r2). See Appendix T, page 412, for Study 3 scenarios.

## B. Questionnaire

The questionnaire was as described for USP-Pilot 3 (see page 272).

### *Procedure*

This was as described for USP-Pilot 3 (page 273). Participants received a written debriefing sheet (see Appendix U, page 413 for the debriefing sheet for Study 3, 4, and 5).

### *Data analysis*

Prior to analysing data from Scenarios 2 – 7r2, distributions of scores for each evaluation dimension were examined to determine suitability for univariate analyses. Outliers ( $> 3$  SD from the mean) were identified on the dimensions of threat ( $n = 1$ ), challenge ( $n = 4$ ), distress ( $n = 1$ ), meaning ( $n = 1$ ), and resolution ( $n = 1$ ). The cases were identified and excluded from the analyses. Oneway ANOVAs with scenario as the between-subjects factor were used to establish whether there were significant differences between Scenarios 1 – 7r2 and Scenarios 2 – 7r2. Significant ( $p < .05$ ) omnibus Fs were followed up with Tukey posthoc comparisons.

## **Results**

Table 39 (page 282) shows the results of analyses comparing (1) Scenarios 1 – 7r2 and (2) Scenarios 2 – 7r2 on content dimensions. As shown in Table 39, scenarios achieved criterion for most evaluation dimensions in most scenarios. Analyses of the set of seven scenarios showed significant differences on the evaluation dimension of personal control.

**Table 39***Means and standard deviations (in parentheses) for comparisons on content dimensions*

<b>Evaluation dimension</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4</b>	<b>S5</b>	<b>S6r1</b>	<b>S7r1</b>	<b>S1-7r1 F(6,89)</b>	<b>S2-7r1 F(5,42)</b>
<b>Novelty</b>	4.16 (1.64)	3.95 (1.93)	3.15 (1.53)	4.10 (1.86)	3.85 (1.93)	3.70 (1.63)	4.85 (1.66)	1.96	1.97
<b>Un-predictability</b>	3.08 (1.43)	3.15 (1.42)	2.45 (1.28)	2.90 (1.55)	2.60 (1.50)	2.40 (1.35)	3.00 (1.38)	1.31	.91
<b>Ability to cope</b>	2.83 (1.00)	2.55 (1.05)	2.65 (1.09)	2.40 (1.10)	2.40 (.94)	2.40 (1.14)	2.80 (1.36)	1.20	.44
<b>Threat</b>	4.99 (1.07)	4.90 (1.29)	4.90 (1.21)	5.20 (1.20)	5.10 (.91)	5.20 (1.06)	5.35 (.75)	.74	.53
<b>Challenge</b>	1.32 (.65)	1.40 (.60)	1.30 (.57)	1.20 (.52)	1.05 (.22)	1.40 (.60)	1.25 (.44)	.93	1.26
<b>Control over situation</b>	1.86 (.95)	1.65 (1.14)	1.60 (.94)	1.25 (.44)	1.25 (.64)	1.55 (.89)	1.85 (.81)	2.54*	1.43
<b>Control by others</b>	3.80 (1.30)	3.95 (1.73)	3.35 (1.18)	3.55 (1.40)	4.05 (.89)	3.65 (1.23)	3.70 (1.22)	.82	.79
<b>Un-controllability</b>	3.33 (1.06)	3.30 (.98)	2.70 <sup>a</sup> (.92)	3.10 (1.25)	3.70 <sup>b</sup> (.80)	3.15 (1.09)	3.55 (.89)	2.03	2.77*
<b>Tax coping resources</b>	4.83 (1.00)	5.05 (.95)	5.05 (.83)	5.35 (.75)	5.10 (.79)	4.90 (.91)	5.40 (.82)	1.89	.95
<b>Overall stressfulness</b>	5.70 (.54)	5.75 (.64)	5.80 (.41)	5.60 (.50)	5.90 (.31)	5.70 (.57)	5.55 (.69)	.96	1.35
<b>Distress</b>	5.72 (.52)	5.75 (.55)	5.90 (.31)	5.70 (.47)	5.85 (.67)	5.70 (.57)	5.55 (.61)	1.03	1.37
<b>Meaning</b>	5.49 (.71)	5.45 (.89)	5.65 (.49)	5.60 (.60)	5.70 (.57)	5.35 (.75)	5.45 (.76)	.67	.87
<b>Uncertainty</b>	4.13 (.81)	4.20 (.89)	3.65 (1.14)	3.70 (1.13)	3.75 (.64)	3.90 (.55)	3.80 (1.01)	2.08	.24
<b>Unresolved</b>	1.96 (1.07)	2.05 (1.32)	2.10 (1.12)	2.00 (1.34)	2.15 (1.23)	1.75 (1.02)	1.70 (1.13)	.46	.50

Note. Scenario 1 ( $n = 120$ ), Scenarios 2 – 7r2 ( $n = 20$ ). Note. \*  $p < .05$ .

Note. Means with different superscripts differ significantly in Tukey posthoc comparisons.

However, although ratings of personal control for Scenarios 1 and 7r2 seemed higher than for other scenarios, Tukey posthoc analyses showed that these differences were not significant ( $ps > .05$ ). Reanalysis of data (excluding Scenario 1) showed that Scenarios 2 – 7r2 differed on only one dimension (uncontrollability). Tukey posthoc analyses showed that Scenario 5 was more controllable than Scenario 3 ( $p < .05$ ). Table 40 shows that there were no significant differences between Scenarios on quality dimensions. All scenarios were rated as readable, imaginable, plausible and understandable.

**Table 40**

*Means, standard deviations (in parentheses) and F-values for quality dimensions*

<b>Evaluation dimension</b>	<b>S1</b>	<b>S2</b>	<b>S3</b>	<b>S4r1</b>	<b>S5</b>	<b>S6r2</b>	<b>S7r2</b>	<b>S1 – 7r2 F (6, 233)</b>	<b>S2 – 7r2 F (5, 114)</b>
<b>Readable</b>	4.83 (1.23)	5.10 (.97)	4.80 (1.11)	4.95 (1.32)	4.80 (1.15)	4.45 (1.57)	4.10 (1.02)	.65	.54
<b>Imaginable</b>	4.39 (1.20)	4.70 (1.13)	4.20 (1.47)	4.40 (1.47)	3.90 (1.59)	4.00 (1.17)	4.75 (1.16)	1.33	1.39
<b>Plausible</b>	5.19 (.80)	5.15 (.67)	4.85 (.99)	5.30 (.66)	5.00 (.92)	4.80 (1.11)	5.40 (.60)	1.62	1.65
<b>Understandable</b>	5.53 (.71)	5.60 (.68)	5.50 (.76)	5.60 (.60)	5.30 (.87)	5.25 (.79)	5.65 (.49)	.44	1.15

*Note.* Scenario 1 ( $n = 120$ ), Scenarios 2 – 7r2 ( $n = 20$ ).

### **Discussion**

The results of Study 3 showed that there were no significant differences between Scenarios 1 – 7r2 on scenario content dimensions, and that Scenarios 2 to 7r2 differed

significantly on the dimension of uncontrollability only, with Scenario 5 appraised as significantly more uncontrollable than Scenario 3. Examination of Scenario 5 showed that this scenario described the reader talking to the injured partner at which point the partner's eyes opened. As the reader's efforts had brought about an improvement in the partner's condition, this may have increased perceptions that the situation could be controlled. Therefore Scenario 5 was revised before Study 4 by removing this positive development.

It was decided that the scenarios now satisfactorily and consistently emulated properties of stressful experiences discussed by Lazarus and Folkman (1984). Each scenario has been evaluated as stressful, unresolved and uncertain, which suggests that the scenarios effectively emulate an experience of this nature. The scenarios have also been repeatedly evaluated as readable, imaginable, plausible and understandable, indicating that the quality of the scenario writing is good. As each scenario now seems as demanding as each other in terms of the events they describe, differences in reactions to the scenarios *over time* can be attributed to changes in responses to a period of unresolved stress, rather than to differences in the valence of events appraised. Thus the first aim of this research has been achieved and the scenarios were now considered to represent an effective unresolved stressor paradigm. The aim of Study 4 was to establish *whether and in what ways* (re)appraisals and emotional reactions changed in response to this unresolved and stressful experience.

## **6.6 Study 4: Changes in appraisals and emotional reactions during an unresolved, stressful experience**

### **Introduction**

The results of Study 3 suggested that each scenario was as demanding as each other in the extent to which it emulated certain characteristics common to stressful situations, and that there were no significant differences in the extent to which each scenario was appraised as threatening, challenging, controllable and so on compared to each other. Therefore, it was not expected that any changes in (re)appraisals and emotional reactions over time in the present study would be due to differences in the content of individual scenarios.

However, there was still the potential that later scenarios in the series could be evaluated differently than earlier scenarios because of the order in which they were presented.

Therefore, a computer programme was developed by the author to present scenarios in a random order.<sup>15</sup> Presenting the USP via computer would also ensure that scenarios were presented in a consistent manner and that clues about the number of scenarios or the duration of the stressor (e.g., number of pages of scenarios) would not be available to participants. It was intended that a computerised USP, coupled with an advertised study time that was considerably longer than the USP would help to maintain the impression of temporal uncertainty.

In light of the above considerations, it was not expected that there would be significant differences between scenarios in terms of (re)appraisals and emotional reactions because of differences in the content of individual scenarios, to the order in which they were presented, or to knowledge of the true duration of the USP. Because scenarios were

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<sup>15</sup> Scenario 1, however, remained in its original position, because of its significance as the event onset and because it contained information needed to make sense of events in all other scenarios.

presented in a random order in this study, the term Position (i.e., P1 – P 7) will be used to refer to scenarios presented in a particular position.

The present study differs from Study 3 because participants rated all seven scenarios and thus the influence of time on (re)appraisals and emotional reactions to an unresolved stressor must be considered. As discussed in the introduction to Part III (see page 244) it was expected that the onset of the USP (Position 1) would cause a significant increase in negative appraisals (e.g., threat appraisals, uncontrollability) and emotional reactions (e.g., threat emotions, uncertainty emotions). With regards to further changes in (re)appraisals and emotional reactions during the time course of the USP, it was predicted that there would be further increases in negative emotions and appraisals, and decreases in positive emotions and appraisals over the time course of this paradigm because Lazarus and Folkman (1984, p. 92) propose that continued appraisal and (re)appraisal in an uncontrollable, uncertain, and unresolved stressor can lead to distress, which in turn can lead to more negative (re)appraisals of the situation. A version of the DRK with added appraisals (meaningfulness, control by others, uncontrollability) was employed to detect the expected deterioration in (re)appraisals and emotional reactions during the USP (see pages 288 – 289 for DRK used in the present study).

The secondary aim of the present study was to determine whether, in line with the proposals of Lazarus and Folkman (1984), higher ratings of positive appraisals (challenge appraisals, ability to cope, personal control) would be associated with higher ratings of positive emotions (challenge emotions, benefit emotions), and whether positive relationships would be shown between negative appraisals (threat appraisals, stressfulness, meaningfulness) and negative emotions (threat emotions, uncertainty emotions, harm emotions) in response to the USP. It was expected that (re)appraisals would be related to

emotional reactions in the said way in the present study. Moreover, it was expected that relationships between (re)appraisals and emotional counterparts would be maintained from Baseline to the end of the USP, and that each type of (re)appraisal (positive, negative) would be associated more to its emotional counterpart than to its opposite.

## **Method**

### *Design*

The experiment used a within-subjects design, with all participants rating all seven scenarios. The independent variable was the scenario presented in each position (i.e., Position 1 – 7) and the dependent variable was participants' ratings of the appraisals (e.g., threat appraisals, personal control) and emotions (e.g., challenge emotions, harm emotions) they experienced in response to the events described in each scenario.

### *Participants*

Undergraduate Psychology students ( $N = 72$ ) participated as part of course requirements and were awarded course credit. The mean age of participants was 20.10 years ( $SD = 2.96$ ) and 66 were women. Inclusion criteria were as described in USP-Pilot 2 (see page 259). The study was advertised as lasting for one hour (although the procedure took  $\approx 30$  minutes), and participants were awarded the advertised course credit.

### *Materials*

#### A. The stressor paradigm

The coping paradigm described in Study 3 was employed in this study, although some modifications were made to some scenarios (except Scenario 1) in order that events remained logical when scenarios were randomised (see Appendix V, page 414, for Study 4

scenarios). Generally, modifications involved altering the first sentence of each scenario because these linked events between scenarios. For example, where the partner was being taken *from* the operating theatre (i.e., Scenario 3) *to* the intensive care unit (i.e., Scenario 4), removing the reference to the operating theatre from Scenario 3 meant that in Scenario 4 the partner could have been taken to intensive care from any location. Further, phrases which described events that must logically occur in a certain order were revised. Scenario 2 originally included the phrase “You notice a lot of doctors and nurses rushing into the emergency room” (the first location for an injured person), which was changed to “You notice a lot of doctors and nurses rushing into the room where your partner is” because this could refer equally well to an emergency room, intensive care unit room, or surgery recovery room. A computer programme was developed by the researcher to present the scenarios and DRK items, using Inquisit 2.0.41230.0 computer software (Millisecond Software, 2004).

### Questionnaires

*The Daily Record Keeping Sheet (DRK)* was used to assess emotions and appraisals/(re)appraisals at Baseline and in each Position. The 20 DRK emotion items were as described in Study 2 (see page 157). The eight appraisal items were derived from the SAM (Peacock & Wong, 1990), as in USP-Pilots 2 and 3 (see Table 32, page 262), and were as follows: “How threatening would this situation be to your well-being?” (primary threat appraisals); “To what extent would you find this situation a challenge to you?” (primary challenge appraisals), and “How much control would you have over what happens in this situation?”, “How much control would others have over what happens in this situation?”, and “To what extent would this situation be controllable by anyone?”

(secondary control appraisals), and “To what extent do you feel that you would be able to cope with this situation?” (ability to cope), “How stressful would this experience be for you?” (overall stressfulness) and “Would this situation have important consequences for you?” (meaningfulness).

At Baseline, participants responded to DRK items in terms of their emotions *at that time* and their appraisals regarding *the experiment*. The same DRK items were presented in a random order on screen in each of Positions 2 – 7, after the scenario, and those ratings were made in the context of those events. Ratings were made on four-point scales as in Study 2. Five emotion subscales (uncertainty, threat, harm, challenge and benefit) were created from the means of individual emotions, as before, and the reliabilities of the emotion subscales at Baseline were acceptable: Uncertainty,  $\alpha = .74$ ; Threat,  $\alpha = .75$ ; Harm,  $\alpha = .85$ ; Challenge,  $\alpha = .74$ ; Benefit,  $\alpha = .75$ . To establish the relationships between individual appraisals and emotional reactions, zero-order correlations were computed between each appraisal and each emotion subscale, summed from Baseline – Position 7. To establish relationships between (re)appraisals and emotions at Baseline and in each Position, composite positive appraisal, negative appraisal, positive emotion and negative emotion variables were computed from the sums of individual appraisals and emotion subscales at baseline (respectively) See Appendix W (page 416), for emotion questionnaire and Appendix X (page 417) for appraisal questionnaire.

The negative emotions variable contained the same uncertainty, threat, and harm emotions described for daily monitoring in Study 2, and the positive emotions variable contained the same challenge and benefit emotions described for daily monitoring in Study 2 (see page 156). A factor analysis of the eight appraisal dimensions showed that appraisals formed two factors. The first factor contained the threat, stressfulness, meaningfulness and

control by others items, with all items loading  $> .30$  (uniquely) on this factor. This first factor was named *Negative appraisals*. The second factor contained the challenge, ability to cope, personal control and uncontrollability items, with all items loading  $> .30$  (uniquely) on this factor (uncontrollability was negatively related). This second factor was named *Positive appraisals*. Two items were excluded from the final negative and positive appraisal dimensions reported in the results of the present study due to poor alpha reliabilities when scales included these items. These items were the control by others item ( $\alpha = .45$  when this item was included in the negative appraisals scale,  $\alpha = .60$  when it was excluded) and the uncontrollability item ( $\alpha = .45$  when this item was included in the positive appraisals scale,  $\alpha = .55$  when it was excluded). Appraisals and emotions contained in each composite are shown in Table 41 along with final reliabilities.

**Table 41**

*Variables and reliabilities for composite negative and positive emotion and appraisal variables*

	<b>Negative appraisals</b>	<b>Positive appraisals</b>	<b>Negative emotions</b>	<b>Positive emotions</b>
<b>Variable</b>	Threat Stressfulness Meaningfulness	Challenge Ability to cope Personal control	Uncertainty Threat Harm	Challenge Benefit
<b><math>\alpha</math></b>	.60	.55	.77	.86

### *Procedure*

This study received ethical approval from the School of Psychology, Cardiff University, School Research Ethics Committee. Participants took part in the study individually. The researcher explained that the purpose of the experiment was to study how people might respond to a particular experience, and participants read the information sheet before consenting to participate. Baseline measures were completed (in pen and paper format) before commencing the USP. Full instructions about how to progress through the USP were presented on screen. Scenarios were presented in a completely randomised order (apart for Position 1; always the original Scenario 1, always presented first). Scenarios in each Position were followed by DRK items, presented individually on screen in a random order. Responses were made using numeric keys. After completing the computer task, participants were debriefed, thanked for participating and awarded course credit.

### *Data Analysis*

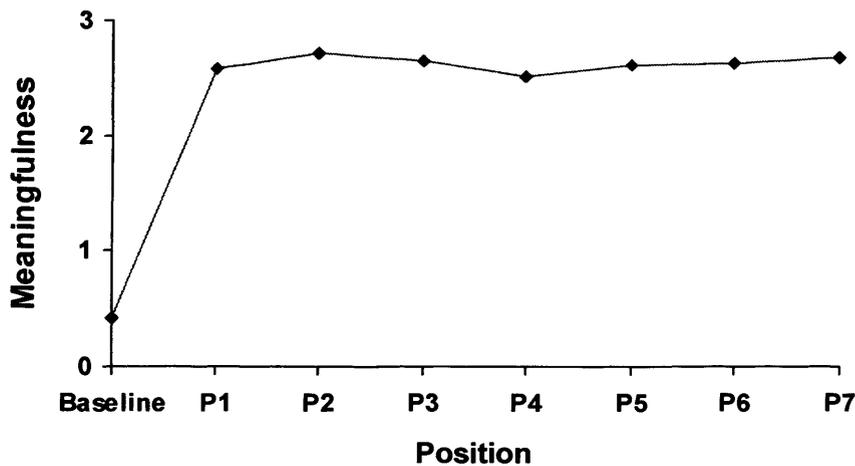
Within-subjects ANOVAs with Position (Baseline – Position 7) as the within-subjects factor were used to establish changes in (re)appraisals and emotional reactions over time. The significance level accepted was  $p < .05$ . Significant effects were followed up with comparisons, using Bonferroni corrections for the number of comparisons (Field, 2005; Hinton et al., 2004). In cases of sphericity violations, Greenhouse-Geisser corrected degrees of freedom were used.

## Results

The results section is divided into two parts. In Part A, the results of analyses on appraisals and emotions over time are presented. Part B contains the results of analyses of relationships between positive and negative appraisals and emotions.

### A. Appraisals and emotions over time

*Appraisals:* Figure 29 shows mean scores for appraisals of meaningfulness at Baseline and in each Position.



*Figure 29.* Mean scores for appraisals of meaningfulness over time.

There were significant differences in ratings of meaningfulness among positions (Baseline to Position 7),  $F(7, 497) = 122.80, p < .001$ . Simple effects tests showed that events in each of Positions 1 – 7 were rated as significantly more meaningful than Baseline ( $ps < .001$ ). There were no significant differences in meaningfulness appraisals between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ). Figure 30 (page 293) shows mean scores for stressfulness at Baseline and in each Position.

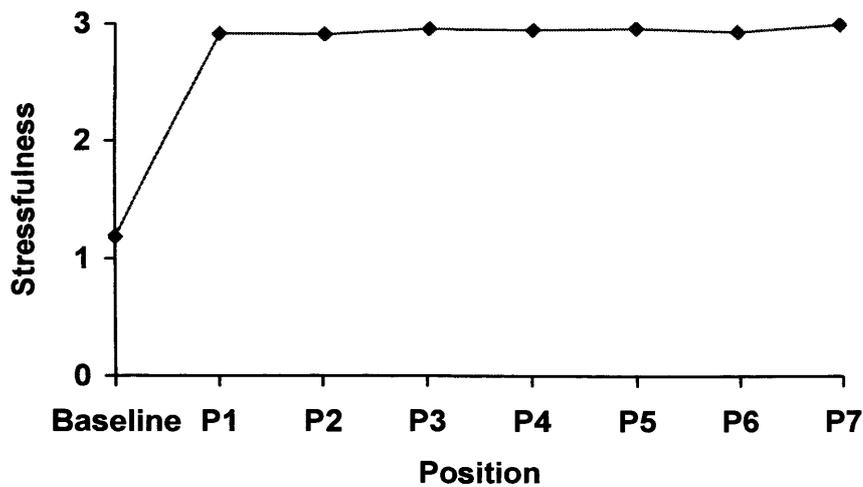


Figure 30. Mean scores for appraisals of stressfulness over time.

There were significant differences in ratings of stressfulness among positions (Baseline to Position 7),  $F(7, 497) = 217.49, p < .001$ . Simple effects tests showed that events in each of Positions 1 – 7 were rated as significantly more meaningful than Baseline ( $ps < .001$ ). There were no significant differences in ratings of stressfulness between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ).

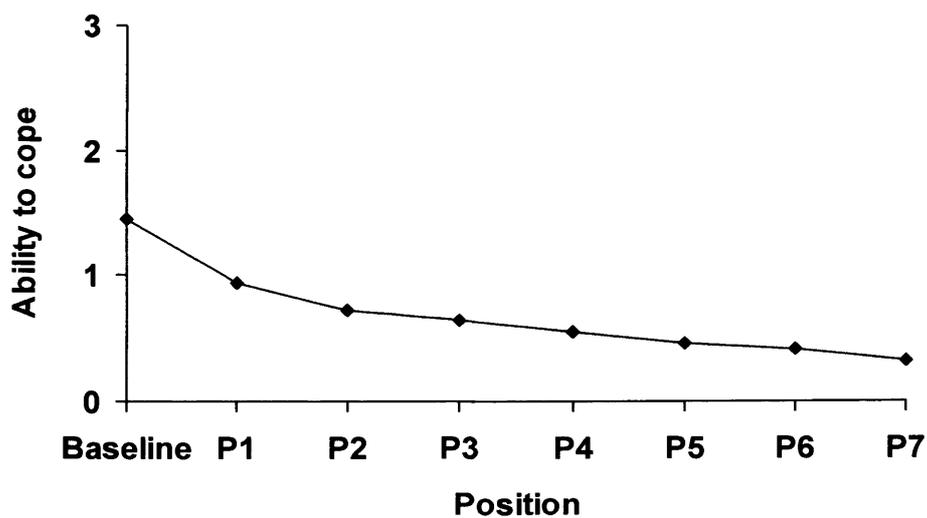


Figure 31. Changes in appraisals of ability to cope over time

Figure 31 (page 293) shows mean scores for appraisals of ability to cope at Baseline and in each Position. There were significant differences in ratings of ability to cope among positions (Baseline to Position 7),  $F(7, 497) = 33.19, p < .001$ . Simple effects tests showed that ratings of ability to cope in each of Positions 1 – 7 were significantly lower than Baseline ( $ps < .01$ ). Furthermore, ratings of ability to cope were higher in Position 1 than Positions 3 – 7 ( $ps < .01$ ), and higher in Position 2 than Positions 6 and 7 ( $ps < .05$ ). Finally, ratings of ability to cope in Position 3 ( $p = .001$ ), and 4 ( $p < .05$ ) were higher than in Position 7. Figure 32 (page 294) shows mean scores for threat and challenge appraisals at Baseline and at each Position.

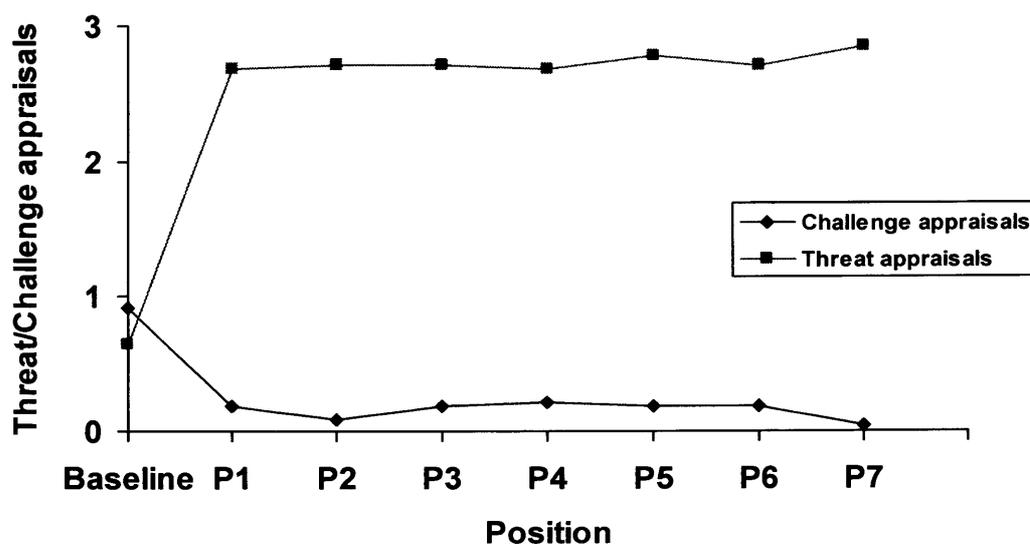


Figure 32. Mean scores for threat and challenge appraisals over time.

There were significant differences in ratings of threat appraisals,  $F(7, 497) = 278.82, p = .000$ , and challenge appraisals,  $F(7, 497) = 21.00, p < .001$ , among positions (Baseline to Position 7). Simple effects tests showed that threat appraisals at each of

Positions 1 – 7 were significantly higher than at Baseline ( $ps < .001$ ), whereas the reverse was the case for challenge appraisals, which were significantly *lower* at each of Positions 1 – 7 than at Baseline ( $ps < .001$ ). There were no significant differences in threat appraisals between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ). Challenge appraisals at Position 1 were significantly higher than at Position 7 ( $p < .05$ ) but there were no significant differences in ratings of challenge appraisals between any other Positions ( $ps > .05$ ). Figure 33 (page 295) shows mean scores for control appraisals from Baseline to Position 7.

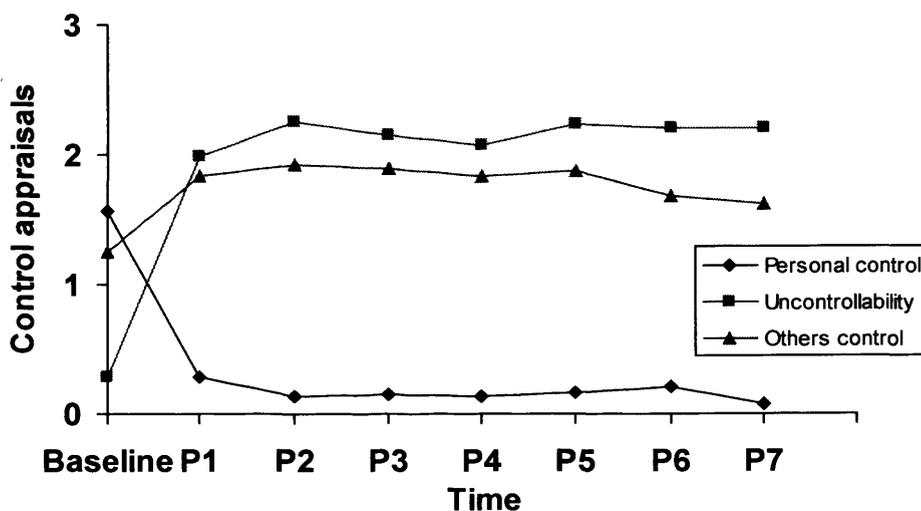


Figure 33. Mean scores for appraisals of personal control, control by others and uncontrollability over time.

There were significant differences in ratings of personal control,  $F(7, 497) = 69.13$ ,  $p < .001$ , the control that others had,  $F(7, 497) = 6.20$ ,  $p < .001$ , and complete uncontrollability,  $F(7, 497) = 69.92$ ,  $p < .001$ , among positions (Baseline to Position 7). Simple effects tests showed that events in each of Positions 1 – 7 were rated as significantly less within personal control than Baseline ( $ps < .001$ ). Baseline was rated as significantly

less uncontrollable than events in all Positions ( $ps < .001$ ), and participants rated the control that others had at Baseline as significantly *lower* than the control others had in each of Positions 2 – 7 ( $ps < .01$ ). There were no significant differences in any of these control appraisals between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ).

In summary, the results showed that appraisals in all Positions were more negative (less positive) than appraisals at baseline, as expected. Further, ratings of appraisals of ability to cope in later Positions were more negative than in earlier Positions.

## 2. Emotional reactions

Figure 34 shows mean scores for uncertainty emotions from Baseline to Position 7.

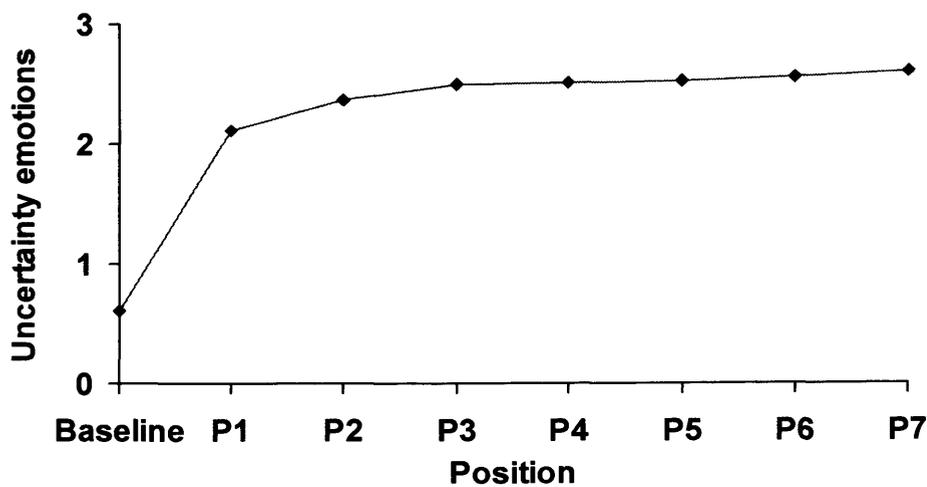


Figure 34. Mean scores for uncertainty emotions over time.

There were significant differences in ratings of uncertainty emotions among positions (Baseline to Position 7),  $F(7, 497) = 264.51, p < .001$ . Simple effects tests showed that participants reported more uncertainty emotions in response to events in each of Positions 1 – 7 than at Baseline ( $ps < .001$ ). More uncertainty emotions were also reported at Positions 2 – 7 than at Position 1 (all  $ps < .001$ ), and at Position 6 ( $p < .01$ ) and 7 ( $p < .001$ ) than at Position 2. Figure 35 (page 297) shows mean scores for threat and challenge emotions from Baseline to Position 7.

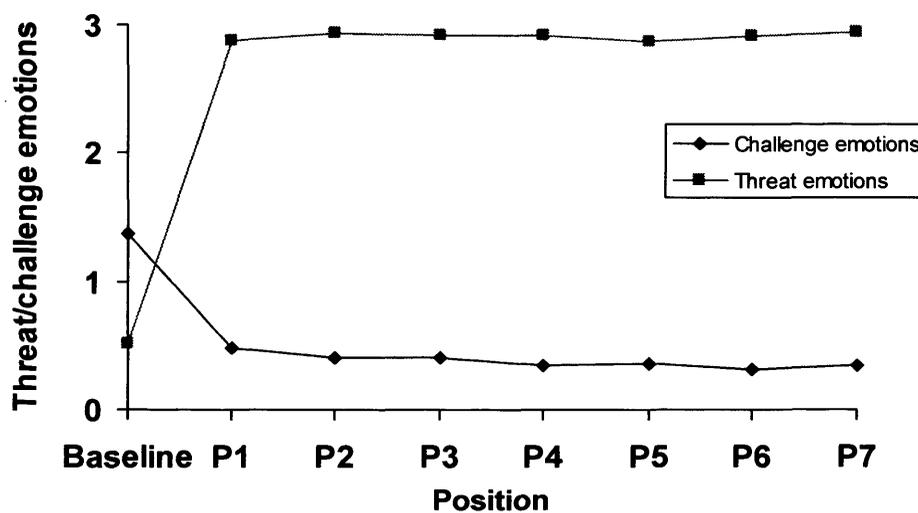


Figure 35. Mean scores for threat and challenge emotions over time.

There were significant differences in ratings of threat emotions,  $F(7, 497) = 828.54, p < .001$ , and challenge emotions,  $F(7, 497) = 63.99, p < .001$ , among positions (Baseline to Position 7). Simple effects tests showed that participants reported significantly more threat and less challenge emotions in response to events in all Positions than they did at Baseline ( $ps < .001$ ). There were no significant differences in threat or challenge emotions

between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ). Figure 36 shows mean scores for harm and benefit emotions from Baseline to Position 7.

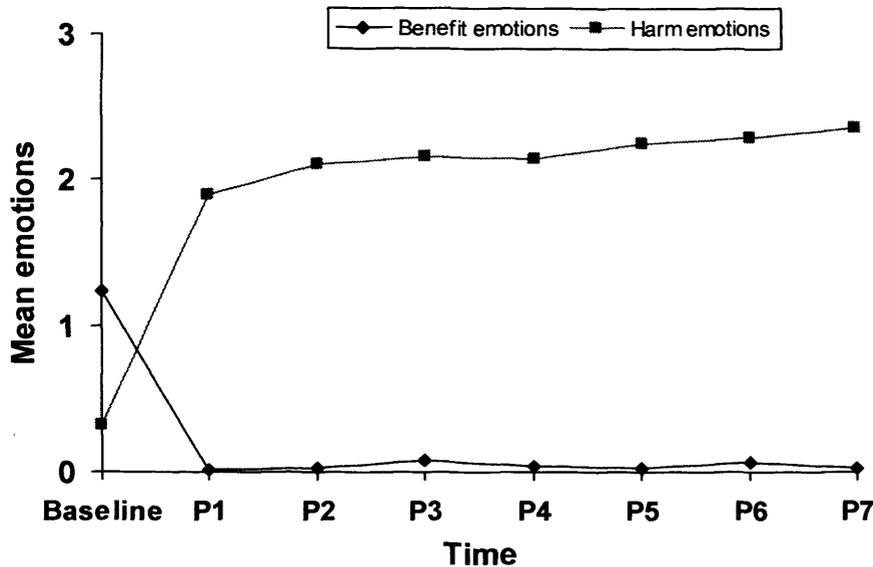


Figure 36. Mean scores for harm and benefit emotions over time.

There were significant differences in ratings of harm,  $F(7, 497) = 136.49, p < .001$ , and benefit,  $F(7, 494) = 167.60, p < .001$ , emotions among positions (Baseline to Position 7). Simple effects tests showed that participants reported significantly more harm and less benefit emotions in response to events in all Positions than they did at Baseline ( $ps < .001$ ). Ratings of harm emotions were also higher in Positions 2 – 7 than at Position 1, and higher in Position 7 than Position 4 ( $ps < .05$ ). There were no significant differences in benefit emotions between individual Positions (i.e., Scenarios 1 – 7;  $ps > .05$ ).

In summary, the results show that negative (uncertainty, threat, harm) emotions increased significantly and positive (challenge, benefit) emotions decreased significantly in

response to the USP, as expected. Negative (uncertainty, harm) emotions were higher in some later Positions (particularly Positions 6 and 7) than some earlier Positions.

**B. Associations between appraisals and emotions during the USP**

*1. Zero-order correlations between individual appraisals and emotion variables*

Table 42 shows zero-order correlation coefficients for the relationships between appraisal and emotion variables.

**Table 42.**

*Zero-order correlations between appraisals and emotions*

Appraisals	Emotions				
	Uncertainty	Threat	Harm	Challenge	Benefit
Meaningfulness	.33**	.23*	.35**	.03	-.03
Stress	.16	.29*	.18	.07	-.23*
Ability to cope	-.03	.11	.08	.30*	.26*
Threat	.41***	.22 <sup>t</sup>	.50***	-.03	-.03
Challenge	.20 <sup>t</sup>	.17	.18	.25*	.20 <sup>t</sup>
Personal control	.24*	.24*	.14	.23*	.25*
Control by others	.18	.12	.19	.11	-.01
Uncontrollability	.22 <sup>t</sup>	-.01	.22 <sup>t</sup>	-.01	-.02

Note. \*  $p < .05$     \*\*  $p < .01$     \*\*\*  $p < .001$

As shown in Table 42, relationships between appraisals and emotional reactions were generally in the expected directions. Higher positive appraisals (e.g., challenge appraisals, ability to cope) were related to higher positive emotions and higher negative appraisals (e.g., stress, threat appraisals) were related to higher negative emotions. There was no significant association between appraisals of ability to cope and negative emotions. Appraisals that others could control events and that events were uncontrollable were both related to greater negative emotions but unrelated to positive emotions. Unexpectedly, appraisals of personal control over events were significantly related to positive *and* negative emotions.

*2. Zero-order correlations between positive appraisals and positive emotions, and negative appraisals and negative emotions at Baseline and at each Position.*

Zero-order correlations between the composite positive appraisal and negative appraisal variables and positive and negative emotions in each context are shown in Table 43. Table 43 (page 301) shows that appraisal dimensions were significantly related in the expected directions to their emotional counterparts, with the exception that negative appraisals were not significantly related to negative emotions at Baseline. As expected, both negative and positive (re)appraisals were more strongly associated to their emotional counterparts than to their opposite, although there was a significant (negative) relationship between negative (re)appraisals and positive emotions in Position 6.

**Table 43.**

*Zero order correlations between positive and negative emotions and appraisals in each Position*

	<b>Baseline</b>	<b>P1</b>	<b>P2</b>	<b>P3</b>	<b>P4</b>	<b>P5</b>	<b>P6</b>	<b>P7</b>
<b>Positive appraisals / positive emotions</b>	.32**	.27*	.37***	.44***	.34**	.26*	.41***	.35**
<b>Negative appraisals / negative emotions</b>	.16	.52***	.43***	.33**	.34**	.31**	.52***	.40***
<b>Positive appraisals / negative emotions</b>	.09	-.11	-.04	.06	.07	-.02	-.14	-.08
<b>Negative appraisals / positive emotions</b>	-.03	.05	.09	-.12	.09	-.01	-.23*	-.07

*Note.* \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

### **Discussion**

The main aim of Study 4 was to establish how (re)appraisals and emotional reactions changed over time in response to the unresolved events described in the USP. The secondary aim was to determine whether, in line with theory (e.g., Lazarus & Folkman, 1984) and research (e.g., Folkman & Lazarus, 1985), positive (negative) (re)appraisals were associated with positive (negative) emotions during the USP. In other words, whether emotional reactions were associated with “...the appraisals on which the emotions depend” (Lazarus and Folkman, 1984, p. 280).

The results showed a consistent pattern of changes in positive (negative) emotions and (re)appraisals over time. In response to the onset of events (Position 1) there was a

significant increase in negative appraisals and emotional reactions compared to Baseline, as predicted. Negative emotions and (re)appraisals were then either sustained at this elevated level over time (e.g., stress appraisals) or increased further (e.g., harm emotions). Conversely, positive emotions and (re)appraisals were either sustained at a low level (e.g., challenge emotions) or decreased further (e.g., ability to cope). Therefore the predictions that negative reactions to the USP would increase over time were not supported for all variables. This may be an artefact of experimental design (restriction of responses, Heiman, 1999) which might have led to floor (e.g., benefit emotions) and ceiling (e.g., stress appraisal) effects for some (re)appraisals and emotions.

Regarding the secondary aim of the present study, the results showed that over time, positive (re)appraisals were associated with positive emotions and negative (re)appraisals with negative emotions, as predicted (Lazarus & Folkman, 1984), showing the expected consistency between negative and positive (re)appraisals and their emotional counterparts. However, it is important that no direction of causality be implied here. As discussed previously, emotional reactions to an unresolved event are not simply emotion *outcomes*, because they form the basis for (re)appraisal of an unresolved stressor (see Figure 1, page 6). Thus it cannot be argued that negative appraisals caused negative emotional reactions to USP events as it might also be the case that negative emotions were responsible for negative (re)appraisals of the situation.

The results of Study 4 suggest that, as would be expected if an event of this nature happened in real-life, the USP had engaged the coping process, as indicated by marked changes in primary stress appraisals, including a significant increase in primary threat (decrease in challenge) appraisals, a significant decrease in secondary appraisals of controllability (by self, by others, by anyone) and a significant increase in stress appraisals.

The results also showed that negative appraisals and emotions were maintained or increased over time. Moreover, these appraisals were related in predicted directions to the sorts of emotional reactions that might be expected in response to an event of this nature outside of the laboratory. Robinson and Clore (2001) showed that appraisals and emotional reactions that individuals predicted they would experience if they had actually seen distressing photographs they had read about were strongly related to those of individuals who had actually viewed the photographs. Therefore, it may be that the negative reactions of participants to the USP in the present study are representative of the reactions they would experience during a naturalistic stressor of this nature. In this case, the USP may be an effective paradigm to use in future research assessing how people cope with unresolved stressors that persist over time.

One counterintuitive result from the present study was that no relationship was found between appraisals of ability to cope and threat, harm, or uncertainty emotions, although it might be expected that appraisals of ability to cope with the events described would be inversely related to negative emotions. As shown in Figure 37 (page 304), appraisals of ability to cope in the present study deteriorated slowly over the time course of the USP, alongside sustained appraisals of low personal control and persistently negative emotions. These results suggest that as an uncontrollable stressor persists over time, continuing distress and perceptions of low control are associated with increasingly more negative appraisals of ability to cope with the situation. It may be that the combined impact of high distress and low controllability steadily undermine an individual's belief that they can cope with what is happening, although it is not possible to propose any direction of causality between appraisals and emotional reactions in the present study as these variables were assessed concurrently. It must also be noted that the appraisal measure was a single-

item measure and thus it is not possible to assert that this item reliably assessed appraisals of ability to cope. This psychometric issue may account for the lack of relationship between appraisals of ability to cope and negative emotions in the present study.

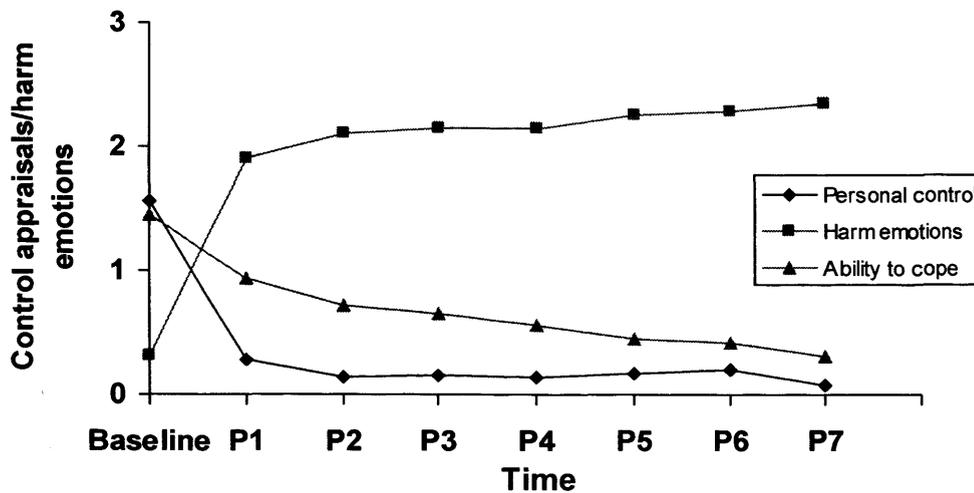


Figure 37. Changes in personal control, harm emotions and ability to cope over time in response to the USP.

Another unexpected finding in the present study was the association between (re)appraisals of personal control over the situation and emotional reactions. Although theory and prior research suggests that greater control over a situation may be associated with higher positive and *lower* negative emotions (e.g., Abramson et al., 1978; Raps et al., 1980; Seligman, 1975), higher control appraisals were related to higher positive and higher *negative* emotions in the present study. This suggests that appraising a situation as controllable by oneself may be something of a double-edged sword with respect to the association between such appraisals and emotional reactions. Indeed, Folkman (1984) proposes that perceiving oneself to have control over events is not always associated with positive emotions. Instead she suggests that perceptions of personal control can increase threat emotions because the potential for control comes with the responsibility to exert

control and manipulate the course of events (and also the potential for getting it wrong). Also, it is possible that perceiving one has the potential for control can conflict with one's preferred style of coping with stressful events, which might normally involve avoiding, denying or escaping from the reality of the situation. Furthermore, people do not necessarily want to get involved with a situation, even when they do have the potential to change it for the better (Folkman, 1984). Any or all of these factors might explain why appraisals of personal control were associated with more negative emotions in the present study. However, the counterintuitive relationship between greater personal control and more negative emotions may also be an artefact of USP design. The events described in the scenarios were predetermined and hence appraisals of personal control were falsified by subsequent scenarios (none of which offered opportunities for control). This may have been frustrating for participants and explain why appraisals of higher control were associated with more negative emotions in the present study.

The results clearly showed that USP events were consistently rated as low in personal control. According to learned helplessness theory (Abramson et al., 1978; Seligman, 1975) learning that one cannot control events leads to a range of negative consequences including passivity, slower motor responses, cognitive deficits, low self-esteem, decrements in intellectual performance, and a general loss of motivation and sense of hopelessness; symptoms common to depression. Further, research suggests that perceiving events as controllable or uncontrollable is related to reports of better or lesser psychological well-being, respectively (e.g., Raps et al., 1980; Taylor, Lichtman, & Wood, 1984), even in the laboratory (Raps et al., 1980). In earlier versions of the scenarios, events that offered participants (albeit unwittingly) opportunities for control over events (e.g., phoning parents, talking to patient), led to more positive reactions to the scenarios in

question, which suggests that the absence of such control opportunities was an important influence on the sustained negative reactions to the USP in the present study. Indeed, although the USP differs from an incident of a similar nature outside of the laboratory, with regards to its real time duration and real life implications and consequences, Abramson et al. (1978, p. 67) argue that “miniature helplessness depressions created in the laboratory” are only quantitatively different from helplessness depressions that occur in real life in terms of their duration. Indeed, the USP developed in the present study may represent a form of learned helplessness paradigm that can be used to generate sustained levels of negative emotionality (i.e., miniature helplessness depression).

That people might give up in their endeavours to change or control events they perceive as uncontrollable is a phenomenon that has received much attention. Carver and Scheier (1982) propose that behavioural or mental disengagement ensues when people believe their efforts will not reduce the discrepancy between their current state and a desired goal state, Abramson et al. (1978) and Seligman (1975) propose that learning that outcomes are not contingent on one’s efforts leads to hopelessness and depression, and Lazarus and Folkman (1984, p. 92) propose that continued appraisal and reappraisal in an uncontrollable, uncertain, and unresolved stressor can lead to distress and “immobilization of anticipatory coping”. The results of the present study are in line with such proposals, and suggest the first application for the USP as an experimental paradigm for testing research hypotheses regarding coping with stressful events. With the importance of controllability in mind, the USP will now be employed in a study in which an experimental manipulation of personal control will be added to the USP. The aim was to establish whether increased appraisals of personal control over the situation influenced situational coping during an unresolved, stressful experience.

## **6.7 Study 5: A test of goodness-of-fit**

### **Introduction**

The main aim of the present study was to establish whether dispositional coping style or situational appraisals would determine the coping strategies employed during an unresolved, stressful experience. The USP was employed as an experimental paradigm to test proposals that (1) dispositional coping style would determine situational coping (dispositional hypothesis) (2) situational appraisals (i.e., personal control) would determine situational coping (goodness of fit hypothesis), and (3) situational appraisals would moderate the influence of dispositional coping style on situational coping. In the present study, situational problem-focused coping was separated into problem-management and problem-appraisal strategies and situational emotion-focused coping was separated into emotional expression and escapism, following the approach of Terry and Hynes (1998).

To examine the proposal that dispositional coping style would determine situational coping, participants were assigned to either a dispositional emotion-focused coping group (EFCs) or a dispositional problem-focused coping group (PFCs), according to whether they reported generally using more problem-focused or emotion-focused coping during stressful past events. Dispositional coping style was assessed prospectively at a Pretest which took place around one week before the USP. Based on proposals that dispositional coping style would determine situational coping (e.g., Carver & Scheier, 1994; Carver et al., 1989), it was expected that PFCs would report significantly more problem-management and problem-appraisal coping and significantly less emotional expression and escapism coping at all assessments from Pretest to Position 7 of the USP, whereas the opposite was expected for EFCs (i.e., less problem-focused, more emotion-focused strategies).

To examine the proposal that situational coping would be influenced by situational appraisals of control (e.g., Forsythe & Compas, 1987; Park et al., 2001; Terry & Hynes, 1998), participants were randomly assigned to receive either the standard version of the USP as described in Study 4 (SUSP condition), or a version that included an experimental manipulation of personal control at Position 4 (personal control manipulation; PCM condition). In line with the goodness-of-fit hypothesis regarding the influence of situational factors on situational coping, it was expected that participants would report more problem-focused coping strategies and less emotion-focused strategies in situations that were more amenable to personal control. In situations that were not amenable to control, it was expected that participants would report more emotion-focused and less problem-focused strategies. Specifically, as all Positions of the USP were rated as being low in personal control in Study 4, it was expected that there would be no significant differences between conditions in reports of emotion- or problem-focused coping, except at Position 4. At Position 4 it was expected that participants in the PCM condition would report significantly more problem-focused coping and less emotion-focused coping than participants in the SUSP condition.

The third hypothesis tested in the present study was that dispositional coping style would be influenced by situational factors, such that EFCs in the PCM condition reported more emotion-focused coping than PFCs in the PCM condition at all times except at Position 4, where situational appraisals of increase personal control would influence an emotion-focused coping style such that there would be no significant differences between EFCs and PFCs in problem-focused coping.

The next proposal examined using the USP was that the match between situational appraisals of personal control and situational coping would determine psychological well-

being (i.e., emotional reactions). Because events in the USP were not amenable to personal control, it was expected that emotion-focused coping would elicit more positive emotions than problem-focused coping, as the former class of strategies are proposed to have more beneficial effects on adjustment to low control stressors. In contrast, it was expected that problem-focused coping would have negative effects on emotional well-being during the USP, because problem-focused efforts to manage these uncontrollable events would elicit greater distress. Specifically, it was proposed that those who used problem-focused coping (i.e., PFCs) would report significantly more negative emotions than those who used emotion-focused coping (i.e., EFCs) and that EFCs would report significantly more positive emotions than PFCs. The exception to these rules would be at Position 4. Because the events in this Position were more amenable to personal control it was expected that those who used more problem-focused coping would report more positive and less negative emotions than EFCs, because the demands of this situation are suited to problem-focused coping efforts.

The secondary aim of the study was to investigate the influence of dispositional optimism and trait anxiety on situational coping. It was expected that dispositionally optimistic individuals would use more problem-focused coping and that trait anxious individuals would use more emotion-focused coping (Carver & Scheier, 1994; Carver et al., 1989; Park & Folkman, 1997; Scheier & Carver, 1985). These trait characteristics<sup>16</sup> were assessed prospectively at the Pretest session that took place one week before participants completed the USP.

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<sup>16</sup> So called to avoid confusion regarding dispositional coping style and dispositional characteristics.

## Method

### *Design*

The study used a 2 (Group; problem-focused copers, emotion-focused copers) x 2 (Condition; personal controllability manipulation, standard USP) x 8 (Assessment time; pre-test – Position 7) mixed within-subjects factorial design with Group and Condition as the between-subjects factors and Assessment as the within-subjects factors. The independent variables were Group, Condition and Assessment. Group assignment was determined by participants' usual coping strategies as assessed one week before they completed the USP task. Participants were randomly assigned to receive the personal controllability manipulation (PCM) or the standard version of the USP (SUSP) on the day of the experiment. The dependent variable was participants' reactions to the scenarios, in terms of their appraisals of the event (e.g., as threatening, uncontrollable) the coping strategies they would employ (e.g., problem-management, emotional expression) and the emotions they would experience (e.g., harm emotions, challenge emotions).

### *Participants*

Undergraduate Psychology students ( $N = 48$ ) participated as part of course requirements and were awarded course credit. The mean age of participants was 19.96 years ( $SD = 2.32$ ) and 42 were women. Inclusion criteria were as described in USP-Pilot 2 (see page 259). As in Study 4, the study was advertised as lasting longer than the procedure, and participants were awarded the advertised course credit. Participants were assigned to one of two Groups (EFCs, PFCs) according to which of these strategies they generally used in stressful situations, and were then randomly assigned to two experimental conditions (PCM, Standard USP). A 2 (Group) by 2 (Condition) independent factorial

ANOVA was computed on participants' age. There were no significant differences between the ages of EFCs compared to PFCs,  $F(1, 44) = 2.39, p > .05$ , nor between participants in the PCM or low control Conditions,  $F(1, 44) = 1.40, p > .05$ . The ages of EFCs and PFCs assigned to the PCM or Standard USP conditions did not differ significantly,  $F(1, 44) = 1.09, p > .05$ .

## *Materials*

### A. The stressor paradigm

The scenarios read by participants in the Standard USP condition were as described in Study 4 (page 284) and were also presented in a randomised order. A statement designed to increase appraisals of control was inserted into whichever scenario was presented in Position 4 for participants in the PCM condition only. This statement was based on an earlier version of Scenario 5 that had increased appraisals of control in a previous study (see below).

*“The doctor asks you to read some information about trauma that you need to know to help your partner and says that it would be important to keep talking to your partner as this may be helpful. The doctor says you can have five minutes with your partner. You sit next to your partner's bed, and follow the doctor's advice. You talk to your partner, but aren't sure if they recognised you or understood what you said. While you are sitting there, your partner's eyes flickered and opened just a little.”*

This statement was adapted as necessary to fit into whichever scenario was randomly presented in Position 4. For example the person giving the advice was either a

doctor or a nurse, depending on who was talking to the reader in that scenario. A computer programme was developed by the researcher to present the USP and DRK items (see below) using Inquisit 2.0.41230.0 computer software (Millisecond Software, 2004).

## B. Measures

### 1. Pretest questionnaires

Approximately one week ( $M = 8.63$  days;  $SD = 3.42$ ) before completing the USP, participants completed two questionnaires assessing dispositional attributes and one assessing how they generally coped with stressful situations.

*1. Dispositional optimism.* The Life Orientation Test-Revised (LOT-R; Scheier et al., 1994) was used to assess dispositional optimism (see Study 2, page 151 for full details of this measure). In the present study, Cronbach's alpha for the three measures was: Overall LOT-R,  $\alpha = .77$ , LOT-R optimism,  $\alpha = .61$ , and LOT-R pessimism,  $\alpha = .72$ .

*2. Trait anxiety.* The trait (STAI-T) scale of the Spielberger et al. (1970) State-Trait Anxiety Inventory was used to assess anxiety proneness (see Study 1, page 59 for full details of this measure). The reliability of the STAI-T in the present study was high ( $\alpha = .91$ ).

*3. Coping inventory.* At Pretest and after the scenario presented in each Position of the USP, participants completed a modified version of the Terry and Hynes (1998) Coping with Infertility questionnaire described in Study 2 (see page 154). The original Terry and Hynes measure questionnaire was shortened to 20 items for practical reasons (i.e., time

taken to complete after each scenario), whilst retaining the four coping constructs proposed by Terry and Hynes (which were of particular interest). Each subscale contained five items and this adapted version was also completed at the pre-test session for the sake of consistency within the present study. Items and instructions were modified to remove references to infertility and instead referred to “coping with the stressful situation”. Written instructions in the Pre-test version informed participants that they should indicate the extent to which they “*usually* use” each strategy when coping with a stressful situation. After each scenario participants were asked to indicate the extent to which they would cope in the manner described in response to the events described in the scenario in question. Four coping subscales: problem-appraisal, problem-management, escapism and emotional expression, each containing five items were created from the means of items. Due to the unacceptably low reliability of the five-item problem-appraisal scale at Baseline ( $\alpha = .39$ ), two items were removed from this subscale before employing this coping construct in analyses. Doing so improved the reliability of the measure. The items removed from the problem appraisal scale were “I take things one day at a time, one step at a time”, and “I get busy with other things to keep my mind off the problem”, and the alpha for the new three-item problem appraisal subscale was  $\alpha = .65$ . The reliability of the escapism subscale at Baseline was also low ( $\alpha = .54$ ), and two items were removed from this scale prior to analyses, again improving reliability. The items removed from the escapism subscale were “I would daydream or imagine a better time or place than the one I was in”, and “I avoid people”, and the alpha for the new three-item escapism scale was a little higher at  $\alpha = .63$ . The reliability of the problem-management subscale at Baseline was  $\alpha = .63$ , and of the emotional expression subscale was  $\alpha = .60$ . Examination of the Cronbach’s alpha if items were deleted showed that removing items from the problem-management and emotional

expression subscales would not improve their reliability. All coping subscales were used in analyses reported in the present study, although it should be noted that the reliabilities are lower than is generally accepted to be indicative of reliable scales (i.e.,  $\geq .70$ ). The results obtained using these coping scales should therefore be interpreted with caution (see Appendix Y, page 418, for the abbreviated version of the Terry and Hynes coping questionnaire used in Study 5).

## 2. Baseline questionnaire

*The Daily Record Keeping Sheet (DRK)* was used to assess participants' appraisals of, and emotional reactions to, the experience of taking part in an experiment. The baseline assessment of emotions and appraisals was made immediately prior to commencing the USP. Emotion and appraisal items were as described in Study 4 (page 288 – 290). Prior to the USP, participants responded in terms of their emotions at that time and their expectations and appraisals regarding participation in the experiment. Ratings for DRK items were made on four-point scales as before. Five emotion subscales (uncertainty, threat, harm, challenge and benefit) were created, as described in Study 4. The reliabilities of emotion subscales at Baseline were acceptable: Uncertainty,  $\alpha = .77$ ; Threat,  $\alpha = .83$ ; Harm,  $\alpha = .83$ ; Challenge,  $\alpha = .74$ ; Benefit,  $\alpha = .74$ .

*The Daily Record Keeping Sheet (DRK)* was used to assess emotions and appraisals before completing the USP and after every scenario. The same emotion and appraisal items as presented at baseline were presented in a randomised order on screen after the events in each Position. Ratings were made in the context of the events described (i.e., P1 – P7).

Participants also rated the extent to which they would employ each of the 20 coping strategies rated at Pretest, in the events described in each scenario.

### *Procedure*

This study received ethical approval from the School of Psychology, Cardiff University, School Research Ethics Committee. Participants completed Pretest questionnaires approximately one week before completing the USP. A median split was performed on the difference between Pretest problem-focused and emotion-focused coping scores for the first 30 participants. Participants who scored above the median (i.e., they generally used more problem-focused than emotion-focused coping) were assigned to the problem-focused copers group (PFCs) and those scoring below the median were assigned to the emotion-focused copers group (EFCs). Before the USP, participants completed the appraisal and emotion measures (Baseline) (in pen and paper format), and were randomly assigned to the PCM or Standard USP conditions before commencing the computer task. DRK items were presented on screen after each Position, as in Study 4. After completing the computer task, participants were verbally debriefed, thanked for participating, awarded course credit, and received a written debriefing sheet.

### *Data Analysis*

LOT-R subscale and STAI-T scores were analysed using Group (EFCs, PFCs) by Condition (PCM, Standard USP) independent factorial ANOVAs to establish whether Groups or Conditions differed in dispositional optimism or trait anxiety. A Group by Condition by Strategy (positive reappraisal, problem-focused, escapism, emotional expression) mixed between-within ANOVA with Strategy as the within-subjects factor was

used to establish differences between and within Groups or Conditions in the use of different coping strategies. As a check on the PCM, a 2 (Condition) x 8 (Position) mixed between-within ANOVA with Position as the within-subjects factor was computed to establish whether the PCM had increased appraisals of personal control at Position 4. DRK variables were analysed using mixed between-within ANOVAs with Group (2) and Condition (2), as the between-subjects factors and Position (Baseline – Position 7) as the within-subjects factor. Significant ( $p < .05$ ) interactions and main effects were followed up with comparisons, using Bonferroni corrections for the number of comparisons (Field, 2005; Hinton et al., 2004). In cases of sphericity violations, Greenhouse-Geisser corrected degrees of freedom were used when describing the Position main effect, the Group by Position and Condition by Position interactions and the three-way (Group by Condition by Position) interaction. Despite random assignment to experimental Conditions, significant differences between Conditions were found on LOT-R optimism and STAI-T scores. In cases where LOT-R optimism and STAI-T scores were also significant predictors of the dependent variable, analyses were repeated using Analyses of Covariance (ANCOVAs).

## **Results**

The results section is divided into two parts. In Part A, the results of analyses comparing Groups and Conditions on Pretest variables are presented and Part B contains the results of analyses on DRK variables.

### **A. Pretest Variables**

#### **1. Dispositional optimism and trait anxiety**

Table 44 (page 317) shows mean LOT-R subscale scores and STAI-T scores by Group and Condition.

**Table 44**

*Optimism, pessimism and trait anxiety by Group and Condition (SD in parentheses)*

Variable	EFCs		PFCs	
	SUSP	PCM	SUSP	PCM
<b>Overall LOT-R</b>	12.45 (2.21)	14.18 (3.95)	16.38 (3.40)	16.92 (3.09)
<b>LOT-R optimism</b>	5.82 (2.14)	7.27 (1.90)	7.92 (1.61)	8.77 (2.20)
<b>LOT-R pessimism</b>	5.36 (1.43)	5.09 (2.16)	3.54 (2.11)	3.85 (1.68)
<b>STAI-T</b>	52.27 <sup>a</sup> (5.52)	43.81 <sup>b</sup> (8.79)	36.69 (9.52)	39.00 (7.47)

*Note.* Means with different superscripts differ significantly in Tukey posthoc comparisons.

The results showed that EFCs had significantly lower Overall LOT-R scores,  $F(1, 44) = 12.73, p < .001$ , and LOT-R optimism scores,  $F(1, 44) = 9.94, p < .01$ , than PFCs. Conversely, EFCs had significantly higher LOT-R pessimism scores,  $F(1, 44) = 8.00, p < .01$ , and higher STAI-T scores,  $F(1, 44) = 19.23, p < .001$  than PFCs. There were no significant differences in Overall LOT-R scores,  $F(1, 44) = 1.47, p > .05$ . .23, LOT-R

pessimism scores,  $F(1, 44) = .001, p > .05$ , or STAI-T scores,  $F(1, 44) = 1.75, p > .05$ , between participants in the PCM and Standard USP conditions. However, participants in the PCM condition *did* have significantly higher LOT-R optimism scores than those in the Standard USP condition,  $F(1, 44) = 4.06, p < .05$ . The Group by Condition interactions on overall LOT-R scores,  $F(1, 44) = .40, p > .05$ , LOT-R optimism scores,  $F(1, 44) = .28, p > .05$ , and LOT-R pessimism scores,  $F(1, 44) = .29, p > .05$ , were nonsignificant, but there was a significant interaction on STAI-T scores,  $F(1, 44) = 5.36, p < .05$ . EFCs in the Standard USP condition had significantly higher STAI-T scores than EFCs in the PCM condition.

## 2. Dispositional coping

Table 45 (page 319) shows mean scores for different coping strategies by Group and Condition. There was no significant difference in the total coping effort reported by EFCs compared to PFCs,  $F(1, 44) = .023, p > .05$ , and no significant differences in the total coping effort reported by the PCM condition compared to the Standard USP condition,  $F(1, 44) = .007, p > .05$ . Further, there were no significant interactions between Group and Condition,  $F(1, 44) = .90, p > .05$ , Condition and Coping Strategy,  $F(3, 132) = 1.69, p > .05$ , or Group, Condition and Coping Strategy,  $F(3, 132) = .94, p > .05$ . There was a significant main effect of Strategy,  $F(3, 132) = 35.04, p < .001$ , and a significant Group by Strategy interaction,  $F(3, 132) = 19.98, p < .001$ . The main effect of Strategy showed that all participants reported using significantly more problem-management coping ( $ps < .05$ ) and less escapism ( $ps < .001$ ) than any other strategy, and further analysis of the Group by Strategy interaction showed that PFCs reported significantly more problem-appraisal and problem-management coping than EFCs ( $ps < .01$ ), but significantly less escapism ( $p <$

.001). However, although it seemed as though EFCs reported more emotional expression coping than PFCs, this difference was only marginally significant ( $p < .10$ ).

**Table 45**

*Positive reappraisal, problem-focused, escapism and emotional expression coping by Group and Condition (SD in parentheses)*

Coping style	EFCs		PFCs	
	SUSP	PCM	SUSP	PCM
<b>Problem-appraisal</b>	1.82 (.58)	1.79 (.54)	2.56 (.48)	2.33 (.41)
<b>Problem- management</b>	1.65 (.38)	1.67 (.50)	1.88 (.44)	2.22 (.47)
<b>Escapism</b>	1.45 (.60)	1.55 (.52)	.62 (.52)	.85 (.66)
<b>Emotional expression</b>	2.00 (.52)	1.60 (.49)	1.46 (.62)	1.51 (.72)

In summary, analyses of Pretest variables showed that, in line with proposals about the link between dispositional optimism and trait anxiety and coping style, EFCs were less optimistic, more pessimistic and more trait anxious than PFCs. Regarding the coping strategies participants reported generally using in stressful situations, the results showed that EFCs and PFCs did not differ significantly in the *overall* coping effort they reported, but did differ with respect to three of the four *types of* coping strategies they recalled using

most (as expected given the method of assignment to coping Groups). EFCs reported more escapism, whereas PFCs reported more problem-appraisal and problem-management coping. The results also suggested a trend for EFCs to report using more emotional expression coping than PFCs. Unexpectedly, despite random assignment to conditions, participants in the PCM condition had significantly higher optimism scores than those in the Standard USP condition, and EFCs in the Standard USP condition reported significantly more trait anxiety than EFCs in the PCM condition.

## **2. Phase II: DRK variables**

### **A. Manipulation check**

Figure 38 (page 320) shows marginal means for the Condition by Position interaction on personal control appraisals.

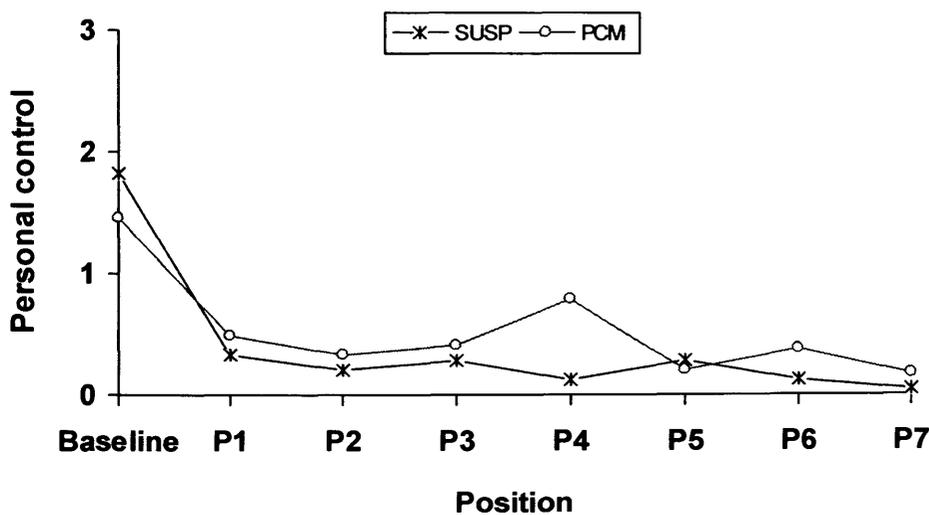


Figure 38. Marginal means for the Condition by Position interaction on ratings of personal control.

There was a significant Condition by Position interaction on personal control appraisals,  $F(7, 322) = 3.70, p < .001$ . Appraisals of personal control at Position 4 were significantly higher in the PCM condition than the SUSP condition ( $p < .001$ ).

## **A. Appraisals**

The results of analyses of appraisals are summarised in Table 46 (page 322).

*1. Summary of Position effects:* There were significant main effects of Position on all appraisals. Ratings of stressfulness, threat, uncontrollability and meaningfulness were lower and appraisals of challenge, ability to cope, and personal control were higher, at Baseline than any Position ( $ps < .001$ ). Further, appraisals of challenge and ability to cope were higher and threat appraisals were lower in Position 4 than 7 ( $ps < .05$ ). Challenge appraisals were also higher in: Position 1 than 5, 6 and 7 ( $ps < .01$ ); Position 2 than 7; Position 4 than 6 ( $ps < .05$ ). There were no significant differences between appraisals of control by others between Baseline or any Positions ( $ps > .05$ ).

*2. Summary of Group and Condition effects.*

A. Group: No significant main effects of Group were found on appraisals, although the results suggested a trend for EFCs to appraise events as more controllable by others than PFCs ( $p < .10$ ). There were also no significant Group by Condition interactions, although the Group by Condition interaction on stress appraisals was marginally significant. However, there was a significant Group by Position interaction on stress appraisals. See Figure 39 (page 323) for marginal means for the Group by Position interaction on appraisals of stressfulness.

**Table 46***Significant and marginally significant main effects and interactions for appraisals*

Appraisals	Main effects			2-way interactions			3-way interaction
	Group (1, 44)	Condition (1, 44)	Position (7, 308)	Group x Condition (1, 44)	Group x Position (7, 308)	Condition x Position (7, 308)	Group x Condition x Position (7, 308)
Meaningfulness			108.00***				
Stress			191.28***	3.61 <sup>t</sup>	4.62*		
Ability to cope			37.38***			2.03*	
Threat			134.10***				
Challenge			16.17***			1.78 <sup>t</sup>	
Personal control			40.35***			3.69***	
Control by others	3.11 <sup>t</sup>		2.91**				
Un-controllability			43.48***			1.93 <sup>t</sup>	1.89 <sup>t</sup>

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

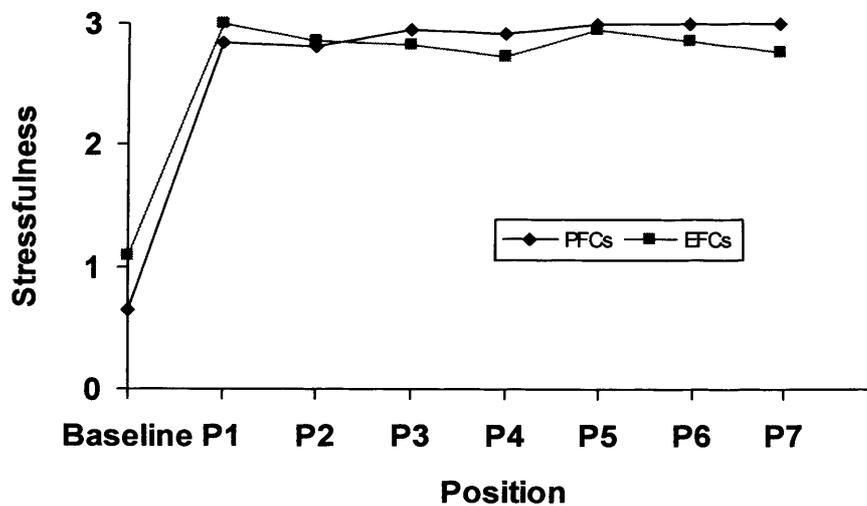


Figure 39. Marginal means for the Group by Position interaction on stressfulness

The Group by Position interaction on appraisals of stressfulness (see Table 46, page 322, Figure 39) showed that EFCs appraised taking part in an experiment as significantly more stressful than did PFCs ( $p < .05$ ).

**B. Condition:** Condition by Position interactions were significant for appraisals of ability to cope and personal control, but only marginally significant for challenge and uncontrollability (see Table 46, page 322). Figure 40 (page 324) shows marginal means for the Condition by Position interaction on appraisals of ability to cope.

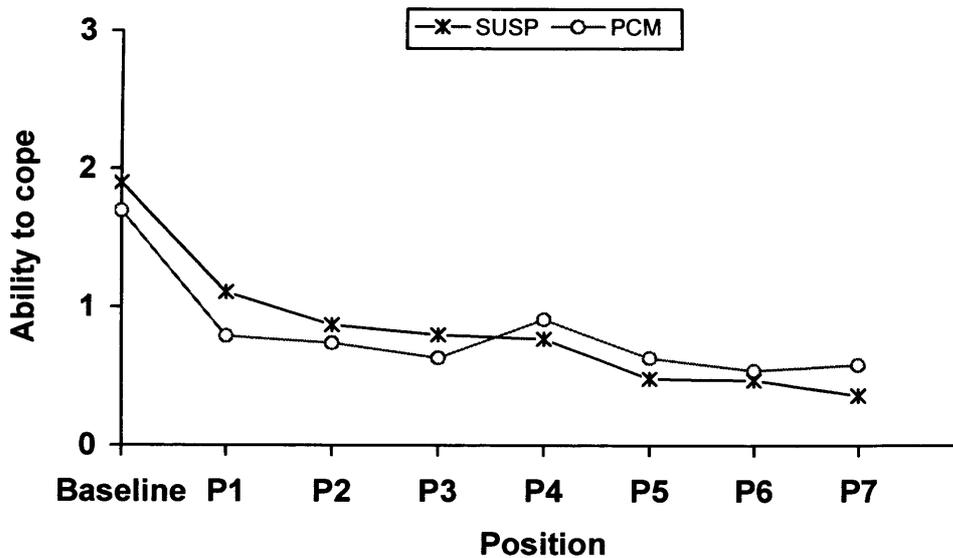


Figure 40. Marginal means for the Condition by Position interaction on ability to cope

Further analysis of the significant Condition by Position interaction on appraisals of ability to cope (see Table 46, page 322, Figure 40) showed no significant differences in appraisals of ability to cope at Position 4 between the PCM and SUSP conditions. See Figure 38 (page 320) for marginal means for the Condition by Position interaction on personal control appraisals.

3. *Summary of ANCOVAs on appraisals.* There were no significant Group differences in appraisals of the situation, and therefore ANCOVAs were not computed on appraisal dimensions.

In summary, regardless of Group or Position, appraisals of Baseline were significantly more positive (e.g., challenge, ability to cope) and less negative (e.g., stressfulness, meaning) at Baseline than in any Position, and EFCs appraised taking part in an experiment (i.e., Baseline) as significantly more stressful than PFCs. Group by

Condition interactions on personal control appraisals showed that Position 4 was appraised significantly more positively by the PCM condition than the SUSP condition.

## **B. Coping**

The results of analyses of situational coping strategies are summarised in Table 47.

**Table 47.**

*Significant and marginally significant main effects and interactions for coping variables*

Coping strategy	Main effects			2-way interactions			3-way interaction
	Group (1, 44)	Condition (1, 44)	Position (7, 308)	Group x Condition (1, 44)	Group x Position (7, 308)	Condition x Position (7, 308)	Group x Condition x Position (7, 308)
Problem-appraisal	3.41 <sup>t</sup>		70.07***		3.07**		
Problem-management			27.40***			1.90 <sup>t</sup>	
Escapism	5.98*		3.61***		2.78**	2.82**	
Emotional expression	4.20*		5.17***				

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$       \*  $p < .05$       \*\*  $p < .01$       \*\*\*  $p < .001$

1. *Summary of Position effects:* There were significant main effects of Position on all coping strategies. At Pretest, all participants reported more problem-appraisal and problem-management coping than they did at any Position ( $ps < .001$ ). Conversely, they reported significantly less emotional expression coping at Pretest than at Positions 1, 2, 3 and 6 ( $ps < .05$ ). Regarding differences between individual Positions, more problem-appraisal and problem-management coping was reported at Position 1 than Positions 3, 5, 6, and 7 ( $ps < .01$ ), and more problem-appraisal coping at Position 2 than Positions 5, 6, and 7 ( $ps < .05$ ). Finally, more problem-management coping was reported at Position 2 than Position 5 and less escapism at Position 4 than Position 3 ( $ps < .05$ ).

2. *Summary of Group and Condition effects.*

a. Group: There was a significant main effect of Group on emotional expression coping.

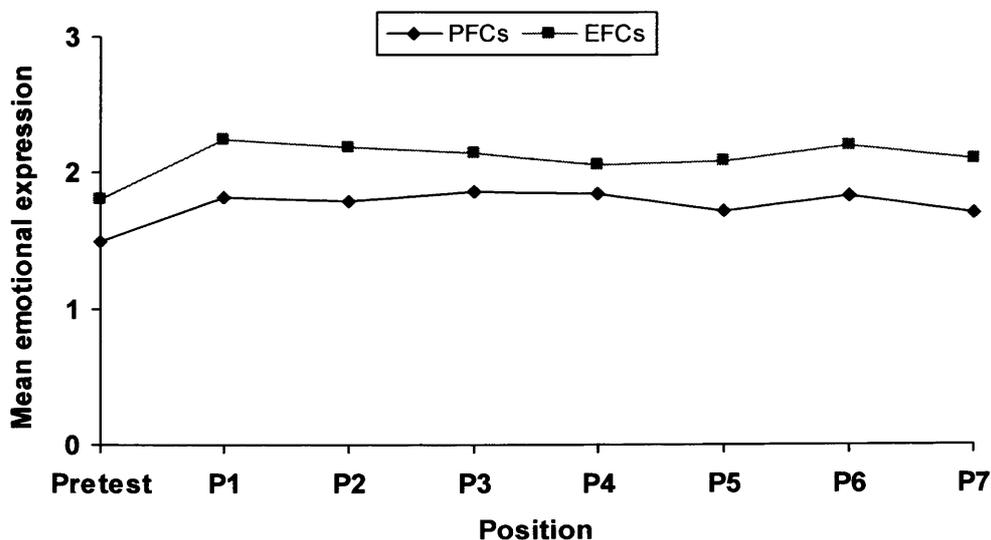


Figure 41. Mean scores for emotional expression coping by Group.

The significant main effect of Group (see Table 47, page 325, Figure 41, page 326) showed that EFCs reported significantly more emotional expression coping than did PFCs ( $p < .05$ ). Table 47 also shows a significant main effect of Group on escapism, although the significant Group by Position interaction suggested that this may be qualified by Position. There was also a significant Group by Position interaction on problem appraisal coping. Figure 42 shows marginal means for the Group by Position interaction on problem appraisal coping.

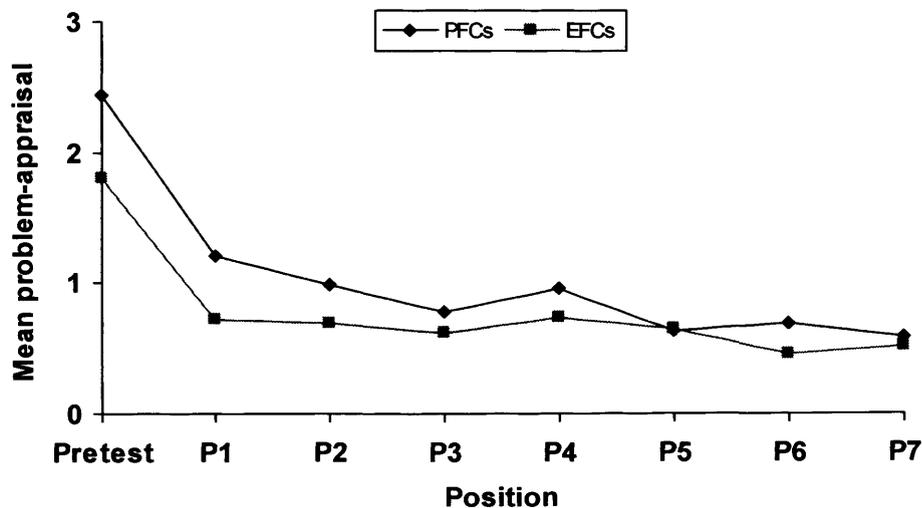


Figure 42. Marginal means for the Group by Position interaction on problem-appraisal coping

Further analysis of the Group by Position interaction on problem-appraisal coping (see Table 47, page 325, Figure 42) showed that PFCs reported more problem-appraisal at Pretest and after Position 1 than EFCs ( $ps < .01$ ). Figure 43 (page 328) shows marginal means for the Group by Position interaction on escapism.

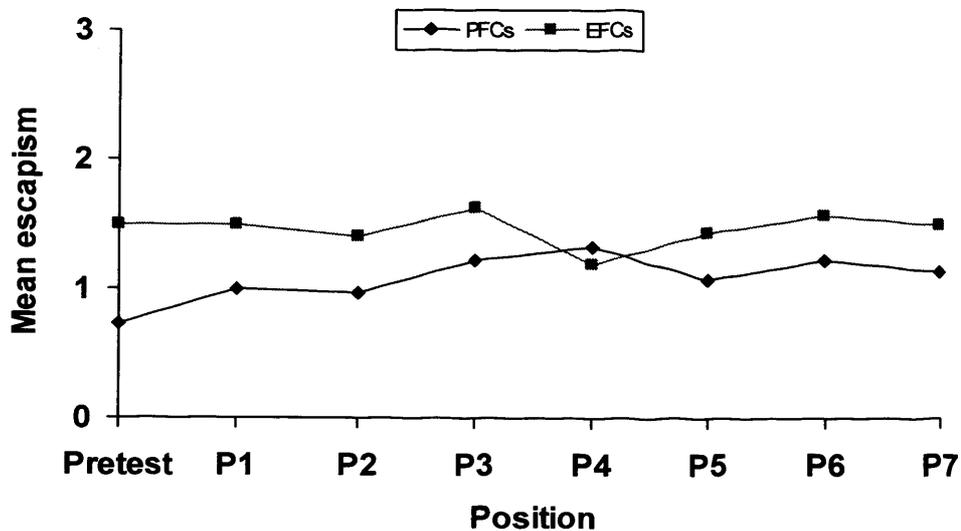


Figure 43. Marginal means for the Group by Position interaction on escapism

Further analysis of the Group by Position interaction on escapism (see Table 47, page 325, Figure 43) showed that PFCs reported significantly less escapism at Pretest ( $p < .001$ ) and Positions 1, 2, 3, and 6 ( $ps < .05$ ) than EFCs. There was no significant difference in reports of escapism by PFCs compared to EFCs at Position 4 ( $p > .05$ ).

**B. Condition:** There were significant Condition by Position interactions on escapism (see Table 47, page 325, Figure 44, page 329). Further analysis of the Condition by Position interaction on escapism showed that participants in the PCM condition reported significantly less escapism in Position 4 ( $p < .05$ ) and 5 ( $p < .05$ ) than participants in the SUSP condition.

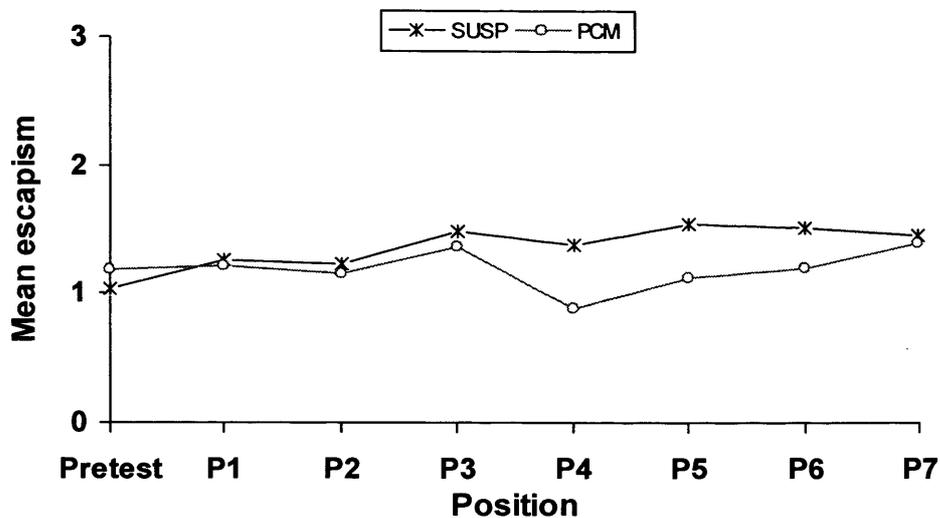


Figure 44. Marginal means for the Condition by Position interaction on escapism.

3. *Summary of ANCOVAs on coping strategies.* To establish whether significant main effects of Group on coping strategies remained after controlling for differences between Groups on STAI-T and LOT-R optimism, STAI-T and LOT-R optimism were entered into analyses as covariates.

A. STAI-T: STAI-T was not a significant predictor of problem-appraisal coping,  $F(1, 43) = .92, p > .05$ , or emotional expression coping,  $F(1, 43) = 2.27, p > .05$ , but was a significant predictor of escapism,  $F(1, 43) = 6.31, p < .05$ . Controlling for STAI-T reduced the significant effect of Group on escapism to nonsignificance,  $F(1, 43) = .60, p > .05$ .

B. LOT-R optimism was a not a significant predictor of escapism,  $F(1, 43) = .48, p > .05$ , nor emotional expression, although there was a marginally significant relationship between dispositional optimism and emotional expression,  $F(1, 43) = 3.28, p < .10$ . However,

dispositional optimism was a significant predictor of problem-appraisal coping,  $F(1, 43) = 12.45, p < .001$ . Controlling for LOT-R optimism reduced the main effect of Group on problem-appraisal (see Table 47, page 325) to nonsignificance,  $F(1, 43) = .13, p > .05$ .

In summary, there was no main effects of Group or Position on problem-management coping, and although there was a trend suggesting that PFCs reported more problem appraisal coping than EFCs, this was qualified by Position, with PFCs reporting more problem-appraisal coping at Pretest and Position 1 only. There were significant main effects of Group on emotion-focused coping both emotional expression and escapism, although the latter was qualified by Position. The only positions in which EFCs did not report significantly more escapism than PFCs were Positions 4 and 5.

### **C. Emotions**

The results of analyses on emotion variables are summarised in Table 48 (page 331).

*1. Summary of Position effects:* There were significant main effects of Position on all emotion variables, which showed that positive emotions were lower and negative emotions were higher at all Positions compared to Baseline. Participants reported significantly less uncertainty, threat and harm emotions, and more challenge and benefit emotions at Baseline than after the events in any Position ( $ps < .001$ ). Regarding differences between individual Positions, less uncertainty and harm emotions were reported at Position 1 than 2, 3, 5, 6, and 7 (uncertainty emotions;  $ps < .001$ ), and Positions 3, 5 and 7 (harm emotions;  $ps < .05$ ). Compared to Position 4, participants reported more uncertainty emotions at 5 and 7 ( $ps <$

.01), more threat emotions at 6 and 7 ( $p < .05$ ), less challenge emotions at all Positions ( $p < .01$ ), and less benefit emotions at 1, 2, 3, 5 and 7 ( $p < .05$ ).

**Table 48.**

*Significant and marginally significant main effects and interactions for emotion variables*

Emotion subscale	Main effects			2-way interactions			3-way interaction
	Group (1, 44)	Condition (1, 44)	Position (7, 308)	Group x Condition (1, 44)	Group x Position (7, 308)	Condition x Position (7, 308)	Group x Condition x Position (7, 308)
Uncertainty		5.39*	144.53***	3.78 <sup>t</sup>	3.84**		
Threat		4.21*	401.23***		7.58***	2.45*	
Harm			138.62***			3.56***	
Challenge			55.91***			6.06***	3.00**
Benefit			118.31***			3.74***	2.99**

*Note.* Only significant ( $p < .05$ ) or marginally significant ( $p < .10$ ) effects shown

*Note.* <sup>t</sup>  $p < .10$  \*  $p < .05$  \*\*  $p < .01$  \*\*\*  $p < .001$

## 2. Summary of Group and Condition effects.

A. Group effects: There were no significant main effects of Group on any emotions, but there were significant Group by Position interactions on uncertainty emotions and threat emotions.

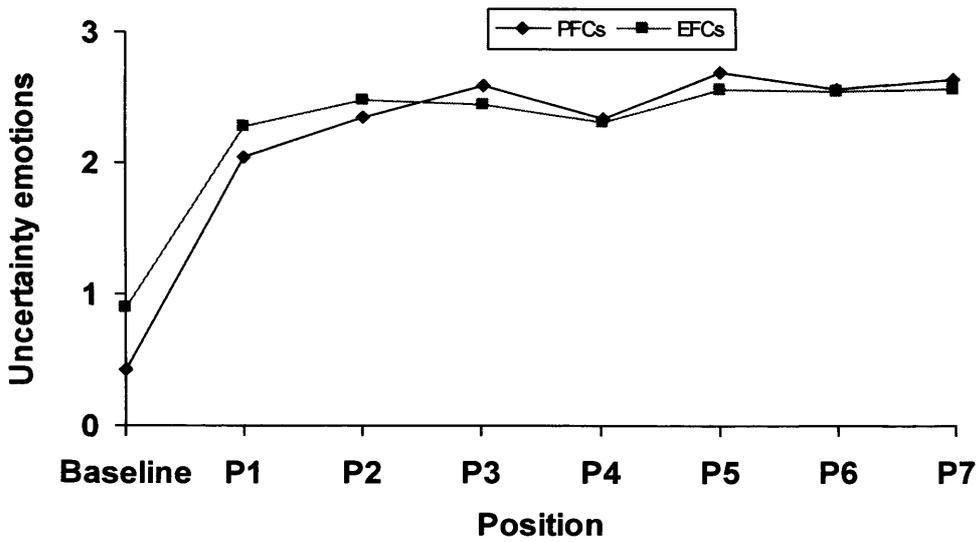


Figure 45. Marginal means for the Group by Position interaction on uncertainty emotions

The Group by Position interaction on uncertainty emotions (see Table 48, page 331, Figure 45) showed that EFCs reported significantly more uncertainty emotions at Baseline than PFCs ( $p < .01$ ). Figure 46 shows the Group by Position interaction on threat emotions.

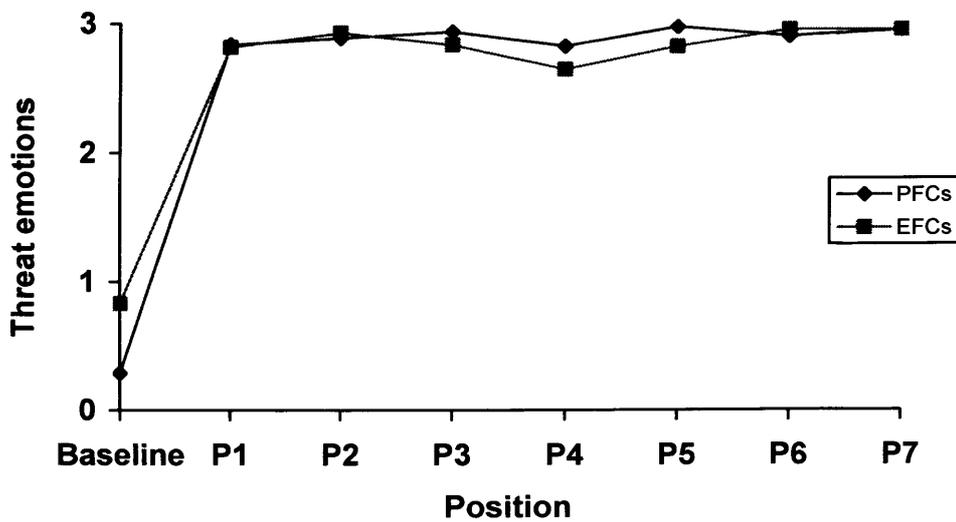


Figure 46. Marginal means for the Group by Position interaction on threat emotions

The Group by Position interaction on threat emotions (see Table 48, page 331, Figure 46, page 332) showed that EFCs reported significantly more threat emotions at Baseline than PFCs ( $p < .01$ ), and significantly *less* threat emotions than PFCs in Position 4 ( $p < .05$ ).

**B. Condition effects:** There was a significant main effect of Condition on threat emotions, which showed that the PCM condition reported significantly less threat emotions than the SUSP condition ( $p < .05$ ). There were also significant Condition by Position interactions on threat emotions, and harm emotions, and significant Group by Condition by Position interactions on challenge emotions and benefit emotions (see Table 48, page 331). Figure 47 shows marginal means for the significant Condition by Position interaction on threat emotions.

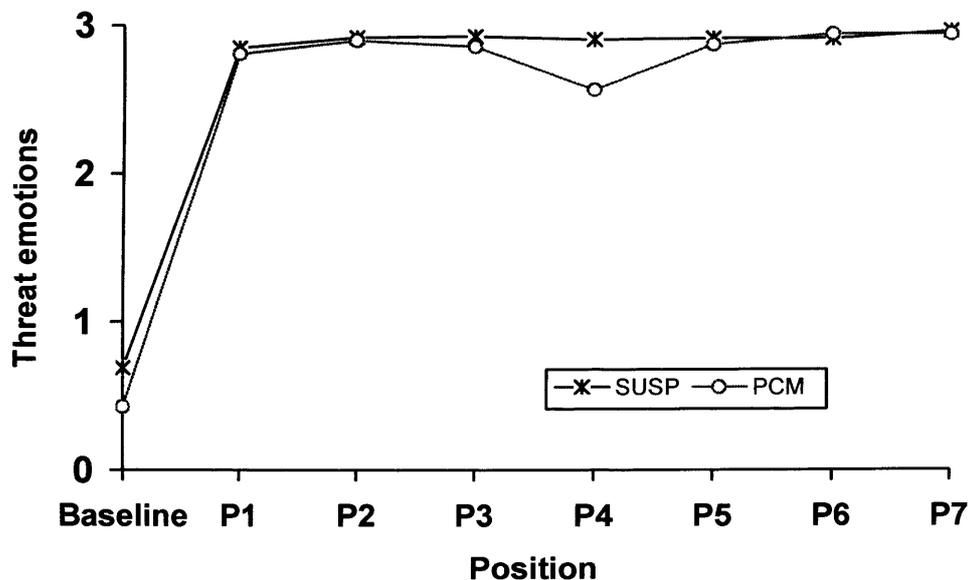


Figure 47. Marginal means for the Condition by Position interaction on threat emotions

The Condition by Position interaction on threat emotions (see Table 48, page 331, Figure 47) showed that the PCM condition reported significantly less threat emotions at Position 4 than the SUSP condition ( $p < .01$ ). Figure 48 shows the marginal means for the Condition by Position interaction on harm emotions.

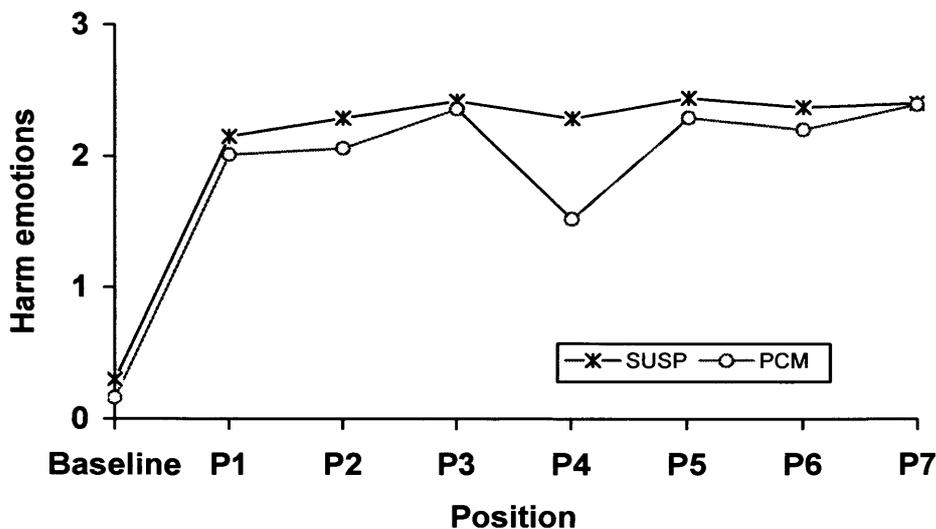


Figure 48. Marginal means for the Condition by Position interaction on harm emotions

The significant Condition by Position interaction on harm emotions (see Table 48, page 331, Figure 48) showed that the PCM condition reported significantly less harm emotions at Position 4 than the SUSP condition ( $p < .001$ ). Figure 49 (page 335) shows means for the significant Group by Condition by Position interaction on challenge emotions. The significant three-way interaction on challenge emotions showed that PFCs in the SUSP condition reported significantly more challenge emotions than PFCs in the PCM condition at Baseline ( $p < .05$ ). PFCs and EFCs in the PCM condition reported significantly more challenge emotions at Position 4 than PFCs and EFCs in the SUSP condition ( $ps < .01$ ).

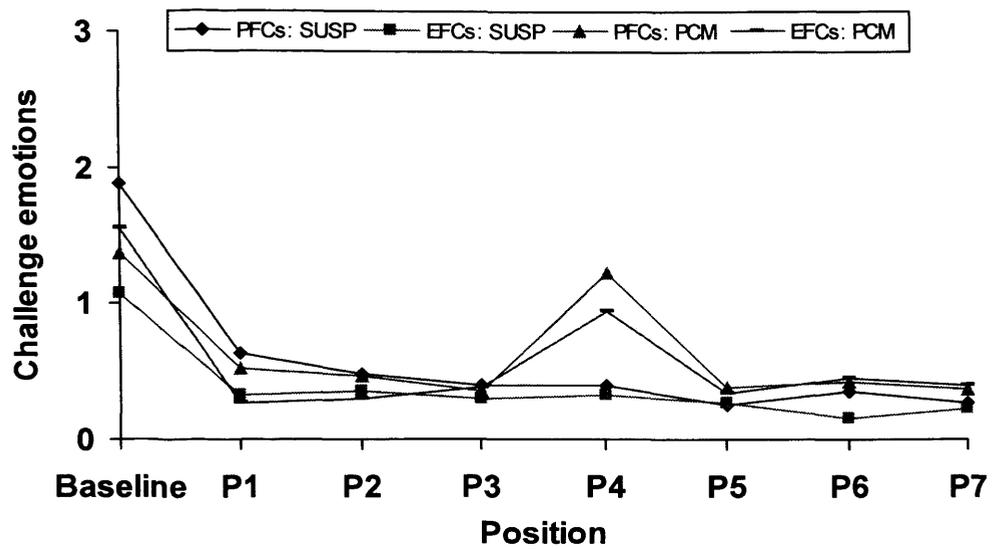


Figure 49. Mean scores for challenge emotions in each Position by Group and Condition

Figure 50 shows means for benefit emotions in each Position, by Group and Condition.

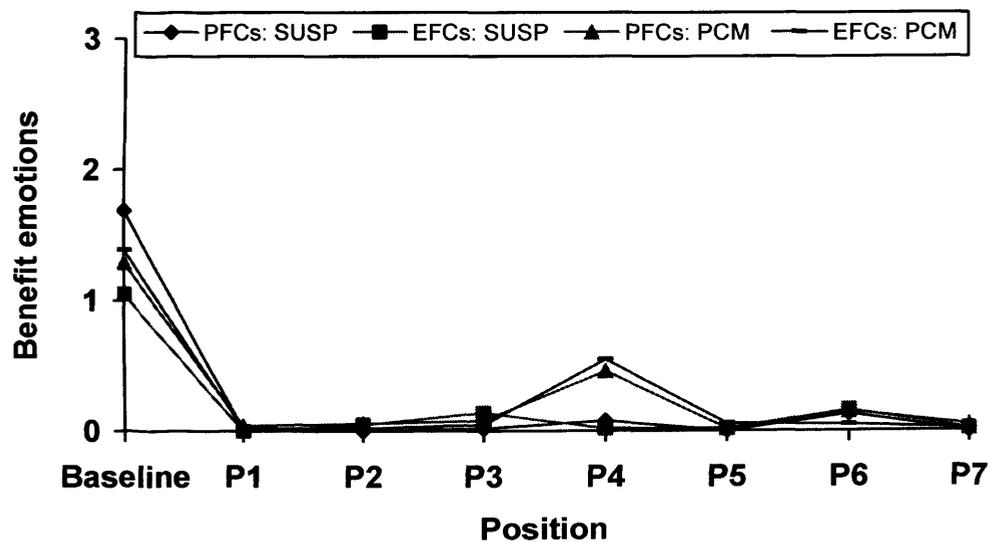


Figure 50. Mean scores for benefit emotions in each Position by Group and Condition

The significant three-way interaction on benefit emotions (see Table 48, page 331, Figure 50, page 335) showed that PFCs in the SUSP condition reported significantly more benefit emotions at Baseline than did EFCs in the SUSP condition ( $p < .01$ ). PFCs and EFCs in the PCM condition reported significantly more benefit emotions at Position 4 than PFCs and EFCs in the SUSP condition ( $ps < .05$ ).

3. *Summary of ANCOVAs on uncertainty and threat emotions.* To establish whether significant main effects of Condition remained after controlling for differences between Conditions on STAI-T and LOT-R optimism scores STAI-T and LOT-R optimism were entered into analyses as separate covariates.

A. STAI-T: STAI-T was not a significant predictor of uncertainty emotions,  $F(1, 43) = 2.99, p > .05$ , but STAI-T significantly predicted threat emotions,  $F(1, 43) = 4.95, p < .05$ . Controlling for STAI-T reduced the significant main effect of Condition on threat emotions to marginal significance,  $F(1, 43) = 2.78, p < .10$ .

B. LOT-R optimism: LOT-R optimism was not a significant predictor of uncertainty emotions,  $F(1, 43) = 3.46, p > .05$ , nor threat emotions,  $F(1, 43) = .00, p > .05$ .

In summary, there were significant effects of Position on emotional reactions, with participants reporting more positive (less negative) reactions at Baseline than in any Position, regardless of Group or Condition. PFCs reported more positive emotions than EFCs at Baseline only, and the PCM condition reported significantly more positive emotions than the SUSP condition at Position 4, regardless of Group.

## **Discussion**

This study saw the first application of the USP as an experimental paradigm to examine the influence of specific factors on the ways in which people cope with stressful situations. In the present study, the USP was employed as a means of examining the influence of dispositional and situational factors on situational coping during a period of unresolved stress. Participants were assigned to coping groups on the basis of their dispositional coping style (i.e., emotion-focused, problem-focused). One week later, they were randomly assigned to receive either the standard version of the USP or a version in which a manipulation intended to increase situational (re)appraisals of personal control was added at Position 4. The results of the present study showed that ratings for situational appraisals of personal control at Position 4 by participants who received this manipulation were significantly higher than ratings by those who did not. This suggests that the personal control manipulation had effectively increased the said situational appraisals. However, as Deck and Jamieson (1995) found when they manipulated aspects of the situation in their scenario study, the manipulation of personal control did not have a unique effect on situational appraisals of personal control. Instead, the manipulation also influenced situational appraisals of challenge and uncontrollability, such that appraisals at Position 4 were more positive than appraisals of other scenarios. It would therefore be more accurate to say that this experimental manipulation had generated more positive (re)appraisals of Position 4 than that it had (only) increased appraisals of personal control.

The first hypothesis tested in the present study was that dispositional coping style would determine situational coping at all times, with PFCs always reporting more problem-focused coping than EFCs and EFCs always reporting more emotion-focused coping than PFCs. This hypothesis was not supported for problem-focused strategies. PFCs did not

report more situational problem-management strategies than EFCs, and only reported more situational problem-appraisal coping than EFCs at Pretest and Position 1. As Pretest differences would be due to the method of assignment to coping groups, the results for situational problem-focused strategies provide very weak support for the proposal that a dispositional reliance on problem-focused coping means that PFCs would always report more situational problem-focused strategies than EFCs. The influence of dispositional coping style on situational emotion-focused coping received more support. EFCs reported more emotional expression coping than PFCs at all assessments apart from the Pretest session where, although differences were in the expected direction with EFCs apparently reporting more emotional expression coping than PFCs, the difference was only marginally significant. EFCs also reported more situational escapism than PFCs at all assessments but one. The exception for escapism was at Position 4, which was likely due to an effect of the experimental manipulation of situational appraisals. All participants who received this manipulation reported less escapism at Position 4 than those who did not (regardless of dispositional coping style). There was no other support for the influence of situational (re)appraisals on situational coping other than this single effect on escapism. Although analyses on appraisals clearly showed that those who received the personal control manipulation appraised Position 4 as more amenable to personal control than those who did not, there were no significant differences in situational problem-management, problem-appraisal or emotional expression coping at Position 4 between participants who appraised this situation as more controllable and those who did not.

These results of the present study provide stronger evidence for dispositional influences than situational influences on coping. As predicted according to the ‘dispositional hypothesis’, situational reports of emotion-focused strategies were

consistently higher in EFCs than PFCs. Further, even though there was an influence of situational appraisal on situational escapism, this was transient, having only affected coping at Position 4, whereas dispositional influences had a consistent influence on situational emotional expression and escapism strategies. Moreover, after Position 4, EFCs reverted back to a greater use of escapism than PFCs, suggesting that a dispositional emotion-focused coping style is a more *pervasive* influence on situational coping than are situational appraisals.

Further support for a dispositional influence on coping comes from two other findings. First, at Pretest, EFCs were more trait anxious and pessimistic than PFCs, which is in line with proposals that more pessimistic individuals would generally employ more emotion-focused strategies to help them cope with the distress aroused by their negative expectations (Carver et al., 1989; Scheier & Carver, 1987). Second, controlling for trait anxiety and dispositional optimism affected the results showing differences between PFCs and EFCs in the ways they coped with the events described in the USP. Trait anxiety significantly predicted escapism and controlling for this trait characteristic removed the significant effect of dispositional coping style on situational escapism, whereas dispositional optimism significantly predicted problem-appraisal coping. Controlling for dispositional optimism removed the effect of trait coping style on problem-appraisal coping. These findings provide some evidence to support proposals that dispositional characteristics influence the ways in which people cope with stressful situations.

Together, the findings regarding the effect of dispositional coping style and trait characteristics on coping versus those regarding the effect of situational appraisals on coping strongly suggest that dispositional factors are the key determinant of the coping strategies people use during stressful situations. There is one caveat, however. There was an

indication that situational (re)appraisal of Position 4 *did* have an influence on the use of escapism by EFCs, although this was not sufficiently strong to generate a three way interaction in the present study. It may simply be that the manipulation of situational appraisals may not have been strong enough to permit the true influence of situational appraisals on coping to become evident, rather than that situational appraisals do not influence situational coping.

Because dispositional optimism, trait anxiety, and dispositional coping style were assessed together, it is not possible to draw conclusions about whether any of these dispositional characteristics uniquely predicted situational coping. In line with the conclusions drawn in Study 1, it may be that all of these trait characteristics are indicators of a broader trait complex (e.g., neuroticism), comprising stable expectations, a predisposition to become anxious, and dispositional coping styles, which combine to influence situational coping. The present prospective study also provided additional information about potential neuroticism effects that were not available in Study 1. In the present study, trait variables were assessed one week before participants completed any assessment of emotions, yet the results showed that trait anxiety was significantly related to threat emotions at the later assessment. These results suggest that, as proposed by Costa and McCrae (1987), aspects of neuroticism may influence the emotions an individual experiences in a stressful situation, as well as the coping strategies they employ.

The next important contribution provided by the present study, is that it confirms the wisdom of looking at the effects of neuroticism by examining individual facets of neuroticism (e.g., dispositional optimism, trait anxiety, coping), rather than treating this trait complex as a homogenous whole. In the present study, trait anxiety was a significant predictor of escapism (but not problem-appraisal coping), whereas dispositional optimism

was a significant predictor of problem-appraisal coping (but not escapism), which suggests that these constructs are not simply the opposite ends of the same continuum of neuroticism (e.g., Smith et al., 1989; Williams; 1992). The second important finding with regards to the influence of these trait characteristics on situational coping is that trait anxiety predicted coping that is proposed to be less adaptive in uncontrollable situations, i.e., escapism (only), whereas dispositional optimism predicted coping that is proposed to be more adaptive in uncontrollable situations, e.g., problem-appraisal coping (only) (Terry & Hynes, 1998). This provides some support for proposals that trait characteristics might determine coping, with dispositional optimists being more likely to use more adaptive strategies, and those higher in neuroticism being likely to use less adaptive strategies (e.g., Carver & Scheier, 1994; Carver et al., 1989; Costa & McCrae, 1987; Scheier et al., 1986; Scheier et al., 1989; Smith et al., 1989). Furthermore, that neither trait characteristic predicted any situational appraisals suggests that the influence of trait characteristics on situational coping was not mediated by situational appraisals. However, it must be borne in mind that both appraisals were assessed with single-item measures in the present study, which means that it was not possible to ascertain whether these measures assessed appraisals reliably.

The next aim of the present study was to test the hypothesis that emotional well-being would depend on the use of coping strategies that matched the demands of the situation, i.e., that more problem-focused coping in *controllable* situations would have more favourable emotional consequences, whereas more emotion-focused coping in *uncontrollable* situations would have more favourable emotional consequences. There was no consistent support for such proposals in the present study. Participants who used more problem-focused coping did report more positive and less negative emotions than those who used more emotion-focused coping at Baseline, which was appraised as the most

controllable of all situations in the present study. However, at the next point at which situational appraisals of personal control were raised (i.e., Position 4), there were no significant differences between EFCs and PFCs in emotional well-being. Both EFCs *and* PFCs who received the experimental manipulation of appraisals appraised Position 4 as more controllable and reported more positive and less negative emotions than those who did not receive the manipulation. This suggests that appraisals of greater personal control over the situation increase positive emotions, regardless of coping. The final evidence disconfirming proposals that the match between appraisals of personal control and coping would determine emotional well-being was shown by the positive and negative emotions reported at all other Positions. All Positions were appraised as low in control but there were no significant differences between EFCs and PFCs in emotional well-being. The events at all Positions elicited more negative and less positive emotions, regardless of whether situational coping was problem-focused or emotion-focused. Therefore these results suggest that rather than the match between situational appraisals and coping explaining emotional well-being, that situational appraisals can influence emotions, regardless of coping.

Together, the results of the present study provide very weak support for proposals that (1) situational appraisals of controllability influence the coping strategies that people employ and (2) the match between coping strategies and situational appraisals of control explains adjustment to the situation. Instead the results of the present study provide stronger evidence that dispositional rather than situational factors are the key influence on situational coping.

## **Conclusions**

The main purpose of Part III was to develop an experimental paradigm emulating an unresolved stressful experience that could be employed in laboratory research examining influences on coping with stressful experiences. The results of Studies 3, 4 and 5 strongly support the USP as an effective experimental paradigm to be used for this purpose. First, Study 3 showed that the scenarios which make up the USP were as demanding as each other in terms of the extent to which they emulated situation properties common to stressful situations and were appraised as threatening, uncontrollable and so on (Lazarus & Folkman, 1984). Combined with the randomised presentation of scenarios in the USP, this meant that it is possible to assert that differences or changes in reactions over time are due to the influence of time (Study 4) or an experimental manipulation (Study 5), rather than to scenario content or order effects.

Second, reactions to the events described at event onset (Position 1) in terms of increased negative appraisals and emotions suggests that the USP had engaged the coping process (Study 4). Further, that appraisal-emotion relationships held across the USP in theoretically predicted directions suggests that appraisals and emotional reactions behaved as one would expect throughout the USP. Moreover, the results of Study 4 suggested that the USP had some similar effects to a learned helplessness paradigm, as some appraisals and emotional reactions became more negative as the uncontrollable and distressing events described in the USP persisted..

Third, the main purpose of developing the USP was as a means of testing experimental hypotheses regarding the influence of particular factors on coping. The practicality of the USP as an experimental paradigm for this purpose was shown in Study 5. Because of the rigorous experimental control the USP affords, it was possible to draw firm conclusions about whether dispositional coping style or appraisals of the situation were the

key determinant of coping and emotional well-being during this unresolved, stressful experience. Specifically, it can be asserted that a manipulation of situational control appraisals *only* was the *only* difference in the information received by participants in the two experimental conditions in the present study. Outside of the laboratory, a myriad of influences other than situational control appraisals might influence situational coping (e.g., a wider range of coping options) and it would never be possible to assert that situational control appraisals (only) had influenced situational coping. Further, it would be difficult to be sure that a baseline measure of appraisal, coping, or emotions during a naturalistic stressor of this nature would not be influenced by existing coping with such a traumatic event. Together the results of the Studies 3 – 5 strongly validate the USP as a means of investigating the ways in which people cope during periods of unresolved stress.

## **Chapter 7**

### **General Discussion.**

#### **7.1 Chapter overview**

This Thesis comprised three lines of research, organised into three sections: Part I, II, and III. My aim for this General Discussion is to review the main findings of the research presented in this Thesis, to discuss the implications of these findings and to propose potential directions for future research. Finally, I will conclude this discussion with my thoughts about what the findings in this Thesis suggest about the power of positive thought.

#### **7.2 Recapitulation**

The three lines of research in this Thesis have a common thread, which is the importance of positive thinking in stressful situations. “Positive thinking” was conceptualised in different ways in each of Parts I – III. In Part I, positive thinking was construed as a cognitive orientation towards expecting positive outcomes in life (i.e., dispositional optimism; Scheier & Carver, 1985). In Part II, positive thinking reflected an effortful cognitive coping process aimed at deriving benefit from a difficult situation (i.e., positive reappraisal coping; Folkman, 1997). In Part III, positive thinking was conceptualised as cognitive appraisal that a situation had changed for the better (i.e., positive (re)appraisal of the situation; Lazarus & Folkman, 1984). The outcomes of interest in each section differed somewhat, but all represented elements of the theoretical model of the coping process advanced by Lazarus and Folkman (1984) and extended by Folkman (1997). Part I examined the impact of person characteristics on outcome (biological

response to fertility treatment), Part II examined the influence of positive reappraisal coping on psychological (e.g., emotional well-being) and physical outcomes (e.g., pregnancy), and Part III examined whether positive (re)appraisals of the situation influenced situational coping and emotional well-being.

### **7.3 Main findings and implications**

#### **Part I: Dispositional optimism and physical health**

Part I of this Thesis examined the influence of dispositional optimism on women's biological response to IVF treatment prior to fertilisation and embryo transfer (Study 1). The aim was to establish whether, in line with theory (Scheier and Carver, 1987) and prior research (e.g., Lobel et al., 2000; Scheier et al., 1989; Scheier et al., 1994) dispositional optimism had direct beneficial effects on physical health outcomes. In Study 1, dispositional variables were assessed some weeks before IVF treatment and biological indicators of women's physical (ovarian) response to IVF treatment were the physical health outcomes of interest. The results of two types of statistical analyses in Study 1 pointed to the same conclusion about the effects of dispositional optimism on physical outcomes in this context. That is, dispositional optimism did not uniquely predict physical outcomes for women undergoing fertility treatment. Instead, Study 1 clearly showed that a trio of trait characteristics (dispositional optimism, trait anxiety, escapist coping) shared sufficient variance with one another that none were unique predictors of ovarian response when the influence of the others was taken into account. The finding that a more maladaptive, avoidant style of coping with infertility (e.g., Terry & Hynes, 1998) was prospectively related to poorer biological fertility outcomes in Study 1 supports prior research by Demyttenaere and colleagues (1992, 1998), who found that other forms of

emotion-focused coping (palliative coping, avoidance, expression of negative emotions, depressive coping), were associated with lower pregnancy rates in their prospective studies. Further, in line with the research by Demyttenaere et al. (1992), who found negative effects of poorer emotion-focused coping on IVF outcomes prior to fertilisation, Study 1 suggests that a maladaptive coping style, along with other neuroticism indicators (anxiety, pessimism) may impact on the very biological responses to fertility treatment that could otherwise lead to pregnancy.

The findings of Study 1 are in line with the arguments of critics of the dispositional optimism construct (e.g., Smith et al., 1989), who argued that dispositional optimism shares variance with other trait constructs. Study 1 makes an important contribution to the literature regarding the influence of psychological factors on physical well-being as it clearly showed that aspects of neuroticism have a meaningful effect on objective physical outcomes during fertility treatment. The implication of this finding is clear. Neuroticism is more than just a “nuisance variable” that contaminates symptom self-report (Costa & McCrae, 1987; Watson & Pennebaker, 1989), but instead may have some important influences on women’s reproductive health. The main practical implication of this finding was that it seems imperative to direct efforts towards reducing the impact of neuroticism on physical response to fertility treatment. IVF treatment is stressful, invasive, and expensive and has success rates which mean that around 75% of women undergoing this procedure will not become pregnant. Developing an intervention that would help to alleviate stress during IVF treatment would be a worthwhile endeavour in itself, but if this intervention impacted on the neuroticism system such that the intervention had secondary benefits on physical IVF outcomes, it would be a valuable addition to the routine care women receive

during IVF treatment. This practical application for the findings of Study 1 was pursued in Part II of this Thesis.

Part II: Positive reappraisal coping, emotional well-being, and physical outcomes.

Part II (Chapter 4) saw the development and validation of a theoretically derived coping intervention (the PRCI), which was designed to promote meaning-based coping (Folkman, 1997). The rationale behind developing the PRCI was that if the effects of one aspect of neuroticism (i.e., maladaptive emotion-focused coping) could be redressed by promoting adaptive coping (Terry & Hynes, 1998), this may reduce women's experience of psychological distress during treatment and have secondary benefits on biological processes leading to pregnancy.

The main aim of Study 2 was to establish whether an intervention that was designed to promote one such adaptive coping strategy (positive reappraisal coping, encouraged by the statements on the PRCI) had beneficial effects on women's psychological well-being during a particularly stressful stage of IVF treatment: the 14 day waiting period between IVF embryo transfer and pregnancy test (Boivin & Walker, 1997). The secondary aim was to establish whether this intervention increased pregnancy rates. Study 2 showed that although this simple, self-administered, pocket-sized intervention card did not have strong effects on positive reappraisal coping, there was a trend suggesting that the women who received the PRCI had sustained positive reappraisal coping during the IVF waiting period, unlike women who did not receive the PRCI. Women receiving the PRCI also reported more emotional expression coping, which is considered to be an adaptive way of coping with low-control stressors (Stanton et al., 2002; Terry & Hynes, 1998). Importantly, compared to women receiving control interventions, women in the

PRCI group perceived that the PRCI had helped them to carry on or keep going during the waiting period, and had helped them to feel 'better' on a daily basis. The results of Study 2 therefore support proposals that one benefit of meaning-based coping is that it helps to sustain the coping process during stressful life-experiences (Folkman, 1997). Study 2 also showed that women thought the PRCI had reduced the stress of the IVF waiting period and had helped them to feel more positive at this stressful time. These findings are a noteworthy first achievement for the PRCI, and make an important contribution to the literature regarding the benefits of positive reappraisal coping during difficult experiences.

However, although Study 2 provided some evidence that the PRCI had influenced the use of adaptive coping strategies (e.g., Folkman, 1997; Sears et al., 2003; Stanton et al., 2002) during the waiting period there was no evidence that women receiving the PRCI experienced greater emotional well-being as a result. A number of methodological and physiological reasons for the absence of PRCI benefits on emotional well-being have already been discussed in Study 2. Therefore I will concentrate here on the implications of this finding in terms of the central principles of the goodness of fit hypothesis: (1) that situational demands (e.g., controllability) influence the coping strategies people employ, and (2) that a 'good fit' between the coping strategies employed and the demands of the situation benefits psychological well-being (e.g., Forsythe & Compas, 1987; Park et al., 2001; Terry & Hynes, 1998). Study 2 supports the first proposal regarding goodness of fit. Women (re)appraised the IVF waiting period more negatively (e.g., as low in control) as the day of the pregnancy test approached, and their daily coping changed at the same time such that they reported less problem-focused and more emotion-focused strategies as the pregnancy test drew near. This provides clear support for the first principle of the goodness of fit hypothesis that situational appraisals determine situational coping, with emotion-

focused coping being used more, and problem-focused coping less in situations that are not amenable to personal control. However, Study 2 provides no support for the second principle of goodness of fit, i.e., that appropriate coping to match situational appraisals leads to better adjustment, as women's emotional well-being deteriorated as the pregnancy test drew near. Further, when the findings of Study 2 regarding the PRCI group alone are considered, no support for the goodness of fit hypothesis was found. Women who received the PRCI appraised the waiting period as more amenable to personal control than other women and reported coping strategies that were expected to be of greater benefit to emotional well-being at this time. However, there was no evidence that the PRCI helped to reduce negative emotions or increase positive emotional well-being.

Study 2 therefore provides weak support for the principles of goodness of fit and for proposals that positive reappraisal coping has beneficial effects on psychological well-being (e.g., Folkman, 1997; Folkman & Moskowitz, 2000; Moskowitz et al., 1996). One explanation for the lack of support for these proposals is that the imminent pregnancy test represents such a 'strong situation' that efforts to cope do not over-ride this situational demand sufficiently to benefit emotional well-being. Further, past research showing associations between meaning-based coping and positive affect were conducted over considerably longer periods than that represented by the IVF waiting period and assessment of psychological well-being in these studies involved aggregation over longer periods than in the present research. It may be that if the effects of positive reappraisal coping on emotional well-being were aggregated over a longer period of time during fertility treatment, such benefits of positive reappraisal coping would become evident. A worthwhile future direction for the PRCI in the context of fertility treatment would be to extend the period in which the PRCI is used so that positive reappraisal coping is promoted

as early as possible. This may help to balance out the “rollercoaster” of emotional demands dictated by different stages of IVF treatment and give a fuller picture of the benefits of positive reappraisal coping on emotional well-being during fertility treatment.

A second unexpected finding in Study 2 was that women who received a modified version of an extensively used positive mood induction procedure (Velten, 1968) showed a less positive response to this intervention, both in terms of their daily reports of psychological and physical reactions to the waiting period and their retrospective evaluations of the PMI. When designing Study 2 it had been expected that the real test of the PRCI would be against the PMI, in view of possible demand characteristics and genuine benefits engendered from reading positive statements. However, the results of Study 2 suggest that the PMI did not have any beneficial effects on psychological well-being during the IVF waiting period compared to the PRCI or to daily monitoring alone. Although covariate analyses suggested that the more severe vaginal bleeding in the PMI group explained the differences between groups in their pessimistic expectations of achieving a pregnancy and their experience of emotions associated with a negative outcome, controlling for physical symptoms associated with imminent treatment failure or pregnancy did not alter the results with respect to daily appraisals of the waiting period or daily coping strategies. My interpretation of the finding that the PRCI had benefits on these psychological variables over and above the PMI is that it suggests that all positive thoughts during stressful experiences are not the same.

The differentiation between PRCI and PMI effects on psychological well-being may perhaps be understood in terms of commonalities between benefit finding and self-affirmation techniques on the one hand, and differences between these and positive reappraisal coping on the other. Sears et al. (2003) found that positive reappraisal coping,

but not benefit finding or counting benefits had positive effects on psychological outcomes in women living with breast cancer, and suggested that this dissociation between the effects of positive reappraisal coping and benefit-finding may be because benefit-finding is habitual and effortless, rather than effortful as must be the case with positive reappraisal coping. In other words, just because one can list or count the good points of a difficult experience does not mean that one believes these points really matter and truly appreciates their value.

In this respect the opinions of Sears et al. (2003) regarding benefit finding and those of Meichenbaum (1977) and Lazarus (1999) about the ineffectiveness of a particular therapeutic approach focusing on self-affirmational, self-instructional or self-referent statements may share some common ground. This latter approach is associated with Coué who, in the early 20<sup>th</sup> century, developed the famous self-statement “Every day in every way I’m getting better and better”. Lazarus (1999, p. 276) describes such statements as “routine and emotionless litanies”, and Meichenbaum (1977, p. 160) asserts that such a formulaic “psychological litany” simply leads to “rote-repetition and emotionless patter”. Meichenbaum proposes that self-instructional statements are ineffective because they are too general, insensitive to the precise demands of the situation, and have transient effects. Further, he argues that such litanies will be ineffective in the face of a challenge that contradicts the self-statements one is repeating (e.g., a time when a behaviour or feeling, etc., is perceived to be worse, not better than before). Such a contradiction between self-statements (ideal) and reality may explain the difference between PMI and PRCI effects in Study 2. Whereas PRCI statements communicate an understanding that women may be having a difficult time, PMI statements may be interpreted as suggesting that women *should* be feeling great, happy, creative, and so on, contrary to their actual feelings.

Reactivity to this contradiction between actual and ideal feelings may explain the detrimental effects of the PMI.

Although the PRCI and PMI cards both used self-statements, the PRCI had some benefits compared to the PMI (and to daily monitoring alone), which suggests that the PRCI does *not* fall into the category of ineffective self-instructional techniques. Instead, it is proposed here that differences between PRCI and PMI effects are *because of the differences in the statements on the cards*. Whereas PMI statements are of the positive self-affirmational variety (e.g., I really do feel good, I feel great), PRCI statements (e.g., I will focus on the benefits and not just the difficulties) seem, as intended, to require cognitive effort to apply (i.e., by both identifying and *focusing on* beneficial aspects of a difficult situation). That women regularly read the PRCI may have prompted repeated efforts to focus on benefits, and this regular, deliberate positive focus may explain why PRCI effects were superior to PMI effects. Indeed, to reiterate Sears et al. (2003, p. 494), it is “the *effortful and regular* use of benefit-related information as a coping strategy (i.e., positive reappraisal coping) ...that predicts future physical and psychological well-being” and not “...the *simple identification* of benefit (i.e., benefit finding)” (italics added). It is proposed here that benefit-finding and self-statements may be linked in the sense that they both reflect effortless, habitual or routine exercises, but that they both diverge from positive reappraisal coping statements because the latter require cognitive effort before benefit is derived. In other words, the cognitive underpinning (e.g., level of processing) required to *derive* benefit may be greater than that required to *count, list or repeat* benefits. Such processing may explain the benefits of the PRCI over the PMI in the present study, and why positive reappraisal coping was more beneficial than benefit finding in research by Sears et al. (2003). As a conclusion to these proposals I will extend the words of

Meichenbaum (1977, pg. 160)... “Saying the right things to yourself may not be a sufficient condition for change” by adding, you *have to mean it before it helps*.

### Part III: Disposition and positive (re)appraisal of the situation

Part III of this Thesis comprised Studies 3, 4, and 5. The main purpose of this series of studies was to develop and test an experimental paradigm emulating an unresolved stressful experience. The intention was that this would be used in future research investigating hypotheses about factors that influence the ways in which people cope and their psychological well-being. This novel paradigm comprised a number of scenarios describing a series of hypothetical incidents that might occur after a loved one was critically injured in a road traffic accident. After preliminary validation and revisions to this Unresolved Stressor Paradigm (USP), the first test (Study 3) was to establish whether the individual scenarios which made up the USP were equivalent in the extent to which they emulated properties common to stressful situations (e.g., novelty, uncertainty, unpredictability; Lazarus & Folkman, 1984).

Study 3 showed that this aim was achieved, and this made it possible to assert that differences in reactions to scenarios when they were combined to form the USP would not be due to differences in how stressful each scenario was. Further, developing a computer programme which permitted scenarios to be presented in a random order made it possible to assert that order effects would not account for any findings in later research. The next test of the USP involved establishing whether appraisals and emotional reactions to this representation of an ongoing period of unresolved stress would change over time in theoretically meaningful ways (Study 4). . Study 4 showed that appraisals and emotional reactions to the USP became, and remained, persistently negative in response to the

stressful experience described, and that appraisal-emotion relationships were maintained throughout in a theoretically meaningful way (Lazarus & Folkman, 1984). These findings suggested that the USP had engaged the coping process and influenced emotions via appraisals and (re)appraisals of the situation described. The main finding from Study 4 was that situational (re)appraisals of personal control became immediately more negative in response to the onset of this stressful experience and remained that way throughout. Moreover, (re)appraisals of ability to cope steadily deteriorated over time in the face of persistent (re)appraisals that the situation could not be controlled and negative emotional reactions. The implications of this finding are that persistent (re)appraisals that a situation cannot be controlled has a detrimental effect on emotional well-being and eventually undermines an individual's ability to cope. This finding suggested the next test for the USP, which was as a means of examining proposals that situational coping mediates the effects of situational control appraisals to influence psychological well-being. Therefore the first application of the USP was in a test of the "goodness of fit" hypothesis (Study 5).

The purpose of Study 5 was to determine whether dispositional or situational factors were the key determinant of situational coping and emotional well-being during stressful situations. A manipulation designed to influence situational (re)appraisals of personal control was added to the USP and the effects of increasing (re)appraisals of personal control on situational coping was examined. The competing hypothesis tested in Study 5 was that dispositional coping style would determine situational coping. The results of Study 5 showed little support for the principles of the goodness-of-fit hypothesis. Situational (re)appraisals did not influence all types of coping and there was little evidence that the match between situational appraisal and situational coping influenced emotional well-being. Instead, in line with the proposals of Carver and Scheier (1994) and Carver et al.

(1989), dispositional coping style was shown to be the pervasive influence on situational coping in Study 5. Together, Studies 3, 4, and 5 strongly validated the USP as an effective paradigm emulating a period of unresolved stress and demonstrated that the USP has practical implications as a means of examining factors that explain why people cope as they do and the effects of coping on adjustment.

Another important finding from Study 5 was that the effect of dispositional coping style on situational coping was partly explained by the influence of other trait characteristics. This finding is in line with Study 1 which showed that this trio of trait characteristics (trait anxiety, dispositional optimism, dispositional coping) combined to influence outcomes. Further, the recommendation made in Study 1, which was that the influence of these neuroticism indicators should be examined separately in order to establish whether they have unique effects on different outcomes was supported by Study 5. Trait anxiety was a significant predictor of escapism (but not problem-appraisal), whereas dispositional optimism was a significant predictor of problem-appraisal (but not escapism). The implication of this finding is clear. Neuroticism is not a homogenous psychological entity which predicts both positive and negative outcomes in different directions.

#### **7.4 Summary**

It is appropriate at this point to summarise the findings presented in this Thesis with respect to the person-situation controversy. The above results suggest that both dispositional and situational factors have an important influence on psychological and physical outcomes in stressful circumstances. First, the influence of disposition on well-being is clear, as this research showed that dispositional attributes impacted on both coping and on physical outcomes. Second, the evidence suggests that the situation matters

enormously, especially when the outcome of that situation has far-reaching implications for the future of the individual and their life-goals (i.e., pregnancy and parenthood). Therefore, it is strongly recommended that researchers should bear the importance of both dispositional and situational factors in mind when examining the ways in which people cope with stressful situations and their psychological and physical well-being. Neither the impact of disposition nor the impact of the situation should be overlooked in favour of the other.

### **7.5 Limitations**

It is important to acknowledge some general limitations which should be born in mind when interpreting the results presented in this Thesis. One limitation relates to the use of adapted, newly developed, and single item measures in this research. In particular, the aim was that studies assessing coping in this Thesis should be consistent in terms of the assessment of the four Terry and Hynes coping constructs introduced in the initial discussion of the coping process (see pages 14 – 16). However, the *versions* of questionnaires assessing these constructs were not consistent between studies. Although Studies 1, 2 and 5 all refer to the four coping constructs of problem-management, problem-appraisal, emotional expression and escapism, following the method of Terry and Hynes (1998), the measure used to assess each construct differed in each of these studies. Moreover, the reliabilities for the adapted scales were sometimes lower than is generally accepted to indicate satisfactory scale reliability. Therefore, the results obtained using adapted scales in this Thesis should be interpreted cautiously when alpha reliabilities were less than satisfactory. A lesson learned from this issue is that it may be unwise to adapt existing measures with a history of satisfactory reliability, because doing so may have a

detrimental impact on the reliability of the adapted scales and hence the interpretation of results obtained using the scales.

In addition, a number of single-item measures were used in this Thesis. These were generally employed to prevent participants being overburdened by full measures of the constructs of interest, especially when these were measured frequently over a short space of time. However, it is difficult to be sure that single items that are developed for a study, or that are selected or adapted from existing subscales are valid or reliable measures of the construct of interest. Even when the results obtained were as predicted for a particular variable (e.g., negative appraisals assessed by single-item measures increased in the last few days before the IVF pregnancy test in Study 2), it is not possible to ascertain whether participants were responding to a *specific* appraisal or just to the positive or negative connotations of the item wording. It is therefore recommended that future research includes multiple-item subscales wherever possible to ensure that the variables of interest are measured reliably. However, the evidence presented in this Thesis suggests that single-item measures have effectively captured the predicted imminence effects on appraisals and coping in the IVF waiting period, as well as differences between emotion-focused and problem-focused copers in their reactions to the USP. These findings provide support for the validity of the single-item measures used in this Thesis.

Another general limitation of the present research (particularly that conducted in the IVF context) is that, for reasons of participant burden, it was not possible to include measures of the many psychological constructs that could potentially have had a positive or negative impact on women's psychological response to fertility treatment. One psychological variable that receives much attention in the fertility literature is depression. As discussed earlier, 12% of infertile men and women scored above the clinical cut-off

point for depression (Lord & Robertson, 2005), 17% of women met clinical criteria for reactive depression after failed IVF (Litt et al., 1992), and 19.4% of women had depression scores indicating that they were moderately depressed prior to IVF treatment (Demyttenaere et al., 1998). In addition, Lord and Robertson (2005) reported that couples perceived that they had little control over their infertility and little faith that treatment would work, and around half of the couples thought that chance, stress and age (i.e., uncontrollable factors) were responsible for their infertility. Together this evidence indicates that depressive symptomology is likely to be experienced fairly commonly by women undergoing fertility treatment, and raises questions about whether depression could have impacted on the results obtained in this Thesis.

This issue may be particularly pertinent to Study 2, where a positive reappraisal coping intervention and a positive mood induction intervention did not have the expected benefits on women's emotional well-being. In other words: might it have been the case that these interventions did not improve women's emotional state because women were too depressed for brief, self-administered intervention cards to have improved their state of mind? Because a depression measure was not included in Study 2, a definitive answer about whether or not depression affected women's response to the PRCI or PMI cannot be given. Only 8.5% of women in Study 2 reported that they had sought help from a mental health professional at some point in time, and only one woman was taking medication to help with her difficulties (this participant was excluded from analyses). Therefore it may be the case that fewer women in Study 2 than in the research by Lord and Robertson (2005), Litt et al. (1992), and Demyttenaere et al. (1998) had significant mental health issues. In addition, research by Boivin and Walker (1997, see Figure 6, page 84) indicates that depressed affect increased sharply in the days immediately prior to the IVF pregnancy test

and did not begin to diminish until the third day after the test. This represents the period of IVF treatment when the outcome of treatment is most salient to women and when the majority of them will have cues and confirmation that treatment has failed. In this respect, depressed affect mirrors the concept of negative outcome emotions (i.e., harm emotions; Folkman & Lazarus, 1985; Lazarus & Folkman, 1984), and such depression may be reactive (and indeed entirely normal) rather than necessarily reflecting a pre-existing clinical mental health condition. However, future research investigating psychological outcomes in infertile women may benefit from including a measure of depression as a matter of routine, in case this mental health issue has an unforeseen impact on study outcomes.

## **7. 6 Future directions**

*The PRCI:* Although it was intended to keep intervention costs to a minimum by providing the PRCI by itself as part of routine medical care, the results of Study 2 do not indicate that the PRCI had as many benefits on psychological well-being as were expected. As women received no information about the purpose of the PRCI or why positive reappraisal coping may be beneficial, a more comprehensive intervention delivery process for the PRCI may help to strengthen PRCI benefits on positive well-being. Providing more detailed information about the value of positive reappraisal coping may help to enhance PRCI benefits by increasing engagement with positive reappraisal, thereby maximising the benefits of this coping strategy on psychological well-being. As discussed in Study 2, one direction for future research might involve a manipulation of personal relevance to help women focus on the positive aspects that are unique to their particular experience. Another line of research could involve providing written information in conjunction with the PRCI.

A leaflet could be provided along with the PRCI which explained possible psychological ‘side-effects’ of medical waiting periods and the potential benefits of positive reappraisal coping in this context. Although not all people may experience exactly the same reactions to medical waiting periods, the effects of imminence in Study 2 and in studies by Boivin and Takefman (1995), Boivin and Walker (1997), Harkness et al. (2003) and Lebel et al. (2003) suggest that deterioration in psychological well-being as an important medical event draws near is a robust phenomenon. Information about possible negative concomitants of waiting in such contexts would give patients the opportunity to engage in anticipatory coping. Moreover, providing the PRCI along with the leaflet would provide a means to help patients with these efforts. Evaluation of the benefits of the PRCI with/out the information sheet would establish whether such information had a positive influence on PRCI effects. If so, such a leaflet may be an inexpensive but worthwhile accompaniment to maximise the benefits of positive reappraisal coping in medical waiting experiences.

*The USP:* One of the main advantages of the USP is that this paradigm will facilitate laboratory exploration of experimental hypotheses about the effects of particular factors on coping and emotional well-being, before the researcher engages in further work with individuals experiencing real life stressors. Such an application for the USP may have particular advantages in the field of applied health research, in which my research interests are grounded. Constraints on access to patient samples and the process of approval to conduct research in applied health settings in the National Health Service are rigorous, and rightly so. However, such constraints mean that it is somewhat ‘wasteful’ to use patient samples in the preliminary stages of hypothesis testing. The USP may offer particular benefits in this regard, because hypotheses about coping and well-being can be explored in

controlled conditions on large numbers of people in the laboratory before beginning research in naturalistic health contexts.

One future direction for the USP in this respect would be to employ the USP in the initial stages of planned research, which would determine whether distraction or positive reappraisal coping was a more effective means of coping with brief periods of unresolved stress. Study 2 showed that distraction coping was much used by women during the IVF waiting period, a distraction coping item received the most endorsements and was considered helpful in PRCI-Pilot 1 (see page 106), and women waiting to find out about genetic risk said that they used distraction as a way of controlling their worries about upcoming medical results and found it helpful (Phelps et al., 2006). Because the distraction intervention and the PRCI are both self-administered interventions designed for medical waiting periods, a future direction for the present research is a randomised, controlled trial investigating the relative benefits of the PRCI against this distraction coping intervention.

However, as the results of Study 2 regarding the PMI suggest, it would be important to ensure that any competing intervention evaluated against the PRCI would be likely to have some benefits on the psychological well-being of women during the IVF waiting period compared to routine care. The USP would have potential benefits in endeavours to ensure that this would be the case, as it would permit extensive laboratory testing of the relative benefits of distraction versus positive reappraisal coping before extending the research to patient samples. One idea would be to randomly assign participants to receive either distraction statements (e.g., neutral Velten statements), positive reappraisal statements or no intervention during the USP, in order to establish which was more beneficial. In this way, should either coping intervention be shown to have negative effects

on psychological outcomes compared to routine care, this would be established without causing unnecessary distress to patients who are dealing with a difficult situation.

## **7.7 Conclusions**

At the end of this Thesis, it is appropriate that I address my opening questions to the reader about whether and to what extent positive thinking, defined for the purposes of this Thesis as "...selectively perceiving or interpreting a stressor's implications as positive..." (Goodhart, 1985, pg. 217) has beneficial effects on physical and psychological outcomes. At first sight, the evidence in this thesis provides somewhat weak support for such proposals. First, Study 1 showed that dispositional positive expectations for future outcomes were not a unique predictor of physical health outcomes. Second, positive reappraisal coping did not have beneficial effects on emotional well-being in Study 2. Third, although positive (re)appraisal of the situation did have a positive effect on emotional well-being, this was transient, lasting only as long as the situation dictated (Study 5). Fourth, although it was not expected, positive self-affirmation did not have any positive effects on psychological well-being. However, some benefits of positive reappraisal coping and dispositional optimism were found in the present research. First, positive reappraisal coping helped support women's efforts to cope with an incredibly demanding experience. Second, dispositional optimism was a predictor of coping strategies that have been shown to have beneficial effects on well-being in difficult situations. Therefore it is concluded that positive thinking as a beneficial endeavour is not yet a redundant concept, and I hope that future research will extend and further delineate whether and to what extent positive thinking in difficult circumstances is truly beneficial to well-being.

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**APPENDIX A:**

**Reanalysis of Study 1 LOT data excluding two LOT items.**

Zero-order correlations between LOT (minus 2 items) and other study variables were computed, followed by the regression analyses aimed at highlighting the mediational role of escapist coping and/or controlling for trait anxiety (see Table A.1).

**Table A.1.**

*Zero-order correlations and path coefficients for the original Life-Orientation Test (LOT; Scheier & Carver, 1985) and a revised dispositional optimism variable excluding two items*

<b>Variable</b>	<b>LOT</b>	<b>LOT (minus 2 items)</b>
Trait Anxiety	<b>-.509***</b>	<b>-.441***</b>
Escapist coping	<b>-.382***</b>	<b>-.386***</b>
Problem-management coping	<b>-.109 (p = .144)</b>	<b>-.174*</b>
Problem appraisal coping	<b>.167*</b>	<b>.082 (p = .212).</b>
Ovarian Response	<b>.222*</b>	<b>.229*</b>
<hr/>		
Ovarian response (controlling for trait anxiety)	<b>.158 (p = .176)</b>	<b>.172 (p = .125)</b>
Significance of model (controlling for trait anxiety)	<b>F (2, 94) = 3.029, MSE = 6.93, p = .053</b>	<b>F (2, 94) = 3.13, MSE = 6.90, p &lt; .05</b>
<hr/>		
Ovarian response (controlling for escapist coping)	<b>.169 (p = .120)</b>	<b>.178 (p = .103)</b>
Significance of model (controlling for escapist coping)	<b>F (2, 94) = 3.27, MSE = 6.90, p &lt; .05</b>	<b>F (2, 94) = 3.40, MSE = 6.89, p &lt; .05</b>
<hr/>		
Ovarian response (controlling for trait anxiety and escapist coping)	<b>.151 (p = .198)</b>	<b>.161 (p = .156)</b>
Significance of model (controlling for trait anxiety and escapist coping)	<b>F (3, 93) = 2.22, MSE = 6.97, p &lt; .10</b>	<b>F (3, 93) = 2.35, MSE = 6.94, p &lt; .10</b>

As shown in Table A.1, the new optimism variable did not markedly change the relationships between dispositional optimism and other variables. Most remained in the

same direction and retained the level of significance found when using the original LOT, except that the relationship between dispositional optimism and problem-appraisal coping (significant when using the original LOT) became non-significant when the items presumed to measure positive reinterpretation and growth were removed, as one would expect. That optimism is associated with significantly less problem-management coping is consistent with the hypothesis that problem-management coping may be inappropriate in a situation which is not amenable to control (Folkman, Lazarus, Gruen & DeLongis, 1986; Terry & Hynes, 1998). Optimistic individuals may be less likely to employ problem-management coping in a situation (such as IVF) that they cannot control.

The SEM was recomputed using the new optimism variable to establish whether removing these two items reduced the amount of variance accounted for by optimism in the latent dispositional factor. Again, there were no marked differences in indicator loadings, prediction of biological response or fit indices. The standardised coefficients showed that all indicators were significant predictors of their proposed latent constructs. Lambda values ( $\lambda$ ) for the psychological construct had altered from those obtained using the original LOT. The Lambda value for the new optimism value was .52 (previously .57), for trait anxiety was .84 (previously .89) and for escapist coping was .77 (previously .73). Lambda values ( $\lambda$ ) for biological variables still ranged from .70 to .98. Of the psychological indicators trait anxiety still had the highest loading with the latent psychological construct whereas of the biological variables the number of oocytes had the highest loading with the latent biological construct. The psychological dimension significantly predicted the biological dimension ( $\beta = -.38, p < .05$ ). Derived goodness-of-fit statistics were within the range considered acceptable, goodness of fit index ( $GFI$ ) = .96, adjusted goodness of fit index, ( $AGFI$ ) = .88, root mean square error of approximation ( $RMSEA$ ) = .085,  $\chi^2(8, N = 97) = 13.03$  ( $p = .11$ ). Fourteen percent of the variance in ovarian response to IVF was associated with psychological characteristics.

**APPENDIX B:**  
**Questionnaire for PRCI-Pilot 1**

**Imagine you are in this situation:**

Some members of your family have a medical condition that has a significant negative effect on their lives (e.g., cancer). You yourself have no symptoms of the condition but you decide to take a medical test to determine whether you will get it in later life. Because of your family history your doctor does the screening tests. You have to wait two weeks until you will find out the results of these tests.

**Below are some statements about how you may think during the 2 week waiting period:**

For each of these statements please indicate:

Question 1: Whether you would think in this way

Question 2: How helpful it would be to think in this way

Question 3: How positive you would feel from thinking like this

Please tick the box next to the statement for question 1.

Please use the scale below to respond to questions 2 and 3.

1                      2                      3                      4  
Not at all              A little              Very              Extremely

<b>During this experience I will:</b>	1. Would you think this way?	2.Helpful (use scale)	3.Positive (use scale)
Discover what is important in life			
Be inspired to do something creative			
Grow as a person			
Try to do something meaningful			
See the situation in a positive light			
Learn something.			
Find something good in what is happening			
Try to do something that makes me feel good			
Make the best of the situation			
Rely on my faith to help me stay positive			
Concentrate on the benefits the situation can bring to my life today			
Focus on the positive aspects of the situation			
Gain something that is meaningful and important to me			
Try to remember something good and why it was important to me			
Look on the bright side of things			
Focus on the benefits and not just the difficulties			
Look for the silver lining			
See things positively			
Try to think of something meaningful that helps me to get through the day			
Be matter of fact about the situation			
Make a plan of action			
Make light of the situation			
Accept the situation			
Take things one day at a time, one step at a time			
Take a step back from the situation			
Keep busy with other things to take my mind off the situation			

**APPENDIX C:  
Baseline questionnaire for PRCI-Pilot 3**

**Background Information**

**Name** \_\_\_\_\_  
**Termtime** \_\_\_\_\_  
**address** \_\_\_\_\_  
 \_\_\_\_\_  
**Telephone** \_\_\_\_\_  
**E-mail** \_\_\_\_\_  
**Age** \_\_\_\_\_  
**Scheme of study** \_\_\_\_\_  
**Level** \_\_\_\_\_

What do you think your average grade will be for these exams (%)? \_\_\_\_\_

What do you believe are your chances of achieving this grade?

0    10    20    30    40    50    60    70    80    90    100 ( % )

To what extent do the following contribute to your estimate?

**Prior performance**

1                      2                      3                      4                      5  
 Not at all                      Somewhat                      Very important

**Amount of revision**

1                      2                      3                      4                      5  
 Not at all                      Somewhat                      Very important

**Performance in the exams**

1                      2                      3                      4                      5  
 Not at all                      Somewhat                      Very important

**A 'feeling' about how well you have done**

1                      2                      3                      4                      5  
 Not at all                      Somewhat                      Very important

**The difficulty of the exams**

1                      2                      3                      4                      5  
 Not at all                      Somewhat                      Very important



**Help you to look at the situation in a different light?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Help you to ignore the situation?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Help you to make plans for after the results?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Help you think about the situation differently?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Was the intervention:**

**Quick?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Easy?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Did it fit into your daily life?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Did it make you feel better about the experience of waiting for your results?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Did it help you to look at the experience in a more positive light?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Did you think that other people would use it?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Was it difficult to remember to read the card?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

**Did any effects last long enough to be helpful?**

1	2	3	4	5	6
Not at all		Somewhat		Extremely	

Please write any comments you have about the intervention you received in the space below (continue overleaf if you wish).

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**Thank you for your help.**

**APPENDIX E**  
**Demographic and fertility history questionnaire for Study 2**

**A. Background information:**

1. How old are you? \_\_\_\_\_
2. What type of work do you do? \_\_\_\_\_
3. How much formal education have you completed? **Please tick the box that applies to you.**

(no schooling)		(primary education)		(some secondary < 16)	
(secondary ed: O levels/GCSEs)		(secondary ed: A levels)		(At least 1 year uni. ed.)	
(uni. grad: BA/BSc)		(Masters: MA/MSc)		(higher degree: PhD MD)	

4. How many years have you been living with your partner? \_\_\_\_\_ years
5. (a) Have you and your partner had any children together? (Including adopted children)  
**Please circle the appropriate answer** Yes / No **If yes:** How many? \_\_\_\_\_
- (b) Do you have any children from a previous relationship? **Please circle**  
Yes / No **If yes:** How many? \_\_\_\_\_ Do any live with you? Yes / No
- (c) Does your partner have any children from a previous relationship? **Please circle**  
Yes / No **If yes:** How many? \_\_\_\_\_ Do any live with you? Yes / No
6. Do you have any medical problems? (E.g., diabetes, high blood pressure, asthma). Do these cause physical symptoms? What sort of symptoms do you experience?  
\_\_\_\_\_

7. Have you ever seen or are you currently seeing a counsellor, social worker or psychologist for any problem? **Please circle the appropriate answer** Yes / No

**If yes:** Is this related to your fertility problems? Yes / No

Are you taking medication for this problem? Yes / No

**B. Infertility History:**

1. How long have you been trying to get pregnant with your partner? \_\_\_\_\_
2. Do you know why you are having problems becoming pregnant? **Please circle** Yes / No

**If yes to question 2: Tick the box next to the diagnoses that apply to you.**

Normal/unexplained	<input type="checkbox"/>	Endometriosis/scar tissue	<input type="checkbox"/>
Do not ovulate	<input type="checkbox"/>	Other hormonal problem	<input type="checkbox"/>
Tubes blocked	<input type="checkbox"/>	Problem with sperm	<input type="checkbox"/>
Tubal ligation/sterilisation	<input type="checkbox"/>	Previous vasectomy	<input type="checkbox"/>

Other (please describe): \_\_\_\_\_

3. Have you ever had a: **(Please circle the appropriate answer(s))**

- a. Miscarriage? Yes / No      b. Ectopic pregnancy? Yes / No  
 c. Abortion? Yes / No      d. Live birth? Yes / No

4. How long have you been receiving **treatment** for fertility problems? \_\_\_\_\_ (years)

5. Overall, how well do you feel you have been coping with the strains of having fertility problems? **Please circle the appropriate number**

1 (not very well)    2                      3                      4                      5 (very well)

**C. In vitro fertilisation:**

1. (a) How many times have you tried IVF or ICSI? \_\_\_\_\_  
 (b) How many fresh Embryo transfers have you had? \_\_\_\_\_  
 (c) How many frozen Embryo transfers have you had? \_\_\_\_\_  
 (d) Was IVF successful? Yes / No

**If yes:** What was the outcome of IVF?

- a. miscarriage              Yes / No              b. live birth?              Yes / No

Other (please write the outcome here): \_\_\_\_\_

2. What did the doctor say were your chances of conceiving on this IVF cycle? **(Circle the number or write it here)** \_\_\_\_\_

0    10    20    30    40    50    60    70    80    90    100%

3. What do you personally think your chances are of conceiving on this IVF cycle? **(Circle the number or write it here)** \_\_\_\_\_

0    10    20    30    40    50    60    70    80    90    100%

4. How much control do you think/feel you have over the outcome of the pregnancy test? **(Circle the number or write it here)** \_\_\_\_\_

0    10    20    30    40    50    60    70    80    90    100%

**APPENDIX F**  
**The LOT-R**

The following questions are concerned with your attitudes towards life in general. There are no right or wrong answers. Please be as honest and as accurate as you can, and try not to let your answers to one question influence your answers to other questions.

**Indicate the extent to which you agree with each of the following items**

**4 = strongly agree, 3 = agree, 2 = neutral, 1 = disagree, 0 = strongly disagree.**

1. In uncertain times I usually expect the best	4	3	2	1	0
2. It's easy for me to relax.	4	3	2	1	0
3. If something can go wrong for me, it will	4	3	2	1	0
4. I'm always optimistic about the future	4	3	2	1	0
5. I enjoy my friends a lot	4	3	2	1	0
6. It's important for me to keep busy	4	3	2	1	0
7. I hardly ever expect things to go my way	4	3	2	1	0
8. I don't get upset too easily	4	3	2	1	0
9. I rarely count on good things happening to me	4	3	2	1	0
10. Overall, I expect more good things to happen to me than bad	4	3	2	1	0

## APPENDIX G

### Terry and Hynes coping inventory used in Study 2

Listed below are a number of different ways of coping with fertility problems. Read each item and circle the number that reflects the extent to which you have used each strategy when coping with fertility problems.

	1 Not used at all	2 Used rarely	3 Used sometimes	4 Used a great deal			
1.	I daydreamed or imagined a better time or place than the one I was in.....			1	2	3	4
2.	I tried to accept and make the most of the situation.....			1	2	3	4
3.	I thought about what steps to take to deal with my fertility problem.....			1	2	3	4
4.	I talked with friends about how I was feeling.....			1	2	3	4
5.	I knew what had to be done so I did what had to be done.....			1	2	3	4
6.	I took things one day at a time, one step at a time.....			1	2	3	4
7.	I avoided being with people in general.....			1	2	3	4
8.	I wished I could change the way I felt.....			1	2	3	4
9.	I tried to see the positive side of the situation.....			1	2	3	4
10.	I tried several alternatives for handling my fertility problem.....			1	2	3	4
11.	I talked with my partner about how I was feeling.....			1	2	3	4
12.	I set some goals for myself to deal with my fertility problem.....			1	2	3	4
13.	I looked for the silver lining, so to speak.....			1	2	3	4
14.	I refused to believe that it (infertility) had happened to me.....			1	2	3	4
15.	I wished I was a stronger person.....			1	2	3	4
16.	I tried to take a step back from the situation.....			1	2	3	4
17.	I tried to think of ways of dealing with my fertility problem.....			1	2	3	4
18.	I talked with another relative about how I was feeling.....			1	2	3	4
19.	I found out more about my fertility problem.....			1	2	3	4
20.	I tried to look on the bright side of things.....			1	2	3	4
21.	I thought about fantastic things that made me feel better.....			1	2	3	4
22.	I wished I was more optimistic and forceful.....			1	2	3	4
23.	I tried to be more objective about the situation.....			1	2	3	4
24.	I let my feelings out somehow.....			1	2	3	4
25.	I got busy with other things to keep my mind off the problem.....			1	2	3	4
26.	I hoped a miracle would happen.....			1	2	3	4
27.	I accepted it because nothing could be done.....			1	2	3	4
28.	I talked with a professional person (e.g., doctor, clergy, nurse).....			1	2	3	4
29.	I made light of the situation and refused to get too serious about it.....			1	2	3	4
30.	I kept my feelings to myself.....			1	2	3	4

**APPENDIX H**  
**Daily Record Keeping form used in Study 2**

# Daily Monitoring Form

Personal code number.....

Date.....

**Rating scale**

- Not at all: leave the box blank if you have not experienced that symptom
- 1 Mild: if you have experienced the symptom but it doesn't interfere with your daily activities
- 2 Moderate: if you have experienced the symptom and it interferes to some degree with daily activities
- 3 Severe: if the symptom has a markedly negative effect on how well you perform your daily tasks

**Part 3**

- Not at all: leave the box blank if you have not experienced that symptom that day
- 1 Mild: if you have experienced the symptom but it doesn't interfere with your daily activities
- 2 Moderate: if you have experienced the symptom and it interferes to some degree with daily activities
- 3 Severe: if the symptom has a markedly negative effect on how well you perform your daily tasks

**Part 1**

Day of study									
Date									

**Part 2: Emotions**

Nervous									
Positive									
Relieved									
Sad									
Hopeful									
Confident									
Disappointed									
Happy									
Discouraged									
Anxious									
Unsure									
Content									
Tense									
Hesitant									
Fulfilled									
Doubtful									
Uncertain									
Encouraged									
Angry									
Worried									
Optimistic: pregnancy									
Pessimistic: pregnancy									

**Part 3: Physical symptoms**

Breast tenderness									
Chest pain/tightness									
Menstrual cramps									
Shortness of breath									
Muscle tension									
Sweatiness									
Nausea									
Abdominal bloating									
Fatigue/tiredness									
Cold hands/feet									
Racing heart									
Spotting / bleeding									

**Part 4: Ways of coping with the waiting period**

I turned my attention away from treatment by thinking about other things or doing activity									
I made a plan of action and followed it									
I accepted there was nothing I could do									
I did something with the implicit intention of relaxing									
I wished the situation would go away or somehow be over with									
I expressed my emotions									
I tried to make the most of the situation									

**Part 5: Ways of thinking about the waiting period**

I perceive that the waiting period is stressful									
I can control what happens in the waiting period									
The waiting period could have a negative impact on me									
I have what it takes to cope with the waiting period									
The waiting period could have a positive impact on me									

**Part 6: About the intervention card**

1. How many times did you read the card today? (write the total number of times each day)									
2. How did you feel after reading the card? (1 = felt more negative, 2 = felt the same, 3 = t more positive)									

**APPENDIX I**  
**Patient instruction sheet for Study 2**

**“Development and validation of a coping intervention for IVF patients”**  
**Instructions for participants<sup>17</sup>**

Participants in the group you have been assigned to receive a card containing 10 statements. We ask that you read this card at least twice daily, starting on the day after embryo transfer.

On this sheet are instructions to help you remember what to do in this study. All the information you need should be on this sheet, but please feel free to contact the researcher (details below) if you have any questions, concerns or difficulties about the study. This is what you need to do:

**1. Fill in the Coping with Infertility Questionnaire and the Miller Behavioral Style Scale on the day of embryo transfer.** Post them back in the envelope provided.

**2. Fill in the daily monitoring form each day:** Full instructions about how to complete the form are on the back of the form. Women in past studies say that keeping the form on a night table next to their bed helps them to remember to complete it.

Once you have finished the first week of monitoring, put the form in the stamped addressed envelope and post it back to me. Then carry on rating your reactions on the second form.

**3. Read the card each day:** *Starting on the day after embryo transfer*, please read your card (at least) twice a day, for example once in the morning and once in the evening. You may also read it as many other times as you wish.

Continue to read the card at least twice a day, each day, *up to and including the day before your pregnancy test*. The card is small enough to carry with you so you can read it whenever you wish. Remember how many times you read the card each day and put this number on the daily monitoring form.

**NB. In the evening, please read the card after you have completed the daily monitoring form or leave at least 1 hour between reading the card and completing the form.**

**3. Fill in the ‘Intervention Evaluation Form’:** *On the day before your pregnancy test*, please fill in this form, which asks you about your thoughts about the intervention. Post this form back in the envelope along with the second daily monitoring form and the card.

**4. Finally, please remember to post the information back to us as soon as possible.**

**NB. Remember that all information you provide is held in the strictest confidence. We will not discuss your responses with *anyone* without your written permission.**

If you have any questions, please contact me (Deborah Lancaster) or my supervisor Dr Jacky Boivin who will be able to help you. You can reach us at the University (029 2087 4007). If I am not in the office, please leave your name and number with a colleague and I will ring you as soon as I can. If you have a computer, you can also contact me on e-mail: [lancastleds1@cardiff.ac.uk](mailto:lancastleds1@cardiff.ac.uk) and I will e-mail or phone you back as soon as possible.

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<sup>17</sup> These instructions were received by the PRCI and PMI groups only.

**APPENDIX J**  
**Patient instruction sheet for Study 2**

**“Development and validation of a coping intervention for IVF patients”**  
**Instructions for participants<sup>18</sup>**

You have been assigned to Group 3. Participants in Group 3 rate their reactions to waiting for their IVF pregnancy test on a daily basis, using the daily monitoring form. You should start to complete the daily monitoring form on the day after embryo transfer.

On this sheet are instructions to help you remember what to do in this study. All the information you need should be on this sheet, but please feel free to contact the researcher (details below) if you have any questions, concerns or difficulties about the study. This is what you need to do:

**1. Fill in the Coping with Infertility Questionnaire and the Miller Behavioral Style Scale on the day of embryo transfer.** Post them back in the envelope provided.

**2. Fill in the daily monitoring form each day:** Full instructions about how to complete the form are on the back of the form. Women in past studies say that keeping the form on a night table next to their bed helps them to remember to complete it. Complete this form each evening, from the day after embryo transfer *up to and including the day before your pregnancy test.*

Once you have finished the first week of monitoring, put the form in the stamped addressed envelope and post it back to me. Then carry on rating your reactions on the second form.

**3. Fill in the Intervention Evaluation Form’:** *On the day before your pregnancy test,* please fill in this form, which asks you about your thoughts about daily monitoring. Post this form back in the envelope along with the daily monitoring form.

**4. Finally, please remember to post the information back to us as soon as possible.**

**NB. Remember that all information you provide is held in the strictest confidence. We will not discuss your responses with *anyone* without your written permission.**

If you have any questions, please contact me (Deborah Lancaster) or my supervisor Dr Jacky Boivin who will be able to help you. You can reach us at the University (029 2087 4007). If I am not in the office, please leave your name and number with a colleague and I will ring you as soon as I can. If you have a computer, you can also contact me on e-mail: [lancastleds1@cardiff.ac.uk](mailto:lancastleds1@cardiff.ac.uk) and I will e-mail or phone you back as soon as possible.

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<sup>18</sup> These instructions were received by the DRK group.

**APPENDIX K**  
**Intervention evaluation questionnaire used in Study 2<sup>19</sup>**

**Instructions**

For all the following questions, please circle the number that corresponds to the way you think and feel about the intervention card you received.

**1. How helpful was the intervention card that you received?**

1      2      3      4      5      6  
Not at all                  Somewhat                  Extremely

**2. How suitable does this type of intervention card seem to you for this experience?**

1      2      3      4      5      6  
Not at all                  Somewhat                  Extremely

**3. To what extent did the intervention card affect the stress of waiting to take a pregnancy test during IVF treatment?**

**The intervention card made the experience of waiting to take a pregnancy test:**

-3      -2      -1      0      1      2      3  
Much LESS                  It had                  Much MORE  
stressful                  no effect                  stressful

**4. How *confident* are you that the intervention card affected the stress of waiting to take a pregnancy test during IVF treatment?**

1      2      3      4      5      6  
Not at all                  Somewhat                  Extremely

**5. Supposing you had fertility treatment in the future, would you be willing to use this intervention card again?**

1      2      3      4      5      6  
Not at all                  Somewhat                  Extremely

**6. How confident would you be in recommending this intervention card to a friend who was extremely anxious about her pregnancy test result?**

1      2      3      4      5      6  
Not at all                  Somewhat                  Extremely

---

<sup>19</sup> The PRCI and PMI groups received this form. The form received by the DRK group contained the same items but the words 'intervention card' were replaced with the words 'daily monitoring'.

**7. How successful do you feel this intervention card would be in reducing anxiety about a different medical test result; e.g., genetic tests or cancer tests?**

1      2      3      4      5      6  
 Not at all      Somewhat      Extremely

**8. How anxious were you during the waiting period?**

1      2      3      4      5      6      7      8      9      10  
 Not at all      Somewhat      Extremely

**9. How anxious do you think you would have been if you had not received the intervention card?**

1      2      3      4      5      6      7      8      9      10  
 Not at all      Somewhat      Extremely

**10. On the whole, how long do you think any effects of reading the card lasted?**

0 – 20 mins      20 mins – 1 hour      1 – 2 hours      2 – 3 hours      3 hours +

**Did the intervention card:**

**1. Help you to feel more positive?**

1      2      3      4      5      6  
 Not at all      Somewhat      Extremely

**2. Distract you from the situation?**

1      2      3      4      5      6  
 Not at all      Somewhat      Extremely

**3. Help you to think what to do after the pregnancy test?**

1      2      3      4      5      6  
 Not at all      Somewhat      Extremely

**4. Help you to carry on or keep going during this experience?**

1      2      3      4      5      6  
 Not at all      Somewhat      Extremely

**5. Did the intervention card help you to look at the situation in a different light?**

1      2      3      4      5      6      7  
 Yes: it made      It made no      Yes: it made  
 me see it more      difference      me see it more  
negatively           positively

**Was the intervention card:**



**APPENDIX L**  
**Patient information sheet for Study 2**

**Development and validation of a coping intervention for IVF patients**

**Information sheet (November 2004)**

You are being invited to take part in a research study sponsored by Cardiff University, in collaboration with the Cardiff Assisted Reproduction Unit, University Hospital of Wales, Cardiff. Before you decide whether to take part, it is important that you understand why the research is being done and what it will involve. All women starting an IVF treatment cycle will receive this information sheet. Please take time to read the following information carefully and discuss it with others if you wish. The researcher will meet with you on the day of embryo transfer and if you wish to participate, will obtain your written consent at that time. If anything is not clear or if you would like more information, you may telephone the researchers with questions and/or ask the researcher when you meet at clinic on the day of embryo transfer.

**What is the purpose of this study?**

Women who have IVF treatment find the days between embryo transfer and the pregnancy test especially stressful, because they are waiting to find out whether treatment has been successful for them. The aim of this study is to evaluate a new intervention designed to help women feel better at this stressful time.

**Who are the researchers?**

The researchers are Dr. Jacky Boivin and Deborah Lancaster of Cardiff University

**Why have I been chosen?**

In order to find out whether the new intervention helps women feel better when waiting for their pregnancy test during IVF, all women who undergo embryo transfer at the Cardiff Assisted Reproduction Unit are being invited to take part in this study. In total, 156 women will take part.

**Do I have to take part?**

It is entirely up to you whether you would like to take part. Your decision about participating will not affect your fertility treatment. If you do decide to take part but later change your mind, you may withdraw from the study without giving a reason and without any consequences to treatment at the clinic.

**What will happen to me if I take part?**

The study begins on the day of embryo transfer. On embryo transfer day, you will see the researcher and complete six questionnaires, which will take approximately 20 minutes of your time. These questionnaires will help us to determine who might benefit most from the new intervention. One questionnaire enquires about your social and medical situation, for example, your age and fertility history. The other questionnaires concern how you feel generally, both emotionally and physically and how you cope with different stressful life events, including fertility problems. Starting on the day after embryo transfer, and finishing the day before your pregnancy test, you will rate your reactions to treatment daily, on a

form you keep at home (daily monitoring). This will take about 5 minutes of your time each day.

There will be 3 groups of women with differing interventions (questionnaires). Women who take part will be randomly assigned to one of these groups. Each group has an equally important role in helping us to evaluate the new intervention. You will not know during the study whether you are in the group that has received the new intervention. Should you require a next treatment cycle and have not received the new intervention you may receive it in that treatment cycle, if you wish. Two of the three groups will be asked to read a card containing 10 short statements, twice a day. At the end of the study, you will complete a 2-minute questionnaire about your reactions to the card or daily monitoring.

As we are also interested in the relationship between stress levels and physical symptoms, we will also obtain information about your physical response to IVF treatment from your medical records once treatment has finished.

**What are the possible benefits of taking part?**

It is hoped that by reducing stress, the intervention will improve quality of life at this time.

**What are the possible disadvantages of taking part?**

Although filling out a daily form might seem like a hassle, it is the only way we can get accurate information about the impact of the new intervention. However, we have used this form with women in other studies and most find it a helpful way of keeping track of the way IVF is affecting them.

**Will my taking part in this study be kept confidential?**

All the information you provide will be held in the strictest confidence. Each form you fill in is identified only by the personal code number you will be given at the start of the study. Only Deborah Lancaster and Dr. Jacky Boivin have access to the master list that links patient names with code numbers. Both researchers specialise in the psychosocial aspects of infertility. The doctors and staff at the Cardiff Assisted Reproduction Unit WILL NOT have access to *any* information you provide without your written permission.

**What will happen to the results of the research study?**

When the study is finished, the results will be published in psychological journals and presented at conferences. No information that could identify you will be included in any publication or presentation of this study. You may receive a copy of the published results if you wish.

**Who has reviewed the study?**

The South East Wales Research Ethics Committee has reviewed this study.

**Thank you for reading this information. This copy is for you to keep.**

**APPENDIX M**  
**Patient consent form for Study 2**

**Consent Form**

You must carefully read and then sign this Consent Form if you wish to participate in the project called "Development and validation of a coping intervention for IVF patients", described on the Information Sheet (November 2004).

-----

I understand that my participation in this project will involve me completing 6 questionnaires today (around 20 minutes in total). Starting tomorrow, I will complete a daily monitoring form (5 minutes) each day until the day before I take my pregnancy test. I understand that it is important that I complete the daily monitoring form every evening. I understand that I will be randomly assigned to one of three groups with differing interventions (questionnaires) for the duration of the study.

I understand that my participation in this study is entirely voluntary, that my decision regarding participation will in no way affect the medical management of my condition and that I am free to withdraw from the study at any time without consequences to the medical management of my condition.

I hereby give my consent for information about my treatment to be obtained from my medical records after treatment has concluded.

Tick here if you wish to receive a copy of the published results:

I, \_\_\_\_\_ (NAME)  
consent to participate in the study conducted by Deborah Lancaster and Dr Jacky Boivin,  
School of Psychology, Cardiff University with the collaboration of the Assisted  
Reproduction Unit, Heath Hospital.

Signed \_\_\_\_\_ Date: \_\_\_\_\_

Address:

\_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

Telephone: \_\_\_\_\_ Mobile: \_\_\_\_\_  
E-mail \_\_\_\_\_

I, \_\_\_\_\_ certify that I have explained to the above named patients, the nature of the study and that the patient has the option of withdrawing from the study at any time.

Signed \_\_\_\_\_ Date \_\_\_\_\_

**APPENDIX N**  
**Daily Record Keeping (DRK) analyses**

**Table N.1**

*Significant and marginally significant main effects and interactions for daily emotion variables*

Emotion subscale	Main effects			2-way interactions			3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	Day (D) F (6, 474)	G x W F (2, 79)	G x D F (12, 474)	W x D F (6, 474)	G x W x D F (12, 474)
Uncertainty	.27	4.12*	7.52***	1.19	.36	2.44*	.28
Threat	.34	5.40**	7.31***	.69	.85	14.44***	1.03
Harm	2.12 <sup>t</sup>	18.06***	7.54***	4.30**	2.10 <sup>t</sup>	3.47**	1.00
Challenge	.48	74.12***	31.99***	2.13 <sup>t</sup>	.85	8.69***	1.05
Benefit	.35	61.65***	23.19***	.56	1.31	13.01***	1.37

**Table N.2**

*Significant and marginally significant main effects and interactions for daily optimism and pessimism*

	Main effects			2-way interactions			3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	Day (D) F (6, 474)	G x W F (2, 79)	G x D F (12, 474)	W x D F (6, 474)	G x W x D F (12, 474)
Optimism	.50	48.91***	15.30***	.89	.30	2.41*	.89
Pessimism	1.87 <sup>t</sup>	43.96***	12.35***	3.24*	2.51**	2.97**	1.57 <sup>t</sup>

**Table N.3**

*Significant and marginally significant main effects and interactions for daily appraisals*

Appraisal	Main effects			2-way interactions			3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	Day (D) F (6, 474)	G x W F (2, 79)	G x D F (12, 474)	W x D F (6, 474)	G x W x D F (12, 474)
Stress	1.30	16.73***	7.35***	.29	1.77*	10.04***	.68
Threat	1.68 <sup>t</sup>	.46	2.01*	.35	1.70*	4.42***	.32
Ability to cope	1.63 <sup>t</sup>	42.90***	8.67***	1.25	1.50 <sup>t</sup>	.97	.21
Personal control	3.10*	10.50***	5.34***	1.60 <sup>t</sup>	1.89*	.77	.83
Challenge	2.58*	4.69*	1.55 <sup>t</sup>	.75	.69	1.42	1.50 <sup>t</sup>

**Table N.4***Significant and marginally significant main effects and interactions for daily coping*

Coping strategy	Main effects			2-way interactions			3-way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	Day (D) F (6, 474)	G x W F (2, 79)	G x D F (12, 474)	W x D F (6, 474)	G x W x D F (12, 474)
Positive reappraisal	.17	23.82***	3.59**	1.99 <sup>t</sup>	1.53 <sup>t</sup>	1.37	.79
Problem-focused	.25	2.04 <sup>t</sup>	.78	.90	1.32	.98	.85
Emotional expression	3.62*	2.78*	.87	.12	.98	3.05**	.58
Escapism	.79	15.44***	5.27***	1.24	1.04	.86	.52
Distraction	2.66*	.00	1.41	.00	.56	4.54**	1.77*
Relaxation	.45	11.51***	10.48***	1.88 <sup>t</sup>	1.08	4.05***	.46
Acceptance	.85	2.57 <sup>t</sup>	3.23**	.61	1.63 <sup>t</sup>	1.51 <sup>t</sup>	1.12

**Table N.5***Significant and marginally significant main effects and interactions for daily physical symptoms*

Symptom	Main Effects			2 way interactions			3 way interaction
	Group (G) F (2, 79)	Week (W) F (1, 79)	Day (D) F (6, 474)	G x W F (2, 79)	G x D F (12, 474)	W x D F (6, 474)	G x W x D F (12, 474)
Breast tenderness	1.13	1.10	3.62**	2.53*	3.20***	8.62***	.29
Abdominal bloating	3.30*	29.39***	4.44***	.75	.61	4.89***	1.04
Menstrual cramps	1.37	.49	.59	1.32	1.27	4.59***	.76
Spotting / bleeding	2.44*	18.10***	7.17***	3.42*	.95	13.32***	1.30
Somatisation index	2.70*	3.42*	.60	.26	1.47 <sup>t</sup>	2.82*	1.16

**APPENDIX O**  
**USP-Pilot 1 questionnaire**

**Life-experiences study**

**This study is looking at the sorts of situations that people may experience from time to time.**

Read through the description of each event below and picture the situation in your mind as best you can. Pretend that you are actually living through this experience. Try to mentally create the thoughts and feelings you would have if you were actually in this situation. When you are experiencing the thoughts and feelings the situation evokes, please answer the questions that follow.

**Each item was followed by the same questions (see following page)**

1. You had an argument with a friend several days ago and he (she) is not speaking to you.
2. You have an important examination tomorrow and you know that you have not done enough revision
3. You have forgotten to pay the electricity bill (final demand) and the electricity company have cut off your electricity supply
4. You have just found out that your boyfriend (girlfriend) has been cheating on you with another girl (boy)
5. You are having problems settling into university and are feeling homesick
6. You have not received your student loan payment yet and your bank account is empty
7. A close friend has been arrested and charged with a crime. He (she) is due in court next week

8. A loved one has been in an accident and is seriously injured. The doctors aren't sure whether he (she) will survive
9. You return from a weekend at home to find that your flat has been burgled
10. Your flatmate is depressed and nothing you say or do cheers him (her) up
11. You think you must have done something to upset a group of friends, because they are avoiding you

Questionnaire items for the Life Experiences study (i.e., Pilot 2).

1. How stressful would you find this experience?
- |            |   |            |   |   |   |           |
|------------|---|------------|---|---|---|-----------|
| 1          | 2 | 3          | 4 | 5 | 6 | 7         |
| Not at all |   | Moderately |   |   |   | Extremely |
2. How unhappy would you be about this experience?
- |            |   |            |   |   |   |           |
|------------|---|------------|---|---|---|-----------|
| 1          | 2 | 3          | 4 | 5 | 6 | 7         |
| Not at all |   | Moderately |   |   |   | Extremely |
3. How meaningful would this experience be to you?
- |            |   |            |   |   |   |           |
|------------|---|------------|---|---|---|-----------|
| 1          | 2 | 3          | 4 | 5 | 6 | 7         |
| Not at all |   | Moderately |   |   |   | Extremely |
4. Would this experience have important consequences for you?
- |            |   |            |   |   |   |           |
|------------|---|------------|---|---|---|-----------|
| 1          | 2 | 3          | 4 | 5 | 6 | 7         |
| Not at all |   | moderately |   |   |   | Extremely |
5. To what extent could you control what happens in this situation?
- |            |   |            |   |   |   |           |
|------------|---|------------|---|---|---|-----------|
| 1          | 2 | 3          | 4 | 5 | 6 | 7         |
| Not at all |   | moderately |   |   |   | Extremely |

**APPENDIX P**  
**Scenarios for USP-Pilot 2**

**Scenario 1**

You are waiting for your partner to arrive home from work. You were expecting him (her) to have come home ages ago and you are getting concerned. You ring your partner's workplace, but his (her) colleagues say that your partner left a while ago. Then the telephone rings - perhaps it's your partner. But it isn't your partner, it is a nurse from the accident and emergency department of the local hospital. She found your telephone number on your partner's mobile phone and rang you straight away. Your partner has been in a terrible car crash and has been rushed into hospital. The nurse won't tell you much about your partner's injuries, except that he (she) is badly hurt. The nurse advises you to call somebody to come with you and to get to the hospital as soon as you can.

**Scenario 2**

You arrive at the hospital with a friend and rush straight to the casualty unit. The receptionist says she cannot tell you anything about your partner's condition and takes you to the 'relatives' room'. She tells you that a doctor will be with you as soon as possible. You notice a lot of doctors and nurses rushing in to the emergency room. After a while a doctor comes into the relatives' room and introduces himself. He tells you that your partner has multiple injuries and has been rushed into surgery because he (she) is losing a lot of blood. The doctor hopes the surgeons will be able to stop the blood loss in surgery. He tells you that your partner is in a critical condition and that his (her) chances of surviving surgery are about 50/50. The doctor tells you that he expects surgery to last for two hours.

**Scenario 3**

You've been waiting outside the operating theatre for four hours now. It is midnight and the waiting area is deserted apart from your friend and yourself. Finally, the surgeon comes out of the operating theatre, looking tired and solemn. You get an icy feeling in the pit of your stomach. She tells you that they have managed to stop the bleeding, but your partner has lost several pints of blood and it is still touch and go whether your partner will survive his (her) injuries. She tells you that your partner's condition is critical but that they will do everything possible to help him (her). At the moment she can't tell you much about the extent of your partner's injuries until they have done some more tests when your partner has recovered from surgery.

**Scenario 4**

Your partner has just been wheeled out of the operating theatre on a trolley and is being taken to the intensive care unit. You can't wait for the chance to touch and talk to your partner and so you hurry along behind the trolley. When you get to the intensive care unit you have to wait outside while the doctors and nurses settle your partner into bed. While you are waiting outside the door an alarm goes off in your partner's room and in no time at all, a resuscitation team arrives and rushes into the room. Then the door to your partner's room opens and a doctor comes out. The doctor tells you that your partner stopped breathing but that they have managed to resuscitate him (her). He says that your partner is

breathing on his (her) own but that your partner's condition is critical and that at the moment they do not know whether he (she) will live or die.

#### **Scenario 5**

You are allowed to enter the room, so you go in. There are so many wires and machines and so many strange 'beeps' and other noises coming from the machines. You hardly recognise your partner because he (she) is almost completely bandaged from head to toe. The part of his (her) face you can see is all battered and bruised. The nurse tells you that your partner may be able to hear you even though he (she) is unconscious. She brings you a cup of tea and you sit next to your partner's bed. While you are sitting there, your partner's eyes flickered and opened just a little. You talked to him (her), but aren't sure if he (she) recognised you or understood what you said. You call the nurse and tell her that your partner's eyes had opened. She said that was a good sign, and checked the monitors. Then she looks worried and presses some buttons. She uses a telephone in the room and talks anxiously to a doctor. Suddenly an alarm goes off and she rushes to your partner's bed. Then several doctors rush into the room.

#### **Scenario 6**

Thankfully, the doctors have managed to sort out the problem and you are able to sit next to your partner's bed again. It's now five o'clock in the morning and your partner's parents have arrived. They tell you that they have just spoken to the doctor who has told them that your partner's condition is critical and that his (her) chances of surviving the injuries are around 50/50. Your partner's parents are distraught. They say that they can see you are exhausted and that you should get some sleep and that they will stay with him (her). Your partner is breathing on his own, but remains unconscious.

#### **Scenario 7**

You managed to get some sleep in a quiet spot in the hospital. You didn't go home just in case you were needed in a hurry. You go back to your partner's room. His (her) parents are dozing in chairs by the bed and your partner is still just lying there. You go to your partner's bed and hold his (her) hand. Your partner's eyes open and he (she) squeezes your hand just a little. Then your partner's eyes close and he (she) lies still again. The nurse comes in and you ask her how your partner is. She tells you that there is no change in your partner's condition and that his (her) life still hangs in the balance.

**APPENDIX Q**  
**Questionnaire items for USP-Pilot 2**

1. How familiar is the situation described in this scenario? (include experience from television programmes such as “Casualty” and “ER”, books etc).

1      2      3      4      5      6      7  
Not at all                      Somewhat                      Extremely

2. To what extent can you predict what will happen in this situation?

1      2      3      4      5      6  
Not at all                      Somewhat                      A great deal

3. To what extent do you feel that you would be able to cope with this situation?

1      2      3      4      5      6  
Not at all                      Moderately                      Extremely

4. How threatening would this situation be to your well-being?

1      2      3      4      5      6  
Not at all                      Moderately                      Extremely

5. To what extent would you find this situation a challenge to you?

1      2      3      4      5      6  
Not at all                      Moderately                      Extremely

6. How much control would you have over what happens in this situation?

1      2      3      4      5      6  
None                      Some                      A great deal

7. How much control would others have over what happens in this situation?

1      2      3      4      5      6  
None                      Some                      A great deal

8. To what extent would this situation be controllable by anyone?

1      2      3      4      5      6  
completely                      somewhat                      completely  
uncontrollable                      controllable                      controllable

9. To what extent would this situation tax or exceed your coping resources?

1      2      3      4      5      6  
Not at all                      Somewhat                      Extremely

10. How stressful would this experience be for you?



**APPENDIX R**  
**Discussion questions for USP-Pilot 2**

**For each scenario:**

1. Did any of you have any particular problems with the way this scenario was written (any words or sentences that weren't clear etc.)? If so, what?
2. Did anyone find it difficult to understand what was supposed to be happening in this scenario? Were there any particular parts that were difficult to understand?
3. Did anybody find it hard to imagine this situation happening to them? Why do you think it was hard to imagine?
4. Did anyone think this situation was unbelievable? Why?
5. Did anyone think this scenario describes a situation that they wouldn't find particularly stressful? (score < 4)
6. Did anyone think this situation would not be distressing? (ditto)
7. Did anyone think this situation would not have important consequences for them? (ditto)
8. Did anyone think that this situation was not a threat to their well-being?
9. Did anyone think that this situation would be particularly easy or difficult to cope with?
10. How much control do you think yourselves/others/anyone would have over the outcome of this situation?
11. How many of you were certain that the injured partner would live? Was there anything in the scenario that suggested this to you?
12. How many of you were certain that the injured partner would die? Was there anything in the scenario that suggested this to you?
13. How many of you were uncertain about whether the injured partner would live or die?
14. Was there anything in the scenario that made you feel uncertain about his or her survival?
15. After reading this scenario did you think that the situation had reached a satisfactory conclusion? If so (not) why so (not)?

**Thank you, please turn to the next scenario. After the final scenario:**

Thank you very much for your help with the initial stages of this research.

## APPENDIX S

### Scenario revisions and revised questionnaire items for USP-Pilot 3

#### Scenario 6r1

The doctors have managed to sort out the problem and you are able to sit next to your partner's bed again. Suddenly you realise that you haven't contacted any of your partner's family or friends to tell them about the accident. You'd totally forgotten. You leave the room to try and find a payphone. However, when you find the phone, you just stand there, your mind a complete blank. You simply cannot remember any of his (her) family or friends' phone numbers. You didn't stop to pick up the address book because you were in such a hurry to get to the hospital. You return to your partner's room. Your partner is still just lying there with his eyes closed, so you ask the nurse if there is any change in his condition. She shakes her head. She says that you look completely exhausted and should sit down. You sit down on the chair by your partner's bed.

#### Scenario 7r1

When you are sitting by your partner's bed, you notice your partner's mobile phone in a plastic bag on the cupboard by his bed. You remember that his (her) parents' telephone number is stored in the phone. You write the number down and go to the payphone to ring them. However, when you ring them, the answerphone takes your call. Perhaps they are out. You don't want to leave such awful news in a message, so you put the phone down and return to your partner's room to think what to do next. However, when you get back to your partner's room there are doctors by your partner's bed, talking quietly. They stop talking and look at you. You ask them how your partner is, how serious his (her) injuries are and whether you partner will get better. They say it is too early to tell, that your partner's condition is still critical and that his (her) life still hangs in the balance.

#### Revised novelty item

How familiar is the situation described in this scenario? (include experience from television programmes and books etc.)

1      2      3      4      5      6      7  
Not at all                      Somewhat                      Extremely

#### Revised challenge item

To what extent does this situation have positive implications for your well-being?

1      2      3      4      5      6  
Not at all                      Moderately                      Extremely

**APPENDIX T**  
**Revised scenarios used in Study 3**

**Scenario 4r1**

Your partner has just been wheeled out of the operating theatre on a trolley and is being taken to the intensive care unit. You can't wait for the chance to touch and talk to your partner and so you hurry along behind the trolley. When you get to the intensive care unit you have to wait outside while the doctors and nurses settle your partner into bed. While you are waiting outside the door an alarm goes off in your partner's room. Some doctors rush into the room. After a while, the door opens. A doctor tells you that your partner had stopped breathing for a moment. He says that although your partner is now breathing on his (her) own, your partner's condition is critical and that at the moment they do not know whether he (she) will live or die.

**Scenario 6r2**

Thankfully, the doctors sort out the problem and you sit down by your partner's bed. He (she) simply lies there with his (her) eyes closed. The machines are beeping away and after a while you start to feel drowsy. A cup of coffee might help you to stay awake so you leave the room to find a coffee machine. However, when you return to your partner's room it is empty. What has happened? You look for the nurse but she is nowhere to be seen – there isn't anyone to ask. You pace the room, sit down for a moment, get up and look down the corridor. There is nobody around. You sit down again but can't settle and get up and look out of the door again. You must find out what has happened. You hurry down the corridor and soon see the nurse coming towards you. You rush up to her and she tells you that your partner has been taken 'for tests'. She says that you'll have to talk to the doctor to find out more. She says that there has been no change in your partner's condition. His (her) condition is still critical. It is too early to tell if he (she) will survive.

**Scenario 7r2**

After what feels like an eternity, your partner is wheeled into the room on a trolley and is settled into bed. A doctor who you haven't seen before comes into the room and you ask her how your partner is. She won't tell you much – she just says that they'll know more about the severity of your partner's injuries and his (her) chances of survival when they have all the test results. You're sure that she is hiding something from you and insist that she gives you more information. But no matter how much you plead, all she will say is that your partner's condition is critical and that it is touch and go whether he (she) will survive. Then the doctor's pager beeps and she rushes out of the room. You are now alone with your partner and sit back beside his (her) bed. Your partner is still unconscious and simply lies there, pale and motionless. You really hope that he (she) isn't feeling any pain and just wish there was something you could do to help. You talk to your partner but there is no response.

**APPENDIX U**  
**Written debriefing**

**This written debriefing sheet was given in Studies 3, 4, and 5.**

Thank you for participating in the ‘Medical Drama’ study. The aim of the study was to find out how people might think and feel during a specific situation. The scenarios you read were written to represent a situation that was stressful, that persisted over time and in which you would be uncertain about which one of two important but mutually exclusive outcomes might occur (i.e., whether your fictitious ‘partner’ would live or die).

Although these scenarios are entirely fictitious, the results of this study will help us to establish how people might respond to any stressful situation that is characterised by uncertainty about mutually exclusive outcomes. The study you have just completed represents an early stage in the development of an intervention that could help people feel and cope better during uncertain experiences, such as when waiting for important medical test results. One population that the future intervention might help is women undergoing fertility treatment, where the outcome of treatment will either be that the woman is pregnant or that she is not. Both these outcomes have important implications for the woman and she may be uncertain about which of these mutually exclusive outcomes will occur.

Your contribution to this research will help us to develop the best possible intervention for individuals trying to cope with uncertain medical experiences.

Thank you for participating.

Regards,

Deborah Lancaster (PhD student)

NB: If you have any questions, issues, problems or concerns arising from your participation in this research, please do not hesitate to contact myself or my supervisor.

## **APPENDIX V**

### **Scenarios used in Study 4**

**Note: Although these scenarios are numbered, the order of presentation was randomised.**

#### **Scenario 1**

You are waiting for your partner to arrive home from work. You were expecting them to have come home ages ago and you are getting concerned. You ring your partner's workplace, but their colleagues say that your partner left a while ago. Then the telephone rings - perhaps it's your partner. But it isn't your partner, it's a nurse from the accident and emergency department of the local hospital. She found your telephone number on your partner's mobile phone and rang you straight away. Your partner has been in a terrible car crash and has been rushed into hospital. The nurse won't tell you much about your partner's injuries, except that they are badly hurt. The nurse advises you come to the hospital as soon as you can.

#### **Scenario 2**

You've been waiting to speak to someone about how your partner is doing and ask the next nurse who walks past. She says she can't tell you anything about your partner's condition and takes you to a relatives' room. She tells you that she will find a doctor to talk to you as soon as possible. You notice a lot of doctors and nurses rushing into the room where your partner is. After a while a doctor comes into the relatives' room and tells you that your partner has been rushed into surgery because it seems that they have serious internal injuries. The doctor hopes the surgeons will be able to repair the damage in surgery. He tells you that your partner is in a critical condition and that their chances of surviving surgery are about 50/50. The doctor tells you that he expects surgery to last for two hours.

#### **Scenario 3**

Your partner is in surgery and you've been waiting outside the operating theatre for four hours now. The waiting area is deserted. Finally, a nurse comes out of the operating theatre, looking tired and solemn. You get an icy feeling in the pit of your stomach. She tells you that your partner has lost several pints of blood and that they haven't managed to stop the bleeding yet. It is touch and go whether your partner will survive. She tells you that your partner's condition is critical. She can't tell you much about the extent of your partner's injuries until they have done some more tests – if your partner recovers from surgery.

#### **Scenario 4**

Your partner is being taken to the intensive care unit on a trolley and you hurry along behind the trolley. When you get to the intensive care unit you have to wait outside while the doctors and nurses settle your partner into bed. While you are waiting outside the door you can hear a lot of activity going on in the room. After a while, the door opens. A doctor tells you that there are some complications and that they need to get your partner into surgery. He tells you that your partner's condition is critical and that at the moment they do not know whether your partner will live or die.

### **Scenario 5**

You are sitting beside your partner's bed. There are so many wires and machines and so many strange 'beeps' and other noises coming from the machines. You hardly recognise your partner because they are so battered and bruised. The nurse brings you a cup of tea and you sit next to your partner's bed. While you are sitting there, your partner's eyes flickered and opened just a little. You talked to your partner, but aren't sure if they recognised you or understood what you said. You call the nurse and tell her that your partner's eyes had opened. She checked the monitors, but looks worried and presses some buttons. She uses a telephone in the room and talks anxiously to a doctor. Suddenly an alarm goes off and she rushes to your partner's bed. Then several doctors rush into the room. Clearly, your partner is in a critical condition.

### **Scenario 6**

Your partner simply lies in bed with their eyes closed. The machines are beeping away and after a while you start to feel drowsy. A cup of coffee might help you to stay awake so you leave the room to find a coffee machine. However, when you return to your partner's room it is empty. What has happened? You look for the nurse but she is nowhere to be seen – there isn't anyone to ask. You pace the room, sit down for a moment, get up and look down the corridor. There is nobody around. You sit down again but can't settle and get up and look out of the door again. You must find out what has happened. You leave the room and see a nurse coming towards you. She tells you that your partner has been taken 'for tests', but that you'll have to talk to the doctor to find out more. She says that your partner's condition is critical. It is too early to tell if your partner will survive.

### **Scenario 7**

You are sitting beside your partner's bed when a doctor you haven't seen before comes into the room to check on your partner. You ask her how your partner is. She won't tell you much – she just says that they'll know more about the severity of your partner's injuries and their chances of survival when they have done some tests. You're sure that she is hiding something from you and insist that she gives you more information. But no matter how much you plead, all she will say is that your partner's condition is critical and that it is touch and go whether he your partner will survive. The doctor's pager beeps and she rushes out of the room. You are alone with your partner and sit beside their bed. Your partner is unconscious and simply lies there, pale and motionless. You really hope that your partner isn't feeling any pain and just wish there was something you could do to help. You talk to your partner but there is no response.

**APPENDIX W**  
**Baseline emotions questionnaire for Studies 4 and 5**

**Feelings and emotions**

This scale consists of a number of words that describe different feelings and emotions.

Read each item and then mark the appropriate answer in the space next to that word.

Indicate to what extent you feel this way **right now**. Use the following scale to record your answers.

None	Mild	Moderate	Severe
<input type="checkbox"/>	<input type="checkbox" value="1"/>	<input type="checkbox" value="2"/>	<input type="checkbox" value="3"/>

Nervous		Content	
Positive		Tense	
Relieved		Hesitant	
Sad		Fulfilled	
Hopeful		Doubtful	
Confident		Uncertain	
Disappointed		Encouraged	
Happy		Angry	
Discouraged		Worried	
Anxious		Optimistic	
Unsure		Pessimistic	

**APPENDIX X**  
**Baseline appraisals questionnaire for Studies 4 and 5**

**Appraisals**

This questionnaire is concerned with your thoughts about the experience of taking part in this research study. There are no right or wrong answers. Please respond according to how you view this experience right NOW by marking the appropriate answer in the space next to the statement. Use the following scale to record your answers.

Not at all                  A little                  Somewhat                  Extremely

1

2

3

This situation could have important consequences for me	
This situation could have a positive impact on me	
I have what it takes to do well in this situation	
This situation could be stressful	
This situation could have a negative impact on me	
I can control what happens in this situation	
Other people can control what happens in this situation	
This situation is uncontrollable	

**APPENDIX Y**  
**Coping questionnaire for Study 5**

Listed below are a number of different ways of coping with a stressful situation. Read each item and circle the number that reflects the extent to which you *usually* use each strategy when coping with a stressful situation. Use the following scale:

1 Not used at all	2 Use rarely	3 Use sometimes	4 Use a great deal
----------------------	-----------------	--------------------	-----------------------

1.	I daydream or imagine a better time or place than the one I am in.....	1	2	3	4
2.	I try to accept and make the most of the situation.....	1	2	3	4
3.	I think about what steps to take to deal with the stressful situation.....	1	2	3	4
4.	I talk with friends about how I am feeling.....	1	2	3	4
5.	I know what has to be done so I do what has to be done.....	1	2	3	4
6.	I take things one day at a time, one step at a time.....	1	2	3	4
7.	I avoid being with people in general.....	1	2	3	4
8.	I wish I could change the way I feel.....	1	2	3	4
9.	I try to see the positive side of the situation.....	1	2	3	4
10.	I try several alternatives for handling the stressful situation.....	1	2	3	4
11.	I set some goals for myself to deal with the stressful situation.....	1	2	3	4
12.	I refuse to believe that it (the stressful situation) has happened to me...	1	2	3	4
13.	I try to take a step back from the situation and be more objective.....	1	2	3	4
14.	I talk with a relative about how I am feeling.....	1	2	3	4
15.	I find out more about the stressful situation.....	1	2	3	4
16.	I wish I was more optimistic and forceful.....	1	2	3	4
17.	I let my feelings out somehow.....	1	2	3	4
18.	I get busy with other things to keep my mind off the problem.....	1	2	3	4
19.	I talk with a professional person (e.g., doctor, clergy, tutor).....	1	2	3	4
20.	I keep my feelings to myself.....	1	2	3	4

