CARDIFF UNIVERSITY

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'It's not over until it's over': Self and Dyadic Regulation and Wellbeing when facing a Blocked Parenthood Goal.

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A thesis submitted for

the degree of Doctor of Philosophy

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I dedicate this thesis

to anybody who is challenging

their limits, whatever they are.

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Papers, talks and posters

Chapter 2:

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Chapter 3:

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Table of Contents

Index of Tables

Index of Figures

Glossary of Abbreviations

ART……………………………………….. Assisted Reproductive Technology

ESHRE………….. European Society of Human Reproduction and Embryology

GDGRS…………………. Goal Disengagement and Goal Reengagement Scale

HADS…………………………………Hospital Anxiety And Depression Scale

ICSI……………………………………Intra-cytoplasmic Sperm Injection

IPA……………………………………Interpretative Phenomenological Analysis

IUI………………………………………………Intrauterine Insemination

IVF…………………………………………………...*in vitro* Fertilisation

MTD………………………….. Motivational Theory of Life-Span Development

NICE………………………. National Institute for Health and Care Excellence

OI……………………………………………………. Ovulation Induction

OPS……………………….. Optimization in Primary Secondary Control Scale

SOC………………………Model of Selection, Optimization and Compensation

TGD………………………………………….. Transactive Goal Dynamics Theory

WHO……………………………………………. World Health Organization

Thesis Summary

Parenthood is a major life-goal that the majority of the population ultimately aims to achieve. Unfortunately, some individuals are not able to achieve parenthood when they desire to. This can happen for reasons related with the postponement of parenthood beyond the optimal biological period to achieve it and/or infertility. In these situations the parenthood goal becomes blocked. The studies presented in this thesis aimed to investigate how people self-regulate when experiencing such a blocked parenthood goal. More specifically, theories of developmental regulation claim that when facing a blocked goal individuals are expected (1) to experience poor wellbeing and (2) to disengage from the goal and reengage in alternative goals; (3) the use of goal disengagement and reengagement strategies is then expected to result in better wellbeing. This thesis directly tests these predictions. Dyadic approaches of regulation were also investigated in an exploratory way.

Overall, results provided weak support for the predictions made by developmental regulation theories. People facing a blocked parenthood goal did not want to disengage from it and only reengaged in alternative life-goals if doing so did not interfere with the pursuit of parenthood. Additionally, in general, disengagement from parenthood did not seem to have benefits for wellbeing. However, in line with predictions, the experience of a blocked parenthood goal was associated with poor wellbeing and reengaging in alternative goals had wellbeing benefits. At the dyadic level, the decision to continue treatment as long as opportunities were not exhausted was predetermined and couples neither communicated about it, nor updated this decision after experiencing a treatment failure.

These results suggest that health professionals should ensure that the true chances of achieving pregnancy are clearly communicated to patients as they often intend to invest in the parenthood goal until the opportunities are absolutely exhausted. Based on the work presented here, more studies aimed at testing developmental regulation theories in the context of parenthood goal should opt to use longitudinal designs and integrate dyadic processes of regulation.

Chapter 1: General Introduction and Thesis Overview

General Introduction

Goals correspond to desired outcomes that help people manage and shape their development (Baltes, 1997). During their lives people are often presented with periods of optimal opportunity in which the possibility of achieving a goal is at its greatest. For instance, it is commonly accepted that if a couple wants to have a biological child without having to use fertility treatment they should start actively trying to conceive before the woman is 32 years old (Habbema, Eijkemans, Leridon, & te Velde, 2015). In these optimal periods individuals are confronted with the existence of deadlines for goal achievement such as biological age constraints (Salmela-Aro, 2009). Theories of developmental regulation claim that when individuals reach a deadline, corresponding to a point in time when the opportunities to achieve the goal are null or close to null, they are expected to give up on the goal (Heckhausen, Wrosch, & Schulz, 2010). Naturally, if individuals make the decision to postpone the achievement of an age-constrained goal they risk missing the developmental deadline to achieve it. The general purpose of this thesis is to investigate how individuals self-regulate when experiencing a blocked parenthood goal.

The particular case of Blocked Parenthood Goal

Parenthood is commonly considered to be a central life goal and indeed the average number of children desired by young people in Europe is approximately two (Testa, 2007). Despite this, many people do not have children when they desire to (Boivin, Bunting, Collins, & Nygren, 2007). Those who do wish to achieve parenthood, but are unable to due to some form of constraint, can be described as

Chapter 1

facing a blocked parenthood goal. Individuals can miss the opportunity (or deadline) to achieve parenthood due to either anticipated or unanticipated reasons. Missing the deadline to achieve parenthood can be considered to be anticipated when individuals take the decision to postpone parenthood during the optimal period of fertility in order to prioritise other life-goals such as career (Nicoletti & Tanturri, 2008). Missing the deadline may be unanticipated however, for reasons such as not having a partner (Berrington, 2004); having a partner who does not want to become a parent (Graham, Hill, Shelly, & Taket, 2013), and medical conditions such as infertility (Zegers-Hochschild et al., 2009). However, as people get older infertility can be anticipated with greater certainty because of the decline in fertility with age (Broekmans, Knauff, te Velde, Macklon, & Fauser, 2007).

A diagnosis of infertility is made when a couple has been trying to conceive for a year or more with regular unprotected intercourse, without a successful pregnancy (Zegers-Hochschild et al., 2009). The inability of a couple to conceive can be a result of solely female factors (e.g., dimished ovarian reserve; Practice Committee of the American Society for Reproductive Medicine, 2015a), or solely male factors (e.g., poor sperm quality; Practice Committee of the American Society for Reproductive Medicine, 2015b), as well as mixed or unexplained factors. Infertility affects 9% of people worldwide and 56% of these people undergo fertility treatment in order to pursue their parenthood goal (Boivin et al., 2007). There are two main types of treatment available. First-order treatments include Ovulation Induction (OI) and Intrauterine Insemination (IUI). These treatments normally start with the stimulation of the women's follicles and eggs, followed with an injection of the prepared sperm directly into the uterus. The second type of fertility treatment includes those that use Assisted Reproductive Technology (ART) such as *in vitro*

Fertilization (IVF) or Intra-cytoplasmic Sperm Injection (ICSI). These treatments differ from first-order treatments in that following the stimulation of the follicles, eggs are retrieved and fertilised in a laboratory before being implanted back into the woman's uterus. IVF and ICSI differ in the manner in which fertilisation is achieved. Whilst with IVF the sperm and eggs are simply mixed together, with ICSI one selected spermatozoid is directly injected into the egg. The probability for a couple to conceive with ART is 49% assuming patients undergo the full three treatment cycles usually recommended by physicians (Stern et al., 2010).

There is a high chance that pregnancy will not be achieved with fertility treatment. Consequently, as treatment progresses and failures occur in successive cycles, people are confronted with the important decision of when to give up on treatment. This decision to continue or to stop with treatment is ambiguous and not obvious since it not only depends on the subjective assessments of patients about their perceived chances to achieve parenthood, but also on the information provided by the fertility staff to patients about their opportunities to achieve it. Therefore, the subjective assessments of patients about their chances to achieve parenthood are likely to be made on top of the information provided by the medical staff. To date, there is a lack of research about how people deal with this decision and regulate after a failed fertility treatment cycle, although developmental and dyadic regulation theories offer at least two pathways from which to address individual and dyadic regulatory issues. The following sections will examine these theories in turn.

Developmental Regulation Theories

The study of self-regulation has been incorporated into a range of research fields including clinical, social, and developmental Psychology, and has been integrated into a great number of studies related to action, affect, cognition,

Chapter 1

physiology, neurology and interpersonal interactions (for a review see Vohs &

Baumeister, 2004). As a result of its wide use the definition of self-regulation often

depends on the focus of the research being conducted. The concept of self-

regulation used in the present thesis, however, is the one adopted in the motivational

regulation field and corresponds to the motivational regulatory strategies used by

people in order to adjust to the discrepancies and challenges faced when trying to

achieve a central life goal, such as parenthood (Heckhausen et al., 2010).

Three major theories of developmental regulation have been proposed which

emphasise the influence people have in shaping their development and in

successfully adjusting to the challenges they experience when trying to reach a

desired outcome (Haase, Heckhausen, & Wrosch, 2013). These theories are the

Dual-Process Model of Assimilative and Accommodative Coping (Brandtstädter, &

Rothermund, 2002), the *Model of Selection*, *Optimization and Compensation* (SOC

Model; Freund & Baltes, 2000), and the *Motivational Theory of Life-Span*

Development (MTD; Heckhausen et al., 2010). These theories are characterised by

their complexity and by the diversity of different names attributed to the same, or

very similar, regulatory strategies. Overall, the theories predict that when people

face a blocked goal they tend to experience poor wellbeing due to the stress that the

possibility of not being able to achieve it elicits and also the consecutive experiences

of failure and loss. Consequently, they are expected to disengage from the blocked

goal and/or reengage in alternative life goals. The theories also predict that for those

facing a blocked goal the use of regulatory strategies such as goal disengagement

and goal reengagement contributes to better wellbeing. These predictions have

previously been applied to different blocked goal situations (for a review see

Heckhausen et al., 2010) but have rarely been tested in those facing a blocked

parenthood goal. This thesis will therefore investigate the predictions made by developmental regulation theories in the specific context of parenthood.

Dyadic Regulation Theories

Parenthood goal is known to be a predominantly dyadic experience, or, in other words, an experience shared by two members of a couple. Dyadic regulation theories therefore take a relational perspective on self-regulation and can be applied to different interpersonal contexts, e.g., groups, friends, and partners. The theory of focus in the present thesis is the *Transactive Goal Dynamics* theory (TGD, Fitzsimons, Finkle, & VanDellen, 2015). TGD claims that even though two people in a relationship correspond to two independent systems, they also share a unique common regulatory system characterised by the existence of transactive processes. Overall, the TGD theory assumes that it is the motivation of each member of the system to invest in interpersonal goals that influences the total amount of investment made, and that this level of investment determines the existence of either a higher or lower density of links among partner goals, pursuits and outcomes. The TGD theory also claims that people can benefit from having a shared regulatory system by experiencing transactive gains. However, in order to benefit, the system members must be able to coordinate their efforts. If coordination is not successful and members experience worse outcomes for investing in a given goal together than they would if investing alone, one can say that there is transactive loss (Fitzsimons et al., 2015). To my knowledge, the TGD has never been applied in the context of blocked parenthood goals. Consequently, in the present thesis, this theory will be applied in order to develop an understanding of how couples regulate after a failed treatment and, particularly, during an active decision-making period when couples have to decide whether to undergo more fertility treatment.

Chapter 1

Thesis Overview

Chapter 2: Self-Regulation and Wellbeing when facing a Blocked Parenthood

Goal: A Systematic Review and Meta-Analysis

The three major developmental regulation theories have been empirically tested in different research domains and evaluated in integrative reviews (e.g. Haase et al., 2013). However, there is a lack of systematic reviews and meta-analyses evaluating these theories and, particularly, in the context of blocked parenthood goal. The main aims of this systematic review and meta-analyses were to test the three main predictions of developmental regulation theories. These claim that: (1) the experience of a blocked goal contributes to poor wellbeing; (2) when experiencing a blocked goal, individuals are expected to disengage from it and to reengage in alternative life-goals and (3) that the use of those regulatory strategies are expected to lead to better wellbeing. Relevant conceptual and methodological moderator variables were also tested. From 4977 potential relevant manuscripts identified, only six articles met the inclusion criteria of the study. Overall, there was weak support for the predictions made by developmental regulation theories in the context of a blocked parenthood goal. From the three predictions tested, there was only partial support for two of them. According to what was predicted, higher goal blockage was related to higher negative mood and reengagement in other life goals was associated with higher positive mood. Contrary to what was predicted, higher goal blockage was not significantly associated with the use of goal disengagement and reengagement strategies. Also contrary to what was expected, higher goal disengagement and reengagement were not significantly associated with lower negative mood. A contribution to the field has been made with the evaluation of the

quality of the existing research and the discussion of important conceptual and methodological flaws.

Chapter 3: Individual and Dyadic Regulation after a failed Fertility Treatment: a Qualitative Study

One of the explanations proposed for the lack of support for the predictions of developmental regulation theories found in Chapter 2 was that parenthood could actually correspond to a unique type of goal that is hardly replaceable. In order to clarify this there was a need to perform a study that could take into account how people who were experiencing a blocked parenthood goal, such as infertile patients, perceived and made sense of this experience. More specifically, the period after a failed fertility treatment cycle is known to be particularly important in terms of decision-making because couples have to decide whether or not to undergo more treatment. During this period people are expected to use individual and dyadic approaches (i.e. behavioural and/or cognitive processes) that allow them to sustain or change their regulatory strategies. The aim of the present chapter was to examine the self and dyadic regulatory approaches that underlie the decision couples make about continuing treatment. This was a qualitative study where we conducted Interpretative Phenomenological Analysis (IPA) of interviews with eight infertile couples. At the individual level, participants remained highly engaged with treatment. At the couple or dyadic level, there were indicators of transactive loss due to a lack of communication between the couple about treatment failure, but also of transactive gain such as the investment on parenthood goal for the sake of the partner and the instrumental and emotional support provided. These findings provide information about the individual and dyadic approaches used by patients

after experiencing a failed treatment cycle that may ultimately be useful for developing support interventions.

Chapter 4: Parenthood Goal Blockage, Self-Regulation and Wellbeing after a Fertility Treatment Cycle: A Prospective Quantitative Study

Past research with couples undergoing fertility treatment has mostly focused on documenting patients' wellbeing through treatment and their compliance behaviour. A systematic review and meta-analysis conducted by Gameiro and colleagues showed that patients disengage from fertility treatment when they still have chances to conceive and that one of the main reasons for their decision is the psychological burden of treatment (Gameiro, Boivin, Peronace, & Verhaak, 2012; Gameiro, Verhaak, Kremer, & Boivin, 2013). What remains unclear is what is implicit under this burden and what type of regulatory strategies patients use to deal with particularly important periods of treatment, such as the moments before and after undergoing a treatment cycle. The three predictions of developmental regulation theories tested in Chapter 2 were also investigated in the present study with a sample of infertile patients. It was expected that (1) higher goal blockage (objective and subjective) would be associated with higher anxiety at pre-treatment and higher depression at post-treatment; (2) goal blockage and goal disengagement would not be significantly associated and, higher goal blockage would be associated with lower goal reengagement; (3) the associations between self-regulation strategies of goal disengagement and reengagement and wellbeing would vary according to the level of blockage (objective and subjective) being faced. Another issue that was addressed in the present chapter was related with the decision to undergo more treatment. In order to understand how this decision happens it is important to evaluate how congruent patients' perceptions of goal blockage are with those of the

medical professionals. It was predicted that patients' perceptions would be

congruent with their prognosis at the pre-treatment phase and updated after knowing

the treatment result. Results supported this last hypothesis. Additionally, consistent

with what was predicted, results showed that higher perceptions of goal blockage

contributed to higher anxiety (and also depression) at pre-treatment, and to more

depression at post-treatment. Results also showed that patients did not shift

regulatory strategies after knowing the treatment outcome. Finally, the associations

between self-regulation and wellbeing varied according to the level of blockage

although the simple slopes analyses did not reach significance. Findings from this

study suggest that physicians should be aware that fertility patients seem to regulate

by keeping engaged with fertility treatment.

Chapter 2: Self-Regulation and Wellbeing when facing a Blocked Parenthood Goal: A Systematic Review and Meta-Analysis

Introduction

Life is shaped around defining and pursing important goals. The achievement of these goals gives meaning to peoples' lives. Individuals develop self-regulation strategies to increase their chances of achieving life goals (Brandtstädter, Wentura, & Rothermund, 1999). Self-regulation strategies emerge from a dynamic motivational system that allows people to prioritise their goals and also to match goals to opportunities to achieve a better fit with their environment (Baltes & Baltes, 1990; Cameron & Leventhal, 2003; Haase et al., 2013). An adaptive self-regulation strategy should maximise goal achievement and lead to positive states of wellbeing (Brandtstädter et al., 1999; Freund & Baltes, 2000; Wrosch, Scheier, Miller, Schulz, & Carver, 2003).

In the last two decades of research, the conceptualisation of adaptive self-regulation has been shaped according to three major emerging developmental regulation theories (Haase et al., 2013): the *Dual-Process Model of Assimilative and Accommodative Coping* (Brandtstädter & Rothermund, 2002), the SOC model (Freund & Baltes, 2000), and the MTD (Heckhausen et al., 2010). These are complex theories that explain how people adaptively regulate goal pursuit during their life-span. Initially, research on self-regulation assumed that adaptive regulation depended on individuals' persistence in pursuing important life goals (Bandura, 2004; Carver & Scheier, 1998). More recent developmental regulation theories (such as the *Dual-Process Model of Assimilative and Accommodative Coping*, the SOC model, and the MTD) have introduced the idea that adaptive self-regulation

also depends on timely disengagement, which is the capacity to withdraw engagement from goals that cannot be achieved (i.e., blocked goals). Numerous empirical studies (Haynes, Heckhausen, Chipperfield, Perry, & Newall, 2009; Wrosch, Bauer, & Scheier, 2005; Wrosch & Heckhausen, 1999) have been converging on a main finding that people employ two main self-regulation strategies in such situations: goal engagement and goal disengagement. The former corresponds to the ability to stay committed and invest further effort (e.g., time and energy) towards the initial goal individuals are pursuing, whereas the latter is related to the ability to withdraw commitment and effort (e.g., time and energy) from the initial goal when it, for instance, becomes blocked. Therefore, these self-regulatory processes involve a cognitive process of commitment and a behavioural process of effort (Wrosch et al., 2003). In addition, Wrosch and colleagues (2003) proposed that individuals use a third self-regulation strategy, goal reengagement, which is the ability to invest in new alternative and meaningful life goals. A blocked goal, as developmental regulation theories propose, is likely to create demands on the individual. When these demands exceed the coping resources available (e.g., social support, finances, resilience) individuals will experience psychological stress (Lazarus & Folkman, 1984) and may use coping strategies to address that stress. These strategies can facilitate self-regulation. For instance, individuals can just re-interpret a goal blockage to decrease its emotional impact (i.e., a type of antecedent-focused strategy named reappraisal; Gross, 2001) and therefore decrease the need to engage with the goal. Despite the interplay between coping and self-regulation, coping theory is not the remit of this thesis. Nonetheless, future research should focus on better understanding how the use of different coping strategies may facilitate or hinder adaptive self-regulation.

Chapter 2

Overall, developmental regulation theories seem to agree on three main theoretical predictions (Haase et al., 2013) that have already been tested in relation to different blocked goal situations, such as couple's separation in late midlife (Wrosch & Heckhausen, 1999), AIDS (Moskowitz, Folkman, Collette, & Vittinghoff, 1996) and transition from school to work in adolescents (Heckhausen & Tomasik, 2002). The three predictions are that when people experience a blocked goal they: (1) experience poorer wellbeing; (2) start disengaging from the goal and reengaging with alternative life goals, and (3) experience better wellbeing from using goal disengagement and reengagement strategies. This dynamic cycle of adjustment-regulation-adjustment is expected to enable people to carry on with development. Concerning prediction one, previous research concluded that women who maintained a child-wish after finishing fertility treatment presented worse adjustment than those who did not maintain it, independently of their parenthood status (Gameiro et al., 2014). In relation to prediction two, research showed that adults suffering from long-term spinal cord injuries started disengaging from goals that were hard to achieve due to their health condition, such as becoming parents (Weitzenkamp et al., 2000). Finally, in respect to prediction three, a study showed that parents of children with cancer had lower levels of depression when they disengaged from the blocked goals that resulted from the challenging situation they were facing (e.g. spending less time investing on career goals) and/or reengaged in alternative life goals, e.g., by redirecting their energy to other goals such as spending more time taking care of their children (Wrosch et al., 2003).

Parenthood is a central life goal the majority of the people intend to achieve at some point in their lives (Martinez, Chandra, Abma, Jones, & Mosher, 2006). However, many people are confronted with obstacles when trying to achieve

parenthood. There are many kinds of blocked goals and developmental regulation theories do not address whether the type or degree of a blocked goal moderates the three predictions described. Most goals are age-constrained, meaning that there are age periods in development when opportunities to achieve the goals are maximised, beyond which attainability starts to decrease until it is close to null (Heckhausen et al., 2010). Because developmental deadlines are known, this type of blocked goal can be anticipated and people can anticipate the need for building self-regulatory strategies. Anticipated blocked goals correspond to situations where people passed the age deadline when opportunities were optimal without taking action toward the desired goal. In contrast, unanticipated blocked goals result from unexpected negative life events, such as disease or disability, which disrupt the normative developmental process. In the case of [biological] parenthood, chances are maximised for women in their 20s but start to decrease rapidly beyond the age of 31 to become close to null after the 40s (Broekmans, Knauff, te Velde, Macklon, & Fauser, 2007; Noord-Zaadstra et al., 1991). In Europe, women are also expected to have children around 24-25 years of age and in the worst case between 40 and 45 years of age (Bavel & Nitsche, 2013). These biological and social norms move people toward attaining their parenthood goal in their mid to late twenties, which corresponds to the current national mean age of 26.3 years in the US (Hamilton, Martin, Osterman, Curtin, & Matthews, 2015). Some people can be faced with anticipated reasons for a blockage because they delay parenthood to prioritise other life goals such as career pursuits or a contemporary life-style with several alternatives to parenthood (Eriksson, Larsson, Svanberg, & Tydén, 2013). However, others can be faced with unanticipated reasons such as unexpected reproductive problems, more specifically infertility (Fulford, Bunting, Tsibulsky, & Boivin,

Chapter 2

2013). It can be expected that individuals will find it harder to self-regulate in these cases than when blockage progressively develops with some form of awareness and that, for this reason, the use of regulatory strategies of goal disengagement and reengagement will be particularly adaptive for those with an unanticipated type of blockage.

Another issue concerns the degree of blockage that people can experience. Developmental regulation theories propose that adaptive self-regulation is dependent on a person's capacity to engage when there are still more opportunities than constraints to achieve a goal (i.e., when goal blockage is low) and to disengage and reengage in alternative life goals when there are fewer opportunities than constraints, i.e. when goal blockage is high (Haase et al., 2013; Wrosch et al., 2003). These variations in the degree of goal blockage could be expected to influence the impact of goal blockage on wellbeing, the use of self-regulation strategies following a blocked goal, and the effect of these strategies on subsequent wellbeing. If applied to the case of anticipated blockage to parenthood, developmental regulation theories would propose that increasing efforts to conceive while younger than 40 would be adaptive, but thereafter the most adaptive strategy would be to disengage from the pursuit of parenthood and reengage in other life goals that can still be achieved. In the case of unanticipated blockages such as infertility, developmental regulation theories propose that it would be adaptive to engage in fertility treatment while prognosis is good but thereafter individuals would better adjust by stopping treatment and engaging with other life goals. Success rates vary according to the number of fertility cycles and, presumably, so would perceived degree of goal blockage. After a typical course of three cycles, the chances to achieve pregnancy decrease (National Institute for Health and Care Excellence, 2004). Because in most

western countries it takes a median of two years to complete five cycles (Smith, Tilling, Nelson, & Lawlor, 2015), the degree of blockage could be conceptualised as low and high depending on whether patients were undergoing treatment for less or more than one year, respectively.

The Present Study

The present meta-analyses are aimed at testing the three predictions of developmental regulation theories in the context of a blocked parenthood goal. More specifically, it is expected that (1) individuals facing a blocked parenthood goal will experience poorer wellbeing; (2) will disengage from parenthood goal and/or reengage with other meaningful goals and, finally, (3) will experience better wellbeing from using goal disengagement and reengagement strategies. Additionally, as a secondary aim, the present study also explored whether the associations hypothesised were moderated by the type (unanticipated, anticipated) and degree (low, high) of goal blockage, the study design (cross-sectional and quasi-experimental, longitudinal) and study quality (low, average, high).

Methods

Search Strategy

The present study adheres to the PRISMA (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines for the reporting of systematic reviews and meta-analysis (Moher, Liberati, Tetzlaff, & Altman, 2009). A review protocol does not exist.

The search terms were associated with goal blockage (e.g. "blocked" or "unattainable") AND parenthood (e.g. "maternity", "birth") AND wellbeing (e.g. "quality of life", "mental-health") OR goal blockage (e.g. "blocked" or

Chapter 2

"unattainable") AND parenthood (e.g. "maternity", "birth") AND developmental

regulation strategies (e.g. "goal engagement", "primary control") (see supplemental

Table 1, Appendix A). Eight databases were searched: AMED (Allied and

Complementary Medicine), EMBASE, HMIC (Health Management Information

Consortium), ICONDA, Ovid MEDLINE(R), Ovid MEDLINE(R) In-Process &

Other Non-Indexed Citations, PsycINFO and PsycArticles Full Text (1806 to

February 2015). The literature search was limited to humans but had no language or

publication type restrictions (journal, conference, paper or dissertation).

The processes of building the search strategy, study selection and duplicate

exclusion were done by the author of the present thesis (Sara Mesquita da Silva,

S.M.S.) and the first supervisor (Sofia Gameiro, S.G.) and all papers then sifted for

relevance based on their title and abstract. When these seemed relevant the full

paper was accessed. Disagreements about inclusion were solved by discussion until

consensus was reached. Reasons for exclusion were noted for all full papers

accessed (see supplemental Table 2, Appendix A). The reference lists of included

studies were checked to identify additional relevant papers for inclusion. S.M.S.

emailed the first authors to obtain full texts that could not be accessed via other

methods (two book chapters, a PhD dissertation, and two journal articles).

Eligibility Criteria

Four inclusion criteria were used. Studies were included if they were: (a)

based on developmental regulation theories; (b) referred to the specific situation of

parenthood goal blockage; (c) reported on at least one quantitative association

(significant or not) among goal blockage, wellbeing and self-regulation strategies;

and (d) reported original quantitative data. The use of developmental regulation

theories was inferred if the authors used a valid (previously tested) theory as the

rationale of the article.

Data Extraction

The present data extraction process was developed in accordance with the

Cochrane Handbook for Systematic Review of Interventions guidelines (Higgins &

Green, 2011). Data extraction was independently done by S.M.S and S.G. First,

data related to the main study characteristics were extracted: country; sample

(sample size, gender, mean age (*SD*), age range); sample characteristics (population

and context); general aim and study design.

Data about the conceptualisation and operationalisation of the study variables

were also extracted. This extraction included the theoretical framework (the use of a

valid developmental regulation theory), the theoretical propositions tested

(association between blocked parenthood goal and wellbeing, blocked parenthood

goal and self-regulation strategies and self-regulation strategies and wellbeing) and

the moderator variables (type and degree of goal blockage). The first moderator

variable of the study was the type of goal blockage and it was categorised according

to whether it was unanticipated or anticipated. Blocked parenthood goal was defined

as being unanticipated for those participants who were facing an unexpected medical

threat, i.e. when the sample referred to patients diagnosed with infertility,

undergoing fertility treatment or who had already finished the treatment process. An

anticipated blockage was considered when blockage was associated with the

participants' age because these participants were not facing an unexpected medical

event and were probably dealing with the consequence of postponing parenthood.

The second moderator variable was the degree of blockage participants were

experiencing. For those assigned to an unanticipated blockage (i.e., infertility), the

degree of blockage was considered low if the study sample was in the diagnostic

phase, was undergoing a type of initial treatment such as Intrauterine Insemination

(IUI) or were undergoing *in-vitro* Fertilization (IVF) or Intra-cytoplasmic Sperm

Injection (ICSI) treatment for less than 12 months. Otherwise unanticipated

blockage was considered high because a year is usually required to complete the

typically recommended regimen of three IVF or ICSI cycles (Smith et al., 2015).

For those participants assigned to an anticipated blocked goal (i.e., age-related), the

degree of blockage was defined as low when women were between 29-40 years of

age and as high if women were over 40 because fertility gets close to null after the

age of 40 years (Broekmans et al., 2007).

Third, data about the measures used in each study to assess goal blockage,

wellbeing and self-regulation, and their reliability were also extracted. These data

included extracting whether the study used an objective (age and infertility

diagnosis) or subjective measure of goal blockage (i.e., self-report items, e.g. "*How*

blocked do you feel in your goal of becoming a parent?") and which self-regulation

strategies (goal disengagement and reengagement) were assessed. When a study

operationalised self-regulation using multiple indicators of each self-regulation

strategy (e.g., study 1 of Heckhausen, Wrosch, & Fleeson, 2001), only one indicator

for each strategy was extracted to perform the meta-analyses. The indicators were

chosen according to the degree to which their content was relevant for each one of

the self-regulation strategies included. Disagreements about content relevance of the

indicators were solved by discussion. Data about the wellbeing measure were

extracted and coded positive when it used positive affect, positive states of mind and

life satisfaction, and negative when it used depressive symptoms and negative affect.

One of the first authors of the studies included was contacted in order to obtain data

for the variables goal blockage, goal disengagement, goal reengagement and wellbeing that were not presented in the paper. Finally, to calculate pooled estimates of the associations tested, the study sample size, correlation coefficient(s) or standardised beta coefficient(s) for the test of association among goal blockage, self-regulation strategies and wellbeing were extracted from each paper.

Quality Assessment

S.M.S. and S.G. assessed the quality of the included studies according to a quality assessment scale they developed. Four general quality criteria were used. Points for representativeness of the study sample (four points) were attributed if (a) the blockage to parenthood goal experienced by participants was clearly defined by the authors (one point); (b) more than 80% of eligible participants agreed to participate in the study (one point); (c) more than 80% of those who participated completed the follow-up study (one point); and (d) correlates or predictors (main socio-demographic variables, such as age, gender, educational level and number of children) of study dropout were taken into account (one point). It was also awarded a point if there was an adequate use of a theoretical framework, i.e. if the aims and hypotheses of the study were clearly derived from developmental regulation theories. Measurement quality was considered to be valid if evidence of construct validity was provided, i.e. validated measures were used or data on construct validity in the study sample was provided (one point). Measures were considered reliable if the authors presented satisfactory values of internal consistency ($\alpha \geq .70$) for the study sample, or inter-rater reliability checks when using behavioural measures (one point). Finally, the evaluation of the study hypotheses was assessed with four criteria (four points): One point was awarded to studies that assessed causal relationships between variables by using a longitudinal or experimental design. Studies with enough power

Chapter 2

to detect significant statistical associations (i.e., small effect sizes) were also awarded one point. Power was determined by G*Power software (Faul, Erdfelder, Lang, & Buchner, 2007). Finally, we evaluated if all potential bias or unmeasured confounders were assessed (one point) and if the analytical plan allowed for the correct testing of the specified hypothesis (one point).

The overall quality rating was the sum of all met criteria and could range from zero to 11 points. The quality rating was divided in three main quality labels, low (scores from zero to four points), medium (scores from five to nine points) and high (scores from 10 to 11 points).

Data Analysis

Eight meta-analyses were performed to evaluate the direction and magnitude of the associations among goal blockage, negative mood, positive mood, goal disengagement and reengagement. Pooled effect size estimates of the associations examined were calculated using sample size, the correlation coefficient(s) or standardised beta coefficient(s). A random-effects model was chosen because it was assumed that each population of the studies included would reflect a different effect size due to the existence of heterogeneity in the general characteristics of the samples (e.g., sample size, gender, age and population context; Borenstein, Hedges, Higgins, & Rothstein, 2009). The proportion of variation in the pooled estimates caused by heterogeneity was calculated with I^2 index. Subgroup analyses were performed on the possible conceptual moderator variables type of blockage (anticipated or unanticipated) and degree of goal blockage (low or high). Sensitivity analyses were used to investigate whether results were robust to study design (quasi-experimental or cross-sectional and longitudinal) and study quality (low, average or high). The X^2 test was used to assess differences in subgroup analyses. Finally,

publication bias was checked with Egger's test and by visual inspection of the funnel plots (Borenstein et al., 2009). In the presence of publication bias, the adjustment of the pooled estimates was done by using the trim and fill test (Duval & Tweedie, 2000). The analyses were performed with Comprehensive Meta-analysis software (2005).

Results

Description of Studies Identification and Selection Procedure

Figure 2.1 shows the results of the studies identification and selection procedure. As shown, a total of 4977 records were screened, 21 full texts assessed for eligibility, and six articles reporting on seven studies included in the meta-analyses (Heckhausen et al., 2001; Kotter-Grühn, Scheibe, Blanchard-Fields, & Baltes, 2009; Kraaij, Garnefski, & Schroevers, 2009; Light & Isaacowitz, 2006; Salmela-Aro & Suikkari, 2008; Thompson, Woodward, & Stanton, 2011).
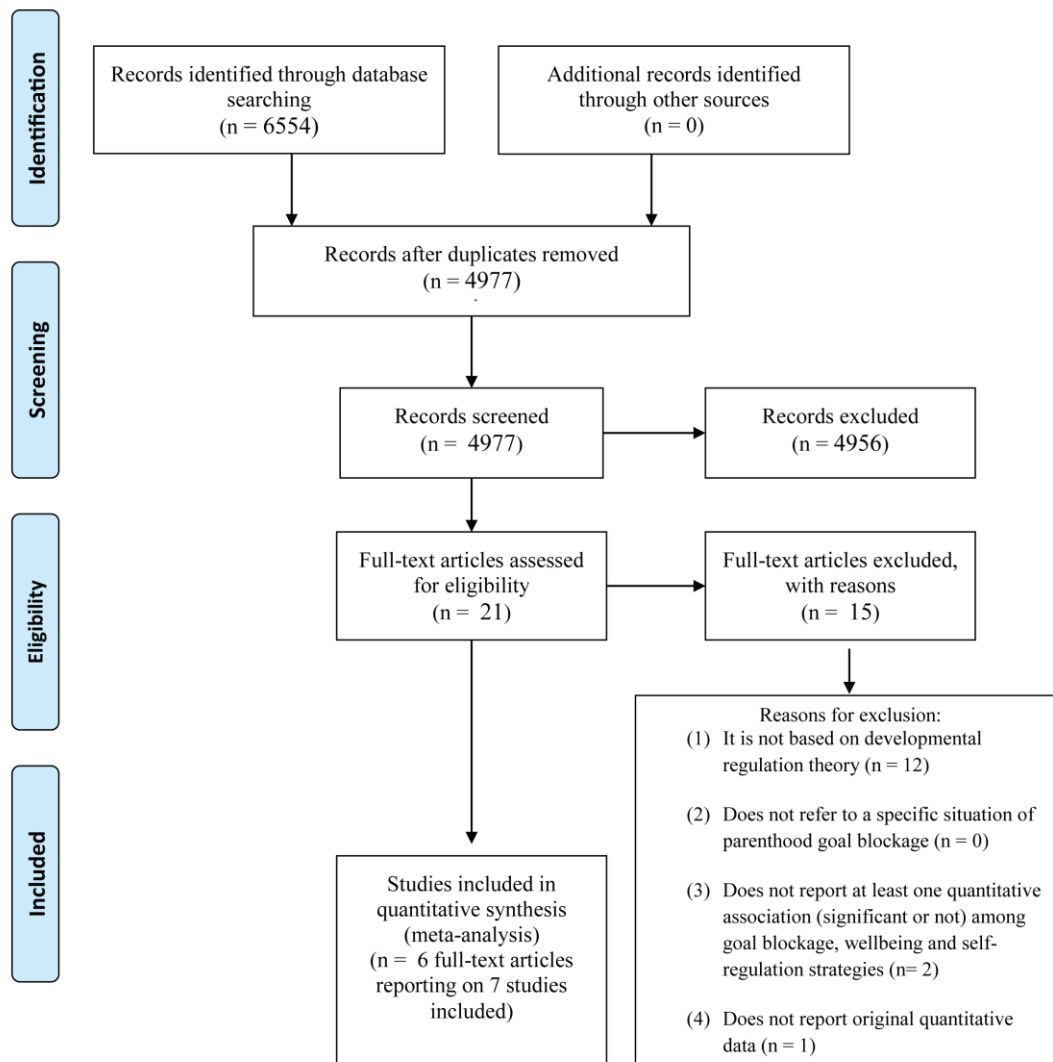
Figure 2.1. Flowchart of Studies Identification and Selection Procedure.

Chapter 2

General Characteristics of the Included Studies

Table 2.1 contains the general characteristics of the seven studies included. Two studies were conducted in the United States and five in Europe. A total of 672 people participated, with five out of seven studies (71%) sampling only women and 29% sampling men and women. Two studies (29%) (Kraaij et al., 2009 and Salmela-Aro & Suikkari, 2008) included couples in the total number of men and women who participated. Four studies (57%) assessed people from the general population at different parenthood deadline phases and three out of seven studies (43%) sampled patients undergoing fertility treatment, and one sampled both. Two studies had a longitudinal design (29%), four were quasi-experimental (57%) and one had a cross-sectional design (14%). Table 2.2 shows the conceptualisation and operationalisation of the study variables. Three out of seven studies (43%) investigated the association between goal blockage and wellbeing and three of seven (43%) the associations between goal blockage and self-regulation strategies. Almost all the included studies (86%) analysed the association between self-regulation strategies and wellbeing. Table 2.3 shows the measures used to assess goal blockage, wellbeing and self-regulation strategies and their reliability (when applicable). Three out of seven studies (43%) operationalised objective goal blockage as participant age, one out of seven (14%) used infertility diagnosis and three out of seven (43%) used subjective self-report items about perceived goal blockage. All the included studies assessed wellbeing with well-known and widely validated measures (e.g., Center for Epidemiology Studies Depression Scale). Six out of seven studies (86%) measured negative states of wellbeing and five of seven (71%) also measured positive states of wellbeing. In total, 100% studies assessed either negative or positive wellbeing.

Chapter 2

Table 2.1. *General Characteristics of the Studies*

Studies (N = 7)	Country	Sample N, gender, mean age (*SD*), age range	Sample characteristics (population and context)	General aim (as described by the authors)	Study Design
Heckhausen (2001) (study 1)	Germany	94 women, 27 – 46 years	General population – 2 groups: (1) women who passed parenthood deadline (40-46, no children) and (2) women who are currently approaching the deadline with no children (27-33, no children)	To explore self-regulation strategies (engagement and disengagement) individuals use in different stages of parenthood goal blockage.	Quasi-Experimental
Heckhausen (2001) (study 2)	Germany	126 women, 29 – 56 years	General population – 2 groups: (1) women who passed parenthood deadline (39-56, no children) and (2) women currently approaching the deadline (29-35, no children)	To explore self-regulation strategies (engagement and disengagement) individuals use in different stages of parenthood goal blockage.	Quasi-Experimental
Kraaij (2009)	Netherlands	59 women and 24 men, 45 (5.95) years	Infertile Patients	To explore associations between coping strategies, goal adjustment strategies (disengagement and reengagement) and positive and negative affect.	Cross-Sectional
Salmela-Aro (2008)	Finland	54 women, 33.92 (0.34) years and 43 men, 35.68 (0.45) years	Infertile Patients	To examine child-related goal adjustment during infertility treatments and how it affects wellbeing.	Longitudinal

Table 2.1. *General Characteristics of the Studies (Continued)*

Studies (N = 7)	Country	Sample N, gender, mean age (*SD*), age range	Sample characteristics (population and context)	General aim (as described by the authors)	Study Design
Thompson (2011)	USA	47 women, 33.13 (5.57) years	Infertile Patients	To examine associations between goal adjustment and psychological adjustment in the context of infertility.	Longitudinal
Light (2006)	USA	Urgent group: 29 women, 27.86 (2.33) years; Passed group: 28 women, 43.96 (3.09) years	General population – women who self-reported they had never had children	To investigate the attention mechanisms related to the self-regulation strategies of goal engagement and disengagement in a life-span context.	Quasi-Experimental
Kotter-Grühn (2009)	Germany	168 women[a], 45.20 (6.60) years	General population and Infertile patients	To investigate whether an intense desire for ideal states of life (life longings) emerge when individuals are confronted with an unattainable goal and to investigate if pursuing an unattainable goal as a life longing leads to better wellbeing.	Quasi-Experimental

Note. USA = United States of America; *SD* = standard deviation. [a]Self-regulation strategies of disengagement and reengagement were not assessed in 66 out of 168 women who indicated they did not have a former or current parenthood goal.

Chapter 2

Table 2.2. *Study Variables Conceptualisation and Operationalisation*

Studies	Theory	Goal Blockage	Self-regulation strategies	Wellbeing	Associations investigated		
					Goal Blockage – Wellbeing	Goal Blockage – Self-Regulation	Self-Regulation – Wellbeing
Heckhausen (2001) (1)	The Action-phase Model of Developmental Regulation (Heckhausen, 1999)	Objective GB - Age	Indicators of goal disengagement and reengagement	Positive and negative affect	NI	Associations between indicators of goal disengagement and goal reengagement with goal blockage	Associations between indicators of goal disengagement and goal reengagement with positive and negative affect
Heckhausen (2001) (2)	The Action-phase Model of Developmental Regulation (Heckhausen, 1999)	Objective GB - Age	Goal disengagement	Depressive symptoms	NI	NI	Associations between goal disengagement and depressive symptoms
Kraaij (2009)	Theoretical assumptions of Adaptive Goal Adjustment (Wrosch et al., 2003)	Objective GB - men and women with infertility diagnosis	Goal disengagement and goal reengagement	Positive and negative affect	NI	NI	Associations between goal disengagement and goal reengagement with positive and negative affect
Salmela-Aro (2008)	Several different theoretical frameworks about child-related goal appraisals	Subjective GB - 3 items, e.g. "How far has this goal progressed?"	NI	Depressive symptoms	Association between goal blockage and depressive symptoms	NI	NI

Table 2.*2. Study Variables Conceptualisation and Operationalisation (continued)*

Studies	Theory	Goal Blockage	Self-regulation strategies	Wellbeing	Associations investigated		
					Goal Blockage – Wellbeing	Goal Blockage – Self-Regulation	Self-Regulation – Wellbeing
Thompson (2011)	Theoretical assumptions of Adaptive Goal Adjustment (Wrosch et al., 2003)	Subjective GB - 1 item, "How blocked do you feel in your goal of becoming a parent?"	Goal disengagement and goal reengagement	Depressive symptoms and positive states of mind	Associations between goal blockage and depressive symptoms and goal blockage and positive states of mind	Associations between perceived goal blockage and goal disengagement and reengagement	Associations between goal disengagement and goal reengagement with depressive symptoms and positive states of mind
Light (2006)	The Action-phase Model of Developmental Regulation (Heckhausen, 1999)	Objective GB - Age	Indicators of goal disengagement (number of sentences recalled)	Positive and negative affect	NI	NI	Associations between goal disengagement and positive affect and goal disengagement and negative affect
Kotter-Grühn (2009)	Theoretical assumptions of Adaptive Goal Adjustment (Wrosch et al., 2003)	Subjective GB -6 items, e.g. "I am sure I can fulfill my wish for a child sometime."	Goal disengagement and goal reengagement	Life satisfaction (Happiness)	Associations between goal blockage and life satisfaction	Associations between goal blockage and goal disengagement and goal blockage and goal reengagement	Associations between goal disengagement and life satisfaction and goal reengagement and life satisfaction

Note. GB = goal blockage; NI = not investigated in the study

Chapter 2

Table 2.3. *Measures used to assess Goal blockage, Self-regulation and Wellbeing and its Reliability (when applicable)*

Studies	Goal blockage	α	Wellbeing	α	Self-regulation	α
Heckhausen (2001) (1)	Women age, 27 – 46 years	NA	Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988)	NR	Open format questionnaire (Heckhausen, 1997)	92% inter-rater agreement
					Memory recall task	98% inter-rater agreement
Heckhausen (2001) (2)	Women age, 29 – 56 years	NA	Center for Epidemiology Studies Depression Scale (CES-D; Radloff, 1977)	.90	OPS Scale (four subscales) for Child-wish developed by the authors	.87(SPCS), .83(SSCS), .87(CPCS), .39(CSCS).
Kraaij (2009)	Definitive infertility	NA	Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988):		Goal adjustment scale (Wrosch et al., 2003):	
			Positive Affect Scale	.90	Goal Disengagement Scale	.71
			Negative Affect Scale	.84	Goal Reengagement Scale	.88
Salmela-Aro (2008)	3 self-report items about perceived goal attainability (e.g. "How far has this goal progressed?")	♀(.63, .60, .67, .78, .70, .78); ♂ (.65, .86, .88, .86, .86, .64)	Beck Depression Inventory	NI ♀(.92,.90) ♂ (.90, 89)	NI	NI

Table 2.3. *Measures used to assess Goal blockage, Self-regulation and Wellbeing and its Reliability, when applicable (continued)*

Studies	Goal blockage	α	Wellbeing	α	Self-regulation	α
Thompson (2011)	1 self-report item about subjective goal blockage (e.g., "How blocked do you feel in your goal of becoming a parent?")	NA	Center for Epidemiology Studies Depression Scale (CES-D; Radloff, 1977)	.94	Self-reported measure developed by the authors:	
			Positive States of Mind Scale (Horowitz et al., 1988)	.92	Goal Disengagement Scale	.92 (Time 1); .89 (Time 2)
					Goal Reengagement Scale	.89 (Time 1); .87 (Time 2).
Light (2006)	Women age:		Positive and Negative Affect Scale (PANAS; Watson, Clark & Tellegen, 1988):		Memory recall task	97% inter-rater agreement
	Urgent group: 27.86 (2.33) years	NA	Positive Affect Scale	.83		
	Passed group: 43.96 (3.09) years	NA	Negative Affect Scale	.78		
Kotter-Grühn (2009)	Subjective attainability 6-item scale partly taken from the Life Longing Realization Scale (Scheibe, 2005)	.81	The Temporal Satisfaction with life Scale (Pavot, Diener & Suh, 1998)	.89	Goal adjustment scale (Wrosch et al., 2003):	
					Goal Disengagement Scale	.84
					Goal Reengagement Scale	.95

Note. α = Cronbach's alpha values of the studies samples; NR = not reported in the study; NI = not investigated; NA = non-applicable; SPCS = Selective primary control subscale; SSCS = Selective secondary control subscale; CPCS = Compensatory primary control subscale; CSCS = compensatory secondary control subscale; GDS = goal disengagement scale; GRE = goal reengagement scale; ♀ = women results; ♂ = men results.

Chapter 2

Quality Assessment

Supplemental Table 3 (Appendix A) shows the quality rating details for all the studies included in the present systematic review and meta-analyses. From the total number of studies included, none met all the representativeness criteria, 100% had an adequate use of a theoretical framework, 14% (n =1) met all the measurement criteria for reliability, and none met the criteria for the evaluation of the hypotheses. The overall quality ratings indicate four average (57%) and three poor (43%) quality studies with almost perfect agreement (S.M.S. and S.G., Cohen's $k = .89$, $p < .001$).

Meta-Analyses

The diagram in Figure 2.2 presents a summary of the theoretically proposed hypotheses on which meta-analyses results have been mapped. Supplemental data in Tables 4-6 (Appendix A) show the effect size for the individual studies. Figure 2.2 shows that two of the eight associations were significant. Specifically, higher goal blockage was related to higher negative mood ($r =.33$, $p < .001$, $I^2 = .00$), and higher goal reengagement in alternative life goals was associated with higher positive mood ($r = .24$, $p < .001$, $I^2 = .00$).

$k = 2; r = \textbf{.33***}; I^2 = .00$

$k = 4; r = .12, I^2 = 86.21$

$k = 8; r = .06; I^2 = 80.11$

Goal Disengagement

Negative Mood

$k = 7; r = .09; I^2 = 26.84$

Blocked Goal

$k = 4; r = -.11; I^2 = 66.93$

$k = 4; r = -.24, I^2 = 76.95$

Goal Reengagement

$k = 5; r = \textbf{.24***}; I^2 = .00$

Positive Mood

$k = 2; r = -.10; I^2 = .00$
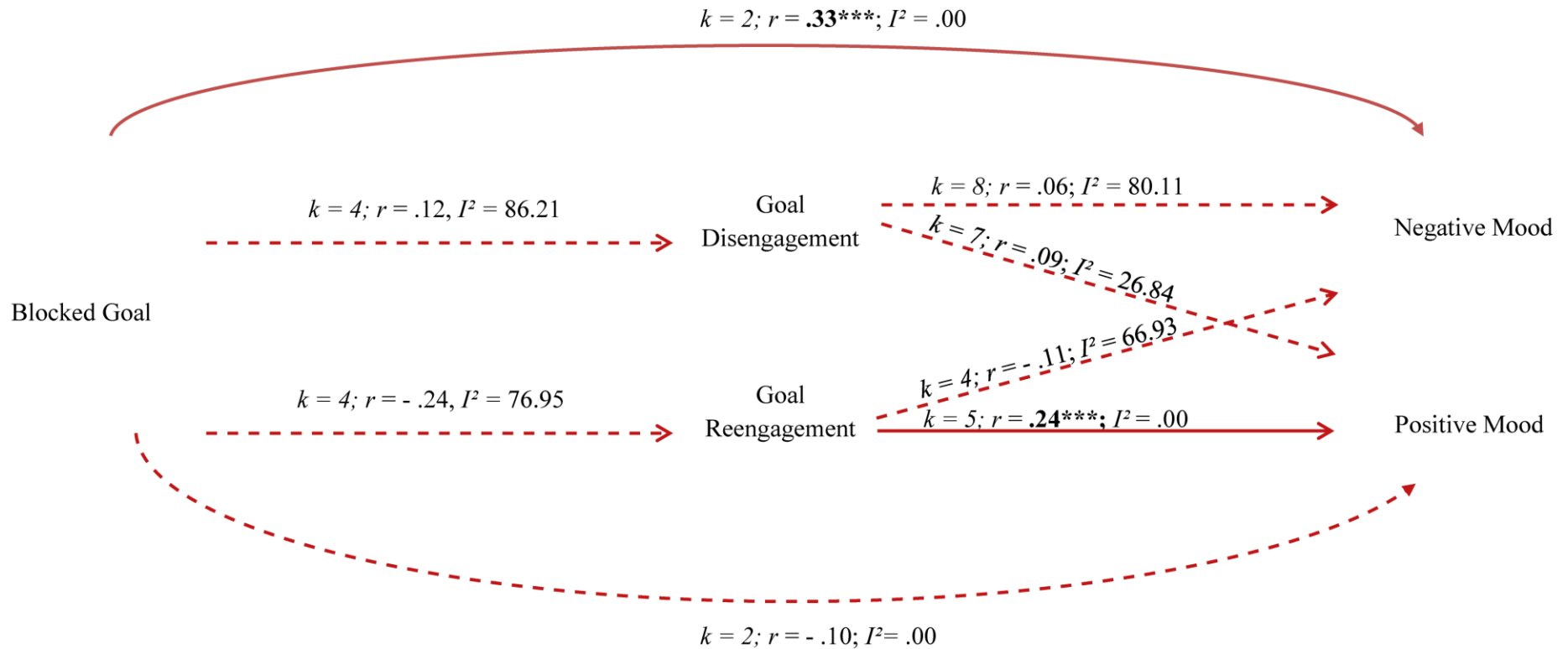
Figure 2.2. Summary Statistics for Random Effects Model of Pooled Effect Sizes. This is not a structural equation model. Diagram reflects the proposed paths in developmental regulation theory. Lines refer to proposed associations tested in the meta-analyses. Continuous line = significant association; Dashed line = non-significant association; k = number of studies testing the association; r = correlation coefficient; I^2 = I squared index; ***$p < .001$.

Chapter 2

Moderation of Effect Size

Due to a lack of studies, it was not possible to perform subgroup analyses for

the associations between blocked goal with wellbeing, and blocked goal with self-

regulation strategies. The sensitivity analyses performed on the associations

between blocked goal and self-regulation strategies were non-applicable for the

variable study design, and no differences were found for the variable study quality

(blocked goal with goal disengagement, $X^2 = 0.195$, $p = .66$; blocked goal with goal

reengagement, $X^2 = 2.425$, $p = .12$). The subgroup and sensitivity analyses

performed for the association between self-regulation strategies and negative mood

are presented in supplemental Table 7 (Appendix A). Only two of the 16 subgroup

and sensitivity analyses were significant. The type of goal blockage moderated the

association between goal disengagement and negative mood in a subgroup analysis.

There was a significant difference between the anticipated and unanticipated

subgroups ($X^2 = 4.867$, $p = .03$) but individually (i.e., in each subgroup), these

associations were non-significant (anticipated, $r = .18$, [-.04, .38], $p = .11$; non-

anticipated, $r = -.29$, [-.58, .07], $p = .11$). The sensitivity analysis also showed that

the direction of the association between goal disengagement and negative mood

varied according to study quality ($X^2 = 4.867$, $p = .03$). However, within each group

these associations were non-significant.

Supplemental data in Table 8 (Appendix A) shows the moderation and

sensitivity analysis performed on the association between self-regulation strategies

(goal disengagement and goal reengagement) and positive mood. There was not any

significant evidence for an association between self-regulation strategies and positive

mood in the subgroup or sensitive analysis performed.

Publication Bias

Visual inspection of the funnel plot and the Egger's test indicated the presence of publication bias for the associations between blocked parenthood goal and goal reengagement (*intercept* = - 9.28, *t* = 7.97, *p* = .01) and between goal disengagement and negative mood (*intercept* = 8.65, *t* = 3.37, *p* = .01). Trim and fill identified one study missing to the right of the mean for the association between goal blockage and goal reengagement (i.e., positive association, see supplemental Figure 1, Appendix A) (adjusted value, *r* = -.17 [- .40, .08]) and none missing for the association between goal disengagement and negative mood. The presence of publication bias was not detected by Egger's test for the association between goal disengagement and positive mood but was identified by visual inspection of the funnel plot and the trim and fill test suggesting the existence of one study missing to the right of the mean (i.e., positive association, see supplemental Figure 2, Appendix A) (adjusted value, *r* = .12 [-.00, .24]).

Discussion

Main Findings

The results of the meta-analyses indicate that the existing evidence regarding a blocked parenthood goal only partially supported two of the three main predictions of developmental regulation theories. Overall, people were, as predicted, more likely to experience poorer wellbeing (e.g., higher depression, negative affect) when facing a blocked parenthood goal but were not more likely to disengage from the parenthood goal and reengage in alternative life goals. Further, only reengagement showed to be positively associated with wellbeing. However, some subgroup differences found suggest that the predictions may be valid but need to be

Chapter 2

reconsidered in light of other moderating influences relevant to parenthood goals. The main limitations of the review were the scarce body of primary research on parenthood goal blockage, self-regulation and wellbeing and the presence of publication bias. The main limitation of the primary research was the lack of consistent operational definitions for blocked parenthood goal. These issues will be developed further.

The meta-analyses did not provide strong support for developmental regulation theories for a blocked parenthood goal. There may be multiple explanations for poor theoretical fit. The unique features of this goal may mean that developmental regulation is less able to account for relevant outcomes. First, its dyadic nature implies the existence of a shared investment by both members of a couple (Fitzsimons, Finkel, & vanDellen, 2015). Past research on developmental regulation has almost always taken the individual level of self-regulation as the main unit of analysis, and this was the case for primary studies included in the present meta-analyses. More recent studies suggest that the use of an individual level of analysis weakens the explanatory power of developmental regulation theories by misrepresenting the phenomenon of self-regulation (Fitzsimons et al., 2015). This is because by only capturing the individual level of regulation, researchers are neglecting the influence of interpersonal processes that have been shown to affect the way individuals regulate in relation to personal goals such as losing weight (Christakis & Fowler, 2007; Leahey, Kumar, Weinberg, & Wing, 2012).

An alternative perspective is that developmental regulation theory is relevant to the blocked parenthood goal but the theory needs to be reconsidered in light of moderator influences on key constructs that arise from this unique goal. First, goal reengagement was associated with positive (life satisfaction, positive frame of mind)

but not negative (depressive symptoms, negative affect) wellbeing, indicating that reengagement produces a divergent effect in wellbeing: it makes people feel good but does not necessarily take away the stress, disappointment or discontent that comes from failing to achieve an important life goal. Previous studies found that reengaging in other life goals when facing an unattainable goal was associated with low levels of depression (Wrosch et al., 2003) but these were not observed in the present study in relation to negative mood. Divergence may be specific to the parenthood goal because it is a hard goal to replace – one cannot, like with other goals, easily replace it. A possible alternative is to substitute biological parenthood with adoption, but it does not suit everyone and tends to delay adjustment (Daniluk, 2001). If parenthood cannot be easily replaced, then one must consider that the purpose of reengagement is coping with the stress caused by the parenthood loss rather than exploring a way forward after goal failure. Another possible explanation is that the impact of goal reengagement on wellbeing is dependent on the ability to disengage from the parenthood goal. In a study conducted with undergraduate students, failing to reengage led to high perceived stress and low self-mastery levels and this happened especially for those students struggling to disengage from an unattainable goal (Wrosch et al., 2003). This also suggests that the effects of disengagement and reengagement on wellbeing are not independent but likely to interact, an important issue to be addressed by future research in the context of a blocked parenthood goal.

A second form of moderation that should be considered in theoretical work is whether the way in which goals become blocked matters to eventual outcomes. Results from this chapter indicate that the value of disengagement differs according to whether goals were anticipated or not. The data suggests that, in accordance with

Chapter 2

the theory, it is adaptive to disengage from unanticipated goals (infertility).

However, it showed that it is maladaptive to disengage from anticipated goals (age).

Decision-making research may be useful to explain this unexpected result. It

suggests that when individuals are confronted with a goal that implies anticipated

action (i.e., anticipated blockage), they perceive themselves to be responsible for the

consequences of engaging or not with the goal (Anderson, 2003). It is this

perception of responsibility, which is absent in unanticipated goals, that may be the

reason for worse adjustment. Indeed, research showed that it manifests in terms of

anticipated regret, which corresponds to a negative emotional state that occurs when

people anticipate the consequences of their decision-making (Anderson, 2003;

Ordóñez & Connolly, 2000). Therefore, the more one disengages by delaying

decision-making, the more one delays goal achievement and, consequently,

experiences more regret. However, it should be noted that although the subgroup

comparisons were significant, the omnibus subgroup tests were not due to the small

sample size. For that reason, this finding needs replication in future research.

  Although parenthood is one of the most central goals in adulthood there is

still a scarce body of research on developmental regulation theories and parenthood

goal. Of the 4977 records screened in our review, only seven studies examined

parenthood goal blockage from the perspective of developmental regulation theories.

12 studies were excluded because they used other theoretical frameworks such as

coping theories (Freeman et al., 1987; McQueeney, Stanton, & Sigmon, 1997; Terry

& Hynes, 1998). This was done to ensure the conceptual validity of the present

study. Indeed, coping and developmental regulation strategies are not conceptually

equivalent. For instance, while avoidant coping and disengagement imply

withdrawing efforts to address the stressor/blockage, they differ in their functional

value. The first implies non-confrontation while the second implies acceptance

regarding the stressor/blockage. Therefore they are also expected to have

differential impact on wellbeing.

The review also highlighted a lack of conceptual clarity in the way that the

blocked parenthood goal has been operationalised in research. This should be

addressed by future research. In the medical literature, people are considered to have

fertility problems when they have had regular, unprotected sexual intercourse for 12

or more months without conceiving (Zegers-Hochschild et al., 2009) or have a pre-

defined medical problem (e.g., Turner syndrome). This level of precision should be

used to define a medical unanticipated parenthood goal blockage within the

developmental regulation literature. Further, in the medical literature the cut-off for

old parenthood age tends to be 35 years (European Society of Human Reproduction

and Embryology Capri Workshop Group, 2005). Applying the same logic, women

and couples should be said to be facing an anticipated parenthood goal blockage

when women are 35 or older. A similar cut-off needs to be identified for single or

gay men pursuing parenthood. Defining a goal blockage using subjective indicators

is a more complex issue. First, different scales are currently being used. From the

ones included in this review, the subjective attainability six-item scale used by

Kotter-Grühn et al. (2009) was the most reliable ($\alpha = .81$) but its validity is not

known. Second, regardless of the scale used, it would be important to try to establish

cut-off scores that would indicate a subjective understanding of when a goal is

blocked. Different methods have been developed that can be used to achieve this.

For instance, the World Health Organization (WHO) advises the use of consistent

magnitudes between the different labels of the response scales (Szabo, Orley, &

Saxena, 1997), e.g., finding the best textual descriptors that represent regular

intervals in terms of the degree of blockage such as halfway between 'not blocked'

and 'completely blocked'. Agreement on a precise operational definition of a

blocked parenthood goal in the literature could help solve the problem of the lack of

conceptual clarity.

The quality of the primary research included was variable. Of the seven

studies, 43% were rated as low quality, mainly because the studies'

representativeness could not be assessed (due to lack of reporting of response rates),

poor quasi-experimental and cross-sectional designs, and inadequate testing of their

research hypotheses (e.g., low statistical power). Past research on developmental

regulation has highlighted the importance of using longitudinal designs when testing

developmental regulation theories in order to capture the micro-sequential changes

of self-regulation strategies (Haase et al., 2013). However, the decision about

whether and when to have children is one that unfolds over a long period of time,

and identifying a practical research paradigm that can allow for an acceptable and

feasible longitudinal study of these constructs in couples about to start trying to

conceive will be a challenge. The use of clinical samples of patients undergoing

treatment is practical, but also has its challenges. For instance, an important one is

that only about 56% of people with fertility problems opt to seek medical advice

(Boivin, Bunting, Collins, & Nygren, 2007), which means that samples would not

necessarily represent the population of people experiencing an unanticipated goal

blockage.

The sensitivity analysis performed on the association between goal

disengagement and negative mood suggested non-consistency in findings reported

according to study quality. This analysis showed that when only average quality

studies were included in the meta-analysis, greater goal disengagement was

associated with lower negative mood, supporting the theoretical prediction.

However, even if subgroup comparisons were significant, due to small sample size,

the omnibus subgroup tests were non-significant and this finding needs further

clarification from future research. In sum, sensitivity analyses suggest that results

may vary according to the quality of the studies included, but unfortunately there

were no high quality studies in primary research to make an estimation of what

results would be. Definitive conclusions about the applicability of developmental

regulation theory to the parenthood goal should therefore be made when relevant

research achieves a higher quality standard.

Finally, low power is likely to have undermined the comprehensiveness of

the evidence base. The presence of publication bias in two of the associations tested

indicated that the 'missing' studies were those that would support developmental

regulation theory. The absence of such studies is unlikely to be a bias due to

preference for other explanatory theoretical approaches such as cognitive coping

theories to explain delayed or blocked parenthood goals. Most likely, bias is due to

the absence of studies capable of showing a significant effect as more than half of

the studies did not have enough power to detect significant associations between the

study variables.

Strengths and Limitations

Meta-analyses.

This meta-analysis is timely and appropriate given the lack of systematic

reviews evaluating developmental regulation theories. Indeed, although two

comprehensive and integrative reviews on this topic exist (Haase et al., 2013; Poulin,

Haase, & Heckhausen, 2005), these did not involve an exhaustive and systematic

review of the literature and quantitative evaluation of basic predictions. The present

Chapter 2

meta-analyses followed a systematic implementation procedure and official

guidelines for conducting systematic reviews and meta-analysis (i.e., PRISMA

statement, see supplemental Table 9, Appendix A). The search strategy used was

systematic and exhaustive as it covered eight databases. The processes of study

selection and assessment were done by two independent researchers (the author of

the present thesis, S.M.S and the primary supervisor S.G.) and based on detailed *a*

priori defined criteria. Subgroup analyses were pre-specified before being carried

out in order to include relevant conceptual moderator variables that could contribute

to the progress of the developmental regulation field. In addition, sensitivity

analyses were performed to assess the robustness of results in relation to

methodological issues and the risk of publication bias was controlled by using

different statistical tests (such as Egger's test and Trim and fill). All these

contributed to an extensive test of the reliability of results.

Studies included.

There are important limitations related to the primary research that also

influenced the present meta-analyses. First, all studies were conducted in developed

countries in Europe and also in the USA, which means that the results reported are

influenced by the specific values and norms related to the parenthood goal in those

cultures. Some studies have shown that the motivational processes of parenthood are

influenced by the individuals' cultural values and norms (Heaton, Jacobson, &

Holland, 1999). Furthermore, regarding the sample characteristics of the studies

included, all of them investigated heterosexual couples and did not focus on other

possible populations, such as gay couples that usually have to deal with higher levels

of parenthood goal blockage due to social norms and values (Riskind & Patterson,

2010).

In sum, the present systematic review and meta-analyses brings forward a complex interplay between blocked parenthood goal, self-regulation strategies and wellbeing which has not yet been address by the empirical research available so far. Developmental regulation theories have been supported in different contexts of life-goal blockages, such as intimate relationships and health conditions (Wrosch et al., 2005; Wrosch & Heckhausen, 1999). However, based on the present chapter results it seems premature to make any confident conclusion about the validity of developmental regulation theories when applied to the specific situation of parenthood goal blockage. A contribution to the developmental regulation field in the specific context of a blocked parenthood goal has been made by proposing a clear conceptualisation of blocked parenthood goal based on evidence from past research. Further studies are required to evaluate the value of developmental regulation theories for parenthood goal because too few studies exist, and important conceptual issues and methodological limitations have not yet been resolved in primary research.

**Chapter 3: Individual and Dyadic Regulation after a failed Fertility
Treatment: a Qualitative Study**

Introduction

The goal of biological parenthood can become blocked when couples are diagnosed

with infertility. Fertility treatment often involves undergoing multiple treatment

cycle attempts with 78% of people recommended to use *In Vitro Fertilization* (IVF)

willing to undergo at least three cycles (Gameiro et al., 2013). The per cycle

pregnancy rate for IVF is similar to natural fecundity (e.g., 22%, De Mouzon et al.,

2009) but the cumulative pregnancy rate over the three cycles is higher (e.g., 49%,

Stern et al., 2010). After each failed cycle, couples must decide whether or not to

undergo an additional treatment cycle. According to developmental regulation

theories, this decision space would be considered an active phase of individual and

dyadic regulation, as couples must reevaluate their motivation to keep pursing

parenthood, reflecting on the chances of being successful in the future.

Self-regulation is the process individuals engage in when they want to reduce

the discrepancy between what they have already achieved and their desired end-state

of goal achievement (Brandtstädter, 1989). Developmental regulation theories have

been used to explain how people address blocked goals, such as the blocked

biological parenthood goal (e.g., Heckhausen et al., 2001; Kraaij et al., 2009;

Thompson et al., 2011). The major theories of developmental regulation, i.e. the

Dual-Process Model of Assimilative and Accommodative Coping (Brandtstädter &

Rothermund, 2002), the SOC model (Freund & Baltes, 2000), and the MTD

(Heckhausen, et al., 2010) concur in the assumption that if people face a discrepancy

between their present and desired goal state they try to reduce the discrepancy and

the distress it creates by engaging in active goal pursuit (Haase, et al., 2013). This

pursuit implies staying committed to the goal and maintaining active efforts and

investment (e.g., time, money) to achieve it (Wrosch et al., 2003). People can also

choose to disengage from the goal, in which case their levels of commitment and

effort will decrease. This is often accompanied by engagement in other life goals.

The adaptive value of these strategies (engagement versus disengagement and

reengagement in other goals) differs according to context-specific life opportunities

such as age or goal attainability (Haase et al., 2013). When a goal becomes

unattainable, staying engaged is expected to lead to poor wellbeing whereas

disengaging from the goal or reengaging in new life goals is expected to contribute

to positive wellbeing (Wrosch et al., 2003). However, in respect to a blocked

parenthood goal, these predictions seem to be at odds with empirical research given

the recent systematic review and meta-analysis conducted in Chapter 2 which

showed that parenthood goal blockage was not associated with goal disengagement

or reengagement.

Previous studies with patients facing infertility have suggested that the vast

majority of patients (eight out of ten) can be expected to remain engaged with the

parenthood goal at least until they have exhausted the cycles recommended by their

doctor (Gameiro et al., 2013). This suggests infertile patients place a high value on

parenthood. Further, patients generally have unrealistic expectations about treatment

success at the start of fertility treatment (Hammarberg, Astbury, & Baker, 2001).

Although positive expectations decrease when patients experience an unsuccessful

cycle, patients nevertheless report they find it difficult to accept childlessness, even

after having decided to end treatment (Peddie, van Teijlingen, & Bhattacharya,

2005). It is unclear how individuals assess goal blockage and the role of this

Chapter 3

appraisal in decision-making about stopping treatment. One would expect that perceptions would be based on objective information about prognosis (e.g. age, number of failed attempts at conception) but a previous study focusing on fertility treatment showed that objective and subjective perceptions of goal blockage were not associated (Thompson et al., 2011). It could be that patients lack individualised information about the prognosis for each cycle. A systematic review of patient needs showed that fertility patients had a strong need for results and treatment information tailored to their own particular case to assist decision-making (Dancet et al., 2010). Indeed, in previous studies patients have mentioned doctors omitting relevant information about the chances of treatment success until close to the end of treatment (Peddie et al., 2005). It could also be that patients undervalue probabilistic information in favor of other issues, for instance, their desire for parenthood and the need to prevent regret in the future. The present study will explore how information about parenthood goal blockage influences decision-making.

Limited research has examined the process of regulation in the face of a blocked parenthood goal (e.g. Heckhausen et al., 2001; Kraaij et al., 2009; Phillips, Elander, & Montague, 2014; Thompson et al., 2001). Even less is known about the approaches people take to sustain or change their regulatory strategies. By approaches I mean specific behavioral and/or cognitive processes that can encourage engagement or disengagement in a given goal and reengagement in other goals. Previous studies hypothesise that people have a [biologically based] behavioral preference for goal striving and mostly try to stay engaged with a goal while they perceive the opportunities to achieve it as favorable (Heckhausen et al., 2010). Examples of the approaches people use to stay engaged include enhancing the positive evaluation of the chosen goal (e.g., increasingly valuing family activities) or

having positive illusions about the potential to control goal achievement (e.g.,

visualising implantation of embryo or IVF success). However, when the

opportunities to achieve the goal are perceived as unfavorable or completely

blocked, the regulation approaches used by individuals would switch to those that

could help them disengage from parenthood goal pursuit without causing blame or

undermining motivation for other life goals (Heckhausen et al., 2010). Such

approaches are supposed to sustain goal disengagement and include, for example,

distancing oneself from the blocked goal (e.g. postponing the decision of doing more

treatment) and, consequently, protecting motivational resources from negative

experiences of failure (Haase et al., 2013). The ability to invest in other meaningful

life goals as an alternative to facing the blocked goal (e.g., investing more time in

career activities rather than in planning or doing fertility treatment) was also

suggested to result in better wellbeing (Wrosch et al, 2003). In the particular context

of infertility, previous research showed that patients tried to maintain investment in

other goals during fertility treatment such as investing in emotional wellbeing,

financial security and the couple relationship (Phillips et al., 2014). Although

research has examined the types of goals patients balance while undergoing fertility

treatment, it is still not clear what type of behavioural and cognitive processes are

involved in goal reengagement. A more in-depth understanding of the different

individual approaches people use to sustain their self-regulation strategies when

facing a blocked parenthood goal is needed, and could be provided using qualitative

methods.

Another important aspect that has received little attention in developmental

regulation research is how the members of a couple regulate together to achieve a

shared goal (Fitzsimons & Finkel, 2010). Recently, a set of hypotheses about dyadic

Chapter 3

regulation have been advanced in the *Transactive Goal Dynamics Theory* (TGD*;* Fitzsimons et al., 2015). TGD states that the couple is a transactive goal system marked by exchange between members regarding each other's goals, pursuits and outcomes and that the amount and strength of those exchanges will contribute to the existence of a transactive density within the system. According to TGD, higher transactive density leads to a greater likelihood of goal achievement when partners are able to efficiently coordinate their goals and pursuits. A high level of goal coordination depends on the existence of shared representations of the goal (e.g. both partners attribute a similar importance to parenthood goal) and relationship orientation and skills (e.g. both partners show a similar investment in activities meaningful for the relationship, such as time and effort spent on fertility treatments). When goal coordination is strong, higher transactive density is expected to result in greater chances of goal achievement. The added value of such numerous, strong, and coordinated interactions can be described as *transitive gain*.

A transactive gain exists when the likelihood of achieving a goal is higher for partners as a consequence of being part of a unit in which relevant skills and resources are shared, than as a single person. For example, partners could benefit from being part of a unit by reminding each other when to attend medical appointments, and as a consequence of resource coordination, there would be an increased chance of achieving the parenthood goal as a couple. On the other hand, when coordination skills are poor, even when transactive density is high, couples are expected to experience *transactive loss* (i.e., when being a member of a couple does not lead to higher chances of achieving a given goal compared to pursuing the same goal as individuals). For example, if only Partner A gives up or postpones the achievement of his/her fitness goals in order to attend medical appointments and

Partner B does not, Partner A feels discouraged, misses appointments, and eventually gives up on treatment. Therefore, Partner A's chances of achieving parenthood are lower as a unit than individually. Although these principles can be applied to the pursuit of any dyadic goal, the types of transactive gains and losses that occur within the context of infertility treatment remain unspecified. This study will thus be useful for developing our understanding of how both members of the couple contribute to transitive density and for identifying the specific transactive gains and losses that occur when a couple undergo fertility treatment.

The Present Study

Focusing on the period after a failed treatment cycle, the present chapter aims to investigate the individual and dyadic approaches through which couples monitor goal progression and activate and maintain self-regulation strategies. Specifically, the aim was to capture the psychological aspects of ongoing regulation in the period of decision-making about doing or not doing another treatment cycle. Interpretative Phenomenological Analysis (IPA) can provide a detailed examination of how couples make sense of the psychological approaches involved in the use of individual and dyadic regulation strategies.

Methods

Research Participants

Participants were Portuguese heterosexual couples recruited from an online support group who had experienced an unsuccessful fertility treatment cycle. In the Portuguese health system heterosexual couples living together for at least two years have access to three free *in vitro* fertilization (IVF) cycle attempts at a public facility under the national health plan. Couples could participate in the study if they

experienced a failed IVF or ICSI treatment cycle between six weeks and one year prior to study invitation; were not advised to discontinue treatment due to poor prognosis; were deciding whether or not to do another cycle and both members agreed to participate. The interval of six weeks to one year was selected because six weeks allowed for couples to recover from a failed cycle (Verhaak et al., 2007) and one year was the upper boundary after which couples not opting to undergo treatment are considered to have discontinued treatment (Gameiro et al., 2012). The Ethics Committee of the School of Psychology, Cardiff University provided ethical review and approval for this study.

The total sample was composed of eight couples (16 individuals) selected from 23 individuals who responded to the study invitation and met the inclusion criteria. Purposive sampling was used with the intention to find a homogenous sample for whom the study research question had a similar meaning (e.g., all had a treatment failure experience) but that allowed patterns of convergence and divergence to emerge within the study sample (Smith, Flowers & Larkin, 2009), for instance, some of patients used third party reproduction techniques. The average age was 36.5 (range = 31 – 45, SD = 3.35), 35 for women (range = 31– 39, SD = 3.12), and 38 for men (range = 35 – 45, SD = 3.60). On average, the couples had been trying to conceive for approximately 4.1 years (range = 1.8 – 6.3 years, SD = 1.40). None of the participants had biological, adopted or step children. The mean number of previous treatment attempts of IVF or ICSI with own or donor gametes was three cycles (range = 1-5 attempts, SD = 1.46). Of these, 62.5% of the participants had done three or fewer cycles and 37.5% had completed more than three cycles. Participants had undergone treatment at the public and private facilities.

Chapter 3

Interviews

A semi-structured format was used to allow for participants' "meaning-making" (Smith et al., 2009, p. 79) of their own experience not considered by the theoretical framework. A literature review was done prior to the design of the interview schedule (see Appendix B) as recommended by IPA standards of practice in order to find theoretical gaps the study could help address (Smith et al., 2009). The author of the present thesis (S.M.S.) also probed participant responses, a technique of following-up after each response with clarifying questions or additional queries with the aim of obtaining a more comprehensive description of the phenomena being discussed. The interview guide covered the topics of parenthood goal importance, goal blockage, and individual and dyadic regulation, although the words used to talk about those topics were more colloquial to facilitate understanding (i.e., 'motivation' instead of 'psychological engagement'). A brief socio-demographic questionnaire was also administered at the time of the interview that included questions on age, months and years spent trying to get pregnant with current partner, number of children (biological, adopted or step children) and the types and number of treatments attempted.

After each interview, the audio recording was uploaded to a password-protected laptop computer and a number was assigned to each interview to ensure participant anonymity. Interviews were transcribed verbatim in Portuguese and pseudonyms replaced names.

Procedure

An invitation to participate in the study, along with additional study information and a Qualtrics' link to an electronic consent form (see Appendix B),

Chapter 3

was posted on the Facebook social media website and consumer forum of the

Portuguese Fertility Association (Portuguese infertility patient advocacy group).

Prospective participants had the opportunity to view the study description (see

Appendix B) and provide electronic consent to be contacted by the author of the

present thesis (S.M.S.) to schedule a convenient day, time, and location for the

interview. Each member of the couple participated in an individual semi-structured

interview that took approximately one hour. At the end of the interviews,

participants were debriefed (see Appendix B) and given more information about the

study and also provided with contacts of mental health providers and an infertility

national association.

Data Analysis

Interpretative Phenomenological Analysis (IPA) was implemented according

to the procedures recommended and developed for sample sizes larger than six

participants (Smith et al., 2009). Generally, IPA is implemented with sample sizes

between three to six participants. However, a larger sample was used because

although the interviews were conducted individually, the unit of analysis was the

couple. This means that in order to capture relevant dyadic patterns, a higher

number of participants was required. The analysis was performed in order to find

group level patterns but as advised by Smith et al. (2009), we preserved the

individual-focused nature of IPA by presenting specific examples of each

participant. The analytical process was done according to the standards for assessing

published IPA studies (Smith, 2011) and included five central steps. First, the author

of the present thesis (S.M.S.) and a research collaborator (Jean Marie Place, J.M.P.)

immersed themselves in the data and independently read and re-read through each

transcript. Second, these authors read each transcript again and proceeded line-by-

line making descriptive and conceptual notes and paying close attention to content,

contradictory statements, and participants' language, such as pronoun and metaphor

use. Third, these exploratory comments were used to generate emergent themes that

aimed to concisely capture the psychological essence of the information. For each

interview, the two authors discussed the emergent themes they had arrived at and

explored similarities and differences in interpretation. Disagreements or

discrepancies were resolved by reviewing the transcripts, followed by discussion.

Fourth, as part of phenomenological coding, these authors organised the emergent

themes for each transcript according to their relevance to the topics that guided the

interview, such as parenthood goal importance, goal blockage, and individual and

dyadic self-regulation strategies. To assist in this endeavor, a summary account of

every transcript was created, drawing on the emergent themes and summarising the

topical data of the interview. An important tenant of IPA is searching for patterns

across the transcripts. This fifth step was achieved by carefully examining the

summary accounts of each transcript for higher-order themes that could help answer

the research questions. Once higher-order themes were identified, Smith et al.

(2009) recommends assessing the frequency of each theme by whether it is

recurrently present in each transcript. A higher order theme was considered

'recurrent' if it was present in over half of the sample (i.e. at least nine transcripts out

of 16), as determined by careful re-reading of transcripts, emergent themes, and

summary accounts. Discussion between S.M.S. and J.M.P. and reflective journaling

during the analytic process was essential to engage in reflexivity and maintain a

"double hermeneutic" perspective. Double hermeneutics refers to making sense of

the participant making sense of his or her experience (Smith et al., 2009, p. 80). In

IPA, the researchers are the instruments through which data are transmitted and

Chapter 3

interpreted and reflexive journaling is one of the essential parts of this methodology because it allows researchers to reflect on their roles and perceptions of the research process (Ahern, 1999). The researchers who were involved in the data analyses (S.M.S and J.M.P.) engaged in a constant reflective journaling exercise across the different steps of the process that allowed them to take into account their beliefs and expectations about the participants and the infertility experience in particular. Accordingly, S.M.S. and J.M.P. acknowledged that the results were constructed from their perspective of being two Portuguese-speaking women, the author of this thesis (S.M.S.) who is a native speaker from Portugal and thus grew up in the same cultural background as the present study sample and the researcher collaborator (J.M.P.) who learned Portuguese as a second language and did not share the same cultural background. Additionally, the two researchers (S.M.S. and J.M.P.) also acknowledged the fact that they do not have children and one has experienced infertility. The process of reflective journaling was particularly important when information contrary to the researcher's expectations were found within the data. For instance, one of the researchers documented that she expected patients to be exhausted of the treatment process and willing to give up on it soon. After closer examination of the data, the researchers agreed that this did not happen as patients were actually still engaged with it. Finally, the data was checked for validity using an independent audit as recommended by the IPA standards of practice (Smith et al., 2009). This validity technique consists of documenting all the information involved in the different research steps in such a detailed and sequential way (e.g. from the initial research proposal until the final research report) that would allow other researchers to evaluate this 'chain of evidence' (Smith et al. 2009, p.182). Data was also checked for credibility according to IPA standards of practice and this was done

by presenting the file of material to other infertility and developmental regulation researchers who gave their critical appraisal of the plausibility of the conclusions given the information documented in the previous research steps. Feedback was incorporated after discussion and a consensus was reached. This audit process was used instead of other reliability techniques such as the inter-rater reliability because the audit process takes into account the existence of several different types of equally credible accounts and not only a single one (Brocki & Wearden, 2006; Smith et al., 2009). Consequently, the researchers who performed the assessment process for credibility mostly focused on evaluating if what was reported was a credible account among the many possible ones that could result from the analytical process. During the different stages of elaboration of the present manuscript, O'Brien and colleagues' guidelines of standards for reporting qualitative research were also taken into consideration (O'Brien, Harris, Beckman, Reed, & Cook, 2014).

In the Results section, quotations are used and presented using the following notation system:

i. […] omission within the textual data. Some part of the quotation is not used in the illustrative text because it is irrelevant to the argument;

ii. [text] addition to the textual data. Where quotations were not grammatical, additional text was added in parenthesis for ease of reading and comprehension of the illustrative text;

iii. (*name and number of IVF or ICSI treatment cycles previously done*) refers to pseudonyms that were changed from Portuguese into English in order to ensure confidentiality, and number of treatment cycles participants undertook.

Chapter 3

Results

Parenthood Goal Importance and Parenthood Goal Blockage

Table 3.1 shows the reasons mentioned by participants that contributed to parenthood goal importance and perceived causes of goal blockage. Nearly all participants considered parenthood to be important because it provides a space for attachment and emotional bonds with children. These relationships were perceived to be the vehicle through which moral education is transmitted. Some participants anticipated that the parent-child connection would motivate children to provide them with instrumental support as they aged. The majority of participants also discussed parenthood as an integral part of personal and family identity.

As shown in Table 3.1, participants commonly mentioned facing three main levels of obstacles when trying to achieve their parenthood goal: intrapersonal, structural and interpersonal. Intrapersonal obstacles were related to the physical and psychological burden of infertility diagnosis and treatments, as well as career and healthcare factors that made it harder for participants to keep pursuing parenthood goal. Structural obstacles included the limited number of treatment attempts funded in the public sector, the poor quality of the healthcare received and the financial constraints that prohibited undergoing more treatment. Interpersonal obstacles were the lack of support and questions from one's social network.

Chapter 3

Approaches to Individual and Dyadic Regulation

   Figure 3.1 shows a graphical representation of the main findings for

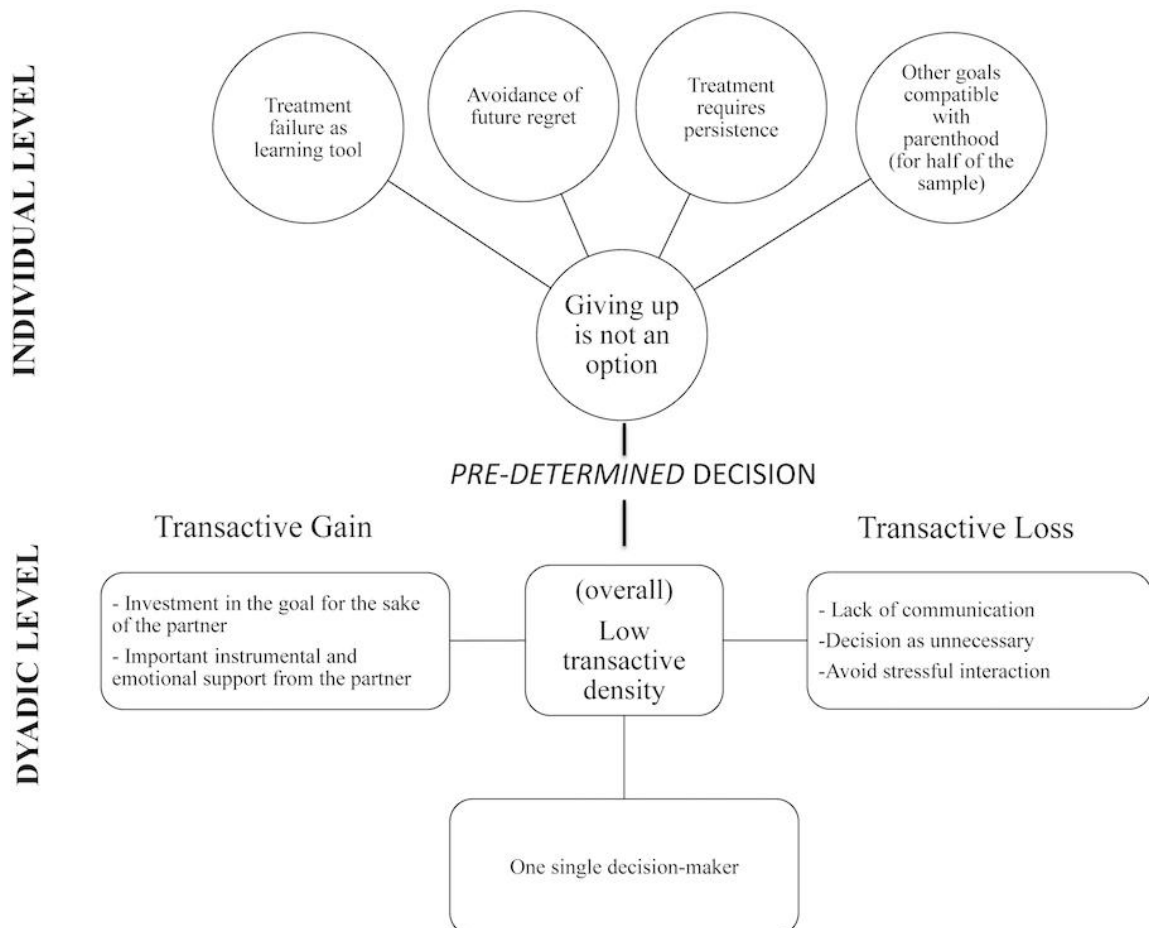approaches to individual and dyadic regulation.

Figure 3.1. Representation of the main results concerned with approaches to individual and dyadic regulation.

Individual Regulation

Giving up on the parenthood goal was not an option for participants who experienced several failed treatment cycles in the past and had recently experienced another failed treatment cycle. When asked about the possibility of continuing or stopping treatment after his fifth failed cycle, one man said, *"At this point it doesn't make any sense, I mean, to have such a big conversation with her. It doesn't make any sense at all to stop [treatment] right now. If failures continue to accumulate […] but we won't give up so early. So early… no, only if we're forced to by external factors. Only then."* (*John, five failed treatment cycles*). Because stopping treatment was not an option to participants, maintaining goal engagement was perceived as crucial and independent of treatment failure. Another participant said, "*Even before we started undergoing treatment we had already thought, the next one will work, and if the next one does not work, even facing adversities we will try until there are no opportunities at all.*" (*Albert, one failed treatment cycle*). Rebecca said, *"[…] I will exhaust every last possibility that there is[…]The first [treatment] failed, the second failed, we'll try a third time. No…I cannot say, 'Oh, it's over now,' because…I always have this question, 'Will I be able to achieve it or not? Will the last [treatment] work or not?' I prefer to exhaust my chances."* (*Rebecca, two failed treatment cycles*).

Participants framed experiences of treatment failure as learning tools that would ultimately help them increase engagement with the parenthood goal. One woman said, *"After we realised the cycle failed […] the feeling was immediately 'Let's learn something from this.' I mean, like, the doctors will know us better, maybe things … in the next treatment our doctor will know how to better adjust the medication for us."* (*Adele, two failed treatment cycles*). Another woman explained

the relationship between past failure and future success, "*The probabilities [of success] get a little bit better because of the knowledge we have about what has already happened.*" (*Camilla, three failed treatment cycles*).

After a failed cycle attempt, participants discussed the importance of persistence because treatment was perceived as a game of probabilities that required consistency to achieve positive results. Cathy (four failed treatment cycles) said, "*Because…we want to become parents…so we do not want to give up. Basically…I say let's go for it [the next treatment]! (said excitedly)*". When asked about the time she planned to spend investing in fertility treatment, Natasha said, "*I am … one hundred percent committed, so […] I have other activities […] to keep me busy, obviously, but I could quit them if needed […].*" (*Natasha, five failed treatment cycles*). Participants also mentioned moving treatment to a new facility or a new provider as a way to overcome the obstacles. One woman said, "*We think that if we go to a new place, where we have confidence, something we did not have this last time, I think that it will make everything better. I think, for now, it will help us achieve our goal.*" (*Cathy, four failed treatment cycles*).

Participants stated that they continued to pursue the parenthood goal because they were interested in avoiding future regrets. In the same vein, when asked about the chances of getting pregnant by doing more fertility treatment, Charlotte said "*…I do [the treatments] because I don't want to think later on, 'and what if I had done them, it could have worked,' but frankly, no…no, I'm not very optimistic.*" (*Charlotte, one failed treatment cycle*).

With respect to other life goals, half of the sample (mostly men) seemed to consider that other life goals such as career activities were compatible with fertility treatment. When asked if he planned to keep investing in other life goals during

treatment, one of the participants replied *"[…] Yes, I invest [in other life goals] […]*
because I have a dream that I am working on, slowly […] I am trying to release a
book next year." (*Bradley, four failed treatment cycles*). However, the other half of
participants (mostly women) considered that other goals were not compatible with
treatments. Betty said *"[…] career wise … there are things I would like to do and*
that I am currently postponing [due to fertility treatments] […] and there are other
things I would like to do but that I am also postponing due to this [treatment
process]." (*Betty, one failed treatment cycle*).

Dyadic Regulation

Regarding approaches to dyadic regulation, overall there was low transactive
density. Couples reported the existence of a pre-determined decision to continue to
do treatment until pregnancy was achieved or until opportunities were exhausted. In
addition, there was a single decision-maker and most men reported that the nature of
fertility treatment meant that they were less actively involved in the treatment
process than their partner (i.e., injections, blood tests and scans are procedures done
on women). Consequently, several male participants mentioned that women were
the ones who had to decide about the shared parenthood goal by choosing whether or
not to do more treatment. One man said, *"…but in fact, physically she is the one*
who is suffering, you know? It's the woman who suffers in physical terms. So, I
don't feel particularly comfortable saying let's do it or not." (*Bradley, four failed*
treatment cycles). Some participants, mostly men, also suggested that they were less
involved in the treatment process than their partners because women were more
efficient in dealing with practical issues related to treatment. Another man said "*She*
was very into searching for information [in the beginning of treatment] […] and she

keeps searching for all the information and everything that is needed, [...] I try to

follow [...] but her pace is ... totally different." (*Albert, one failed treatment cycle*).

Overall, the lack of communication about undergoing a further treatment

cycle seemed to have contributed to the presence of transactive loss since

participants reported that communication about continued goal pursuit was often not

necessary. When asked if a decision about doing more treatment was already made,

Albert replied, *"I think there was no decision, it was already pre-established even*

before [we started treatment] ... I do not remember if we even talked about that [...]"

(*Albert, one failed treatment cycle*). On the other hand, some couples avoided

communication about undergoing another treatment cycle mostly due to the partner's

negative emotional reaction with respect to the failed cycle or worry about an

upcoming cycle, e.g., "*We never spoke, and, we have not spoken a lot because...*

some things, it is really hard to talk about it…" (*Cathy, four failed treatment cycles*).

However, there was some transactive gain among couples. First, some

participants reported investing in the parenthood goal by agreeing to do more fertility

treatment attempts because of their partner's strong child-wish rather than due to

their own child-wish. One man said, *"My wife… she still thinks that… she still*

wants to undergo treatment in… in January. I told her that I don't… My willingness

is not the same but… but I respect, if she wants I will do it again [...]." (*Robert, four*

failed treatment cycles). Second, participants talked about how instrumental and

emotional support from their partner was critical to pursuing future treatment after a

failed cycle and keeping them engaged with the parenthood goal. Instrumental

support was characterised by the support given by one partner through individual

tasks (e.g., one partner reminded the other partner to take medication). One woman

said, *"I think that the effort is the same. The effort is the same and the commitment*

is the same … for example, when I went to take the medication, both he and I were aware of this, if I [...] sort of forgot [...] but he is always, like, 'Did you do this?'" (*Lisa, three failed treatment cycles*). Instrumental support was also characterised by the support related to dyadic chore-related tasks such as house cleaning. Another woman said, *"The collective effort is dealing with the expectations… There are also parts that he does, that he always does…and always with a really good attitude and always with a lot of support… it's in those times that I can't move much and can't do much that he does everything. He washes, irons, makes dinner… cleans… walks the dog, he... goes shopping, carries it all. He does everything."* (*Charlotte, one failed treatment cycle*). Partners' emotional support was particularly important. When asked about the support they gave to each other after a failed cycle, a woman said, *"...when one of us is feeling down [about the failed treatment cycle], the other one tries to... encourage and support the other."* (*Betty, one failed treatment cycle*).

Discussion

The main findings from this study were that the decision to undergo more fertility treatment was not revised in response to any contextual changes, such as consecutive treatment failure. Instead, these contextual changes were reframed to fit participants' a priori desire to stay engaged with the parenthood goal (despite the recent failed attempt). This seemed to result from the shared beliefs couples had around the importance of parenthood. At the individual and couple level, the decision to exhaust all the opportunities was made before the start of the first treatment cycle. Accordingly, specific individual and dyadic regulatory approaches were used in order to overcome setbacks. Reengagement in other life goals was only done to the extent that it did not compromise goal engagement in parenthood. At the

dyadic level, there was low transactive density with only a few instances of deep transactive exchange. This pattern of transaction was attributed to the fact that many aspects of treatment were, by nature, disproportionally weighted toward women (e.g., physical burden), thus both women and men perceived the women as the person who deserved to be the decision-maker in matters of reproduction. Future research should use longitudinal designs in order to investigate how the use of individual and dyadic approaches to regulation changes over time.

Past research showed that 56% of infertile couples engage in fertility treatment, suggesting that parenthood is highly valued (Boivin et al. 2007). Indeed, the participants of the present chapter attributed a high value to parenthood, despite the amount of previous treatment failure. Having a partner with a high child-wish seemed influential in developing and sustaining an individual's child-wish. Previous research has also shown a moderate positive correlation between partners on the importance attributed to parenthood (Thompson, Woodward, & Stanton, 2012). The positive correlation between the importance both partners attribute to parenthood may be due to the partners sharing similar meanings of parenthood (e.g., a vehicle through which moral education was transmitted, a way of receiving later instrumental support from children, etc.).

Overall, and in line with the predictions of developmental regulation theories, goal engagement corresponded to the existence of high levels of effort, commitment, and time investment. Participants used several approaches to mitigate the impact of obstacles on the parenthood goal that helped them stay engaged. Treatment failure was converted into an opportunity to grow from the experience and implement changes that might improve treatment success in the future. Doing so made the perceived level of the blocked goal less threatening and contributed to continued

engagement with the parenthood goal. Another approach to overcome the obstacles faced was to recruit additional external resources by moving treatment to a new facility or new provider. Moving to a new clinic was a way to maintain optimism and confidence in the possibilities of treatment success. Therefore, contrary to what was expected, results suggested that people might not always adjust engagement according to level of objective goal blockage, but instead discount the level of blockage to maintain engagement.

Also, contrary to the theoretical assumptions of the three major developmental regulation theories, our results suggested that disengagement is not the obvious alternative when opportunities to achieve parenthood become unfavorable (i.e. after a failed fertility treatment cycle) and even when they become extremely unfavorable (i.e., more than three failed cycles indicating high goal blockage). Opting for more treatment and maintaining behavioral effort was not always determined solely by the chances of getting pregnant, but also by the desire to avoid possible future regrets about giving up on the parenthood goal by stopping treatment. As a result, goal engagement appeared to continue, no matter how low or high the probabilities of treatment success were. One might hypothesise that by wanting to avoid future regrets, participants are considering parenthood goal failure as something to integrate in their future and, consequently, were adjusting their expectations about parenthood in a broader temporal perspective. The strategy of choosing the appropriate time to invest in a given goal considering the opportunities available is called *meta-regulation,* or *optimization* (Haase et al., 2013; Heckhausen et al., 2010). These findings are novel in that they suggest individuals not only do optimization by considering the present and future opportunities to achieve the goal

but also by anticipating the (positive or negative) long-term consequences of failing to achieve it.

With respect to reengagement in other life goals, the approach taken by participants was to only pursue alternative goals to the extent that it did not compromise engagement with parenthood. Half of the sample, primarily men, considered that other life goals such as career were compatible with fertility treatment and the other half, primarily women, considered that it was not possible to pursue other goals due to the resources (e.g. emotional and financial) spent with fertility treatment. The MTD postulates that the level of engagement for one goal is normally consistent with the availability of opportunities and that engagement does not deter goal pursuit in other areas. The present chapter results support these hypotheses.

Concerning dyadic regulation, on the whole findings show low exchange between partners about parenthood goal blockage, resulting in an overall low transactive density. This was mainly because the decision to undergo more treatment was pre-determined; women were clear decision leaders during the treatment process and there was a lack of communication about treatment failure within the couple.

Participants emphasised that the decision to do more treatment and exhaust all the treatment opportunities was made before the start of the first treatment. Moreover, several male participants mentioned that women should make the treatment decisions because of the implications to her body. Past research on infertility has revealed that women used more coping strategies based on accepting responsibility for infertility than men (Peterson, Newton, Rosen, & Skaggs, 2006).

The present chapter results suggest that men place the responsibility to decide to pursue treatment on women.

Results also indicate that the distress of experiencing a blockage to parenthood leads participants to avoid communication about doing more treatment in order to protect their partner from feelings of frustration. The consequence was an environment of silence. Communication is crucial for efficient goal coordination as it increases the amount of interaction between partners and allows both members to share and divide resources during goal pursuit (Fitzsimons et al., 2015). A lack of communication can lead to a transactive loss and increased distress because it prevents couples from efficiently coordinating their shared resources and from updating perceptions about goal importance and blockage. The existence of low levels of communication has been shown to be a significant predictor of low marital benefit for men (Schmidt, Holstein, Christensen, & Boivin, 2005). Another study revealed that the more men talked to their partners about investing in the parenthood goal, the more the quality of marital communication and relationship increased (Pasch, Dunkel-Schetter, & Christensen, 2002). Evidence suggests that couples would benefit with increased communication, but the present chapter participants seemed to perceive communication as something potentially harmful for their partners and, consequently, felt afraid of initiating it.

Although the transactive density within our sample was overall low, there remained some strong and frequent transactive links that suggest the presence of at least partial transactive gain. First, some people invested in the parenthood goal (i.e., were doing treatment) because of their partner's child-wish. This type of transactive goal pursuit, a shared-target oriented goal (TGD theory), describes a scenario where both members of a couple held a shared goal, but only one of them will experience

the outcomes of the goal. In other words, in our study Robert and Camilla were investing in the parenthood goal because Camilla wanted to become a mother. This investment in the partner's goal can be described as a demonstration of relationship commitment, which has been suggested to be a predictor of efficient goal coordination by TGD. As transactive gains are characterised by efficient goal coordination, it is possible that investing in a goal for the sake of a partner results in providing meaningful support, thus generating a transactive gain. Second, the partner's instrumental and emotional support was reported to be crucial in the period of decision-making about doing more treatment. This suggests that partner support may result in a transactive gain because support might keep individuals engaged with fertility treatment and, consequently, can increase their chances of achieving the parenthood goal.

The present chapter focused on self and dyadic regulation to failed fertility treatment from the patients' point of view. The sample was large for IPA common standards but Smith and colleagues' (2009) recommendations for analysis of large data sets were taken into account when reporting recurrent themes. The analytical process was carried out by two independent coders and was subjected to expert feedback. All participants lived in the same country and past research has indicated that sharing cultural values can influence parenthood motivational processes (Heaton et al., 1999). As such, our study findings only reflect cultural values and social norms of a sample of the Portuguese people and are not representative of other cultures. Furthermore, not all participants were in the same stage during their fertility treatment experience; some had recently started their infertility journey (only one failed cycle) and some had multiple failed cycles. This means that even if the parenthood goal was blocked to all participants, they were experiencing different

levels of blockage depending on the number of failed cycles completed. This limitation was addressed by presenting the number of failed cycles experienced by each patient when reporting data and thus allowing for greater clarity in relation to the level of blocked goal patients were experiencing at the moment of the interview. However, our results suggested that objective goal blockage was not the key determinant of regulation.

The findings from this chapter suggest that health professionals may have a role in prompting individuals to integrate new medical information into their decision-making after each failed treatment cycle. For example, the healthcare provider could clearly clarify to patients what the benefits and implications are of continuing or stopping treatment. Indeed, few patients recall having the opportunity to discuss the advantages (24%) or disadvantages (18%) of ending/continuing treatment (Peddie, van Teijlingen, & Bhattacharya, 2004). Enhanced communication with the healthcare provider would allow couples to adjust their subjective and objective chances of achieving parenthood goal. Patients should also be offered additional support to consider wider psychosocial implications of continuing treatment. The ethics of intervening in decisions about continuing or discontinuing with fertility treatment should be examined given popular conceptions of fertility doctors taking advantage of desperate infertile couples (Thompson, 2005).

In conclusion, results from this study suggest that after a failed treatment cycle patients do not engage in an active decision-making process. The absence of an active decision-making process is related with their willingness to remain engaged with treatment and fear that such decision-making creates stress in the partnership. Instead, both partners focus on supporting the other in continuing with treatment without questioning or discussing their intentions to do so.

Chapter 4: Parenthood Goal Blockage, Self-Regulation and Wellbeing after a Fertility Treatment Cycle: A Prospective Quantitative Study

Introduction

People try to give meaning to their lives by pursuing central goals such as graduating, getting married, and having children. However, at some point, due to external factors (e.g., a health threat), these goals may become blocked. Developmental regulation theories (e.g. Haase et al., 2013) state that being faced with a blockage to a central life goal results in poorer wellbeing and that individuals use regulatory strategies in order to reduce the discrepancy between their actual and desired state of goal achievement (Carver & Sheier, 2003).

In a study about intentions to have children, 96% of women and 97% of men intended to achieve parenthood at some point in their lives (Lampic, Svanberg, Karlström, & Tydén et al., 2006). When parenthood becomes a blocked goal due to infertility and individuals choose to undergo fertility treatment, 78% do at least the three *in vitro* Fertilization (IVF) cycles normally recommended by healthcare providers (Gameiro et al., 2013). During this process individuals are often confronted with treatment failure. Indeed, only 22% of people achieve pregnancy in their first fertility treatment cycle attempt and 49% achieve pregnancy after three treatment cycles (Stern et al., 2010). Patients who do not achieve pregnancy by the end of a cycle are expected to face a particularly challenging period in terms of goal regulation, as they need to use adequate regulatory strategies to adjust their commitment and effort with the parenthood goal. Patients who achieve pregnancy after an IVF cycle will experience lower levels of goal blockage (at least objectively)

but remain at risk of not achieving a live birth due to the chance of having complications during pregnancy. Indeed, pregnancy complications are more frequent in ART than spontaneous pregnancies due to a higher risk of, for instance, experiencing ante-partum haemorrhage, i.e. bleeding after 24 weeks of pregnancy (Pandey, Shetty, Hamilton, Bhattacharya, & Maheshwari, 2012). The prospective study presented in this chapter uses developmental regulation theories to investigate how people regulate before and after knowing the outcome of an IVF treatment cycle. Results from this study will help to develop a deeper understanding of how treatment outcome influences the subjective level of parenthood goal blockage, the type of regulatory strategies used, and the wellbeing of patients.

Past infertility research has predominantly focused on documenting patients' wellbeing through treatment and compliance behaviour. Less attention has been given to understanding how people make decisions about compliance and how these are affected by their wellbeing status and vice-versa. This is important because a recent meta-analysis showed that patients disengage from fertility treatment when they still have chances to conceive and that one of the main reasons for their decision is the psychological burden of treatment (Gameiro et al., 2012; Gameiro et al., 2013). What is not clear is what is implicit under this burden and how it affects important treatment-uptake decision-making moments, such as after a failed cycle. It is well known that after failed treatment women experience strong negative emotional reactions and that 25% present subclinical symptoms of depression and anxiety (Verhaak, Smeenk, Van Minnen, Kremer, & Kraaimaat, 2005). Most studies have used stress-coping models to explain how patients deal with the negative impact of IVF showing that in order to adapt to failed treatment people need to reconstruct the meaning attributed to parenthood goal by using cognitive strategies

(Verhaak, et al., 2007). However, less is known about how the ways in which people deal with negative emotions influences their decision-making about undergoing more fertility treatment after a failed cycle.

Developmental regulation theories can help to explain how individuals adapt to a failed or successful IVF treatment cycle, and how they decide whether to keep pursuing their parenthood goal either at a cognitive (commitment) or behavioural (effort) level. The present study has a longitudinal design and this will allow an evaluation of how patients' perceptions about goal blockage (subjective blockage) change across time according to treatment outcome (objective blockage), and how this will influence the regulatory strategies used and patient wellbeing. According to developmental regulation theories (Haase et al., 2013) people will stay committed to a goal while they perceive it as achievable, i.e. as having more opportunities to achieve it than constraints. In this sense, if treatment is successful patients are expected to remain engaged with parenthood goal. However, if the perception of goal blockage increases as a result of treatment failure it is expected that patients will perceive a decrease in opportunities and, consequently, will be more likely to disengage from parenthood goal and/or reengage in other life goals.

An important question that needs addressing is how patients assess the degree to which their parenthood goal is blocked. These subjective perceptions are expected to be based on objective information received from fertility staff, although patients will also make their own inferences on top of this information. In a study conducted by Thompson and colleagues, objective and subjective blockage were not found to be associated (Thompson et al., 2011). However, it can be argued that the measure of objective blockage that they used (i.e., the number of previous failed treatment cycles) has limited validity, as people with the same number of previous failed

cycles can have considerably different prognosis. Oppositely, the results from a six-month longitudinal study including patients undergoing fertility treatment showed consistency between objective and subjective goal blockage levels since parenthood goal attainability increased for patients who achieved pregnancy with treatment and decreased for those with a failed treatment cycle compared to previous stages of the cycle (Salmela-Aro et al., 2008). In Chapter 3, participants with a highly blocked parenthood goal (e.g. couples had experience on average three failed treatment cycles) engaged in cognitive strategies of reappraisal in order to downplay the levels of goal blockage perceived and maintain optimism. Thus, there is a lack of clarity concerning the congruency between subjective and objective goal blockage at different stages of fertility treatment. The measurement of both subjective and objective goal blockage at the pre and post-treatment stages is therefore necessary in order to identify the congruence between people's perceptions about their chances of becoming a parent and their real medical chances to achieve it. This issue will be addressed in the present chapter taking into account two valid measures of objective goal blockage at two different stages of treatment, i.e. patients' prognosis at the start of treatment and the treatment outcome after the uptake of a fertility cycle.

Another important issue is how goal blockage affects patients' wellbeing. In Chapter 2, a meta-analysis of self-regulation to a blocked parenthood goal showed that higher levels of blockage were associated with higher negative mood. Research has addressed how experiencing infertility affects wellbeing. Previous studies seem to consistently show that infertile patients do not experience higher depressive symptoms than people from the general population at the start of treatment (Verhaak et al., 2007). However, findings regarding anxiety are mixed. While some studies show that infertile patients presented higher anxiety than the general population

Chapter 4

(Slade, Emery, & Lieberman, 1997; Visser, Haan, Haan, & Wouters, 1994), other studies suggest that the levels of anxiety between infertile patients and the general population do not significantly differ (Edelmann, Connolly, & Bartlett, 1994;.Verhaak et al., 2001). A possible explanation for this inconsistency is that anxiety may be associated with the number of cycles patients underwent. For instance, a study showed that couples who were undergoing ART treatment for the first time presented higher levels of state anxiety than those who were undergoing a repeated ART cycle (Reis, Xavier, Coelho, & Montenegro, 2013). Another possible explanation for the inconsistency in the levels of anxiety reported by previous research is that anxiety may not be dependent on the objective levels of blockage being faced (i.e. prognosis) but on the way and degree to which patients perceive their parenthood goal to be blocked. For instance, in a study conducted with patients both in the diagnostic and treatment phases, objective goal blockage was not significantly correlated with any of the measured wellbeing indicators but higher subjective goal blockage was significantly correlated with higher depression, greater infertility-specific thought intrusion and lower positive states of mind (Thompson et al., 2011). After starting with treatment, the main challenge seems to be the uncertainty of the treatment outcome as the waiting period before the pregnancy test was recalled by patients as one of the most stressful (Boivin & Takefman, 1995). In general, patients seem to adjust well to the period at the start of a treatment cycle although there is some evidence that patients can experience anxiety during this period, mostly at the moment just before start taking medication (Verhaak et al., 2007).

In the post-treatment phase, patients are known to experience higher levels of depressive symptoms when treatment fails than when it is successful (Verhaak et al.,

2007). One study that assessed patients six-months after experiencing a failed treatment cycle reported that the presence of higher perceptions of goal attainability was associated with less depressive symptoms (Salmela-Aro et al., 2008). This indicates that when treatment fails patients' wellbeing at the post-treatment is characterised by the experience of depressive symptoms and that the experience of depression is influenced by the way patients perceive parenthood goal as being more or less blocked. Past studies have predominantly assessed how objective goal blockage influences wellbeing but there remains a lack of research investigating the relative influence of subjective and objective goal blockage on wellbeing. As both may be particularly relevant predictors of wellbeing, since patients will be informed about a change in their level of parenthood goal blockage, this issue will be addressed in the present chapter.

A further question addressed in this chapter is how goal blockage is associated with self-regulation. In a previous study conducted with patients who were either in the diagnostic phase or who had already started undergoing treatment, higher levels of subjective goal blockage were correlated with higher goal disengagement and lower goal reengagement (Thompson et al., 2011). However, in the same study, the levels of objective goal blockage were not correlated with goal disengagement or goal reengagement. In relation to goal disengagement, a systematic review and meta-analysis on compliance predictors showed that 1 in 5 patients disengage from fertility treatment when they still have objective chances to achieve parenthood by undergoing more treatment (Gameiro et al., 2012; Gameiro et al., 2013). Oppositely, in Chapter 3, the experience of a high level of objective goal blockage by patients did not increase participants' willingness to disengage from parenthood goal and patients were motivate to maintain or increase engagement with parenthood goal.

Concerning goal reengagement, in Chapter 3 participants mentioned their intentions to invest in alternative goals but only if this investment did not compromise the achievement of parenthood. Thus, previous findings seem to be consistent suggesting that when objective and subjective goal blockage are high patients reengage less. However, the same does not apply to the associations between goal blockage and goal disengagement since findings are inconsistent, thus requiring more research to clarify this association. The periods before and after a treatment cycle are especially relevant to evaluate intentions to disengage from parenthood and reengage in alternative goals since self-regulatory strategies may change after knowing treatment outcome. This issue will also be addressed in the present chapter.

Finally, the fourth central topic addressed in this chapter concerns to the associations between self-regulation strategies and wellbeing. In the meta-analyses performed in Chapter 2 only goal reengagement was significantly associated with higher positive mood. This suggests that goal reengagement can be adaptive and conducive to positive wellbeing for people facing a blocked parenthood goal. In the specific case of infertility, for patients in the diagnostic or treatment phase the ability to disengage from parenthood goal and to reengage in alternative life-goals were correlated with less depressive symptoms, lower infertility-specific thought intrusion and greater positive states of mind (Thompson et al., 2011). In line with this finding, the results of one of the moderation analyses performed in the meta-analysis of Chapter 2 also suggested that goal disengagement contributed to lower negative mood for those facing infertility. Another issue to consider is the possible moderation effect of the subjective and objective goal blockage levels, especially considering that the adaptive role of self-regulation strategies depends on the balance of opportunities and constraints (Haase et al., 2013; Wrosch et al., 2003). One

would expect that for patients with better prognosis, who achieved pregnancy after a

a cycle or with lower perceptions of goal blockage, goal disengagement or

reengagement would not be adaptive since opportunities are favourable. For those

patients who perceive more constraints than opportunities to achieve parenthood,

who have a bad prognosis or who face treatment failure, goal disengagement and

reengagement are expected to be adaptive since constrains are higher. To my

knowledge, specifically how the levels of subjective and objective goal blockage can

influence the impact of goal disengagement and goal reengagement on wellbeing for

patients in the pre- and post-treatment phases has not been investigated before.

These moderations will be therefore tested in this chapter.

The Present Study

The main goal of this study is to investigate how couples self-regulate between the

pre-treatment/start of an IUI or IVF/ICSI treatment cycle (referred to here as TIME

1) and roughly one and a half months after knowing the treatment outcome (TIME

2). The study has four specific goals:

(1) To understand how subjective and objective goal blockage are associated, and

how objective changes in goal blockage (according to the cycle outcome) are

associated with changes in subjective goal blockage.

Hypothesis 1: Based on past research, it is expected that subjective and objective

goal blockage will be positively associated at TIME 1 and TIME 2. More

specifically, at the start of treatment, higher objective goal blockage (i.e., lower

chances of conception given by the doctor or, when this information was not

provided, calculated according to a predictive model for pregnancy) is expected to be

associated with higher subjective goal blockage. It is also expected that the level of

subjective goal blockage will vary across time according to the levels of objective

Chapter 4

goal blockage experienced at TIME 2. More specifically, it is expected that those

who experienced a failed treatment cycle (i.e. higher objective goal blockage) will

experience greater levels of subjective goal blockage and that those patients who

achieved pregnancy (i.e., lower objective goal blockage) will present lower levels of

subjective goal blockage.

(2) To investigate how subjective and objective parenthood goal blockage are

associated with wellbeing (anxiety and depression) at the start of treatment (TIME 1)

and once patients know the treatment outcome (TIME 2).

Hypothesis 2: Although there are inconsistent findings in past research concerning

the influence of goal blockage (subjective and objective) on anxiety, overall goal

blockage seems to influence anxiety in the pre-treatment period. At the same time,

the levels of goal blockage are expected to influence depression in the post-treatment

period. Therefore, it is expected that higher parenthood goal blockage (subjective

and objective) will be associated with higher anxiety at TIME 1 and higher

depression at TIME 2.

(3) To investigate how subjective and objective goal blockage are associated with

the self-regulation strategies of goal disengagement and goal reengagement at the

start of treatment (TIME 1) and once patients know the treatment outcome (TIME

2).

Hypothesis 3: Based on previous research, at TIME 1 and TIME 2 it is expected that

experiencing higher parenthood goal blockage (subjective and objective) will be

related with lower goal reengagement. Concerning goal disengagement, although

the findings from past research are inconsistent, results from Chapter 2 were non-

significant and Chapter 3 findings suggested that even after facing multiple treatment

failures patients wanted to remain engaged with treatment. Therefore, it is expected that goal blockage (subjective and objective) will not be significantly associated with goal disengagement.

(4) To understand how the self-regulation strategies of goal disengagement and goal reengagement are associated with wellbeing at the start of treatment (TIME 1) and once patients know the treatment outcome (TIME 2). Because developmental regulation theories predict these associations will differ according to the level of goal blockage, objective and subjective goal blockage will be tested as possible moderator variables of those associations at TIME 1 and TIME 2.

Hypothesis 4: At TIME 1 and TIME 2, the associations between goal disengagement and reengagement and wellbeing (anxiety and depression) are expected to vary according to the levels of subjective and objective goal blockage (i.e. prognosis at TIME 1 and the outcome of treatment at TIME 2). For patients facing low levels of goal blockage (i.e. with a good prognosis at TIME 1 or who achieved pregnancy at TIME 2) or with lower levels of subjective goal blockage, disengaging from parenthood goal or reengaging in other life goals is expected to be associated with an increase in anxiety and depression. Oppositely, for patients experiencing high levels of objective goal blockage (i.e. bad prognosis at TIME 1 or failed treatment at TIME 2), or who perceive their parenthood goal to be highly blocked, it is predicted that disengaging from parenthood goal or reengaging in other goals will be associated with lower anxiety and depression.

Chapter 4

Methods

Design

This was a prospective quantitative study with two assessment moments.
TIME 1 corresponded to the period before or at the start of treatment, and TIME 2
was roughly one and a half months after patients knew the treatment outcome. This
is expected to correspond to a period of active decision-making when patients are
deciding whether to undergo another treatment cycle. The study variables were
objective and subjective goal blockage, self-regulation strategies (goal
disengagement and goal reengagement) and wellbeing (anxiety and depression).

Participants

Eligibility.

Participants were infertile patients undergoing treatment at a private
reproductive medicine clinic in Spain and at a public reproductive medicine clinic of
a large urban area hospital in the UK. The inclusion criteria for participants was to
be a member of a couple (heterosexual or same sex), or a single women starting a
first order treatment (Ovulation Induction, OI or Intrauterine Insemination, IUI) or
assisted reproduction (*in vitro* Fertilization, IVF or Intracytoplasmic Sperm
Injection, ICSI) treatment with their own or donated gametes. In order to take part in
the present study patients had to be fluent in the language of the study materials (i.e.
English or Spanish) and complete the questionnaires at both assessment moments
(TIME 1 and TIME 2).

Procedure

The study was approved by the National Research Health Service Committee South West - Frenchay of the National Health Service (NHS) and by the Ethics Committee of the School of Psychology, Cardiff University.

The recruitment procedure was developed to be as flexible as possible with regards to when and how patients wanted to participate in the study. At baseline, data collection procedures were different between clinics. The follow-up data collection protocol and collection of medical data were very similar. These procedures are described in more detail below.

At the clinic in Spain all patients starting a new fertility treatment cycle, regardless of whether it was the first treatment or not, were invited to take part in the study by the clinic psychologist at TIME 1. For those who agreed to participate, a consent form was signed and the first questionnaire was taken home for completion. This was returned to the clinic on the day they started a treatment cycle (i.e., start of hormonal stimulation). The clinical identification numbers of the patients who consented to take part, as well as their email address, were sent by the clinic Psychologist to the author of this thesis (S.M.S.). At TIME 2, patients were contacted by S.M.S by email and asked to complete the second questionnaire. Those who did not reply received an email reminder two weeks later and a call by the clinical psychologist three weeks later. At the end of the study, S.M.S went to the clinic in Spain and collected information about the patients' medical records with the help of the clinic psychologist.

At the clinic in the UK, patients who were planning to undergo their first cycle at the UK clinic attended a group session, the Patient Information Meeting (PIM) to receive general information about the clinic and treatment procedures that

they were planning to undergo. The relevant UK clinic staff member responsible for

organising the PIM session briefly introduced the study to patients and each patient

was asked whether S.M.S. could provide more information about the study. For

those patients who agreed, S.M.S. provided more information about the research. If

the patients accepted to receive more information about the study, they could choose

to fill out a paper version of the questionnaire or to be sent an online version by

email. Questions about the study could be answered at this time, or, if patients did

not have time, at some other agreed convenient time to the patient. Patients were

asked to return the paper version of the study consent form and first study

questionnaires on the day they attended a Personal Planning Appointment (PPA)

with a nurse in order to start treatment and to drop it in a study box made available at

the UK clinic. Patients who did not complete the questionnaires at TIME 1 received

an email reminder two weeks later. Patients were only included in the study if they

completed the questionnaire before or at the start of treatment and were excluded if

they had already commenced treatment (i.e. taking medication). When completing

the first questionnaire, patients were asked how they would prefer to be sent the

second questionnaire. At TIME 2, patients who chose to fill out the online version

received an email from S.M.S. with the first study questionnaire and debriefing. If

patients did not reply to the second questionnaire, three reminder emails were sent

two, three and four weeks later. For those patients who preferred to receive a paper

version of the second questionnaire, a copy, and a debriefing document, were sent by

S.M.S and returned by participants by post.   Patients were only included if they

replied at least 2 weeks after the end of treatment. This was because patients are

known to experience high distress immediately after receiving news of their

treatment outcome (Verhaak et al., 2007). If patients were found to have started

another treatment cycle by the time they returned the second questionnaire they were

also excluded. Data from the medical records were extracted by S.M.S with the help

of a UK clinic staff member.

Materials

A paper and an online version of the study questionnaires were built for the

two assessment moments. The online version was built using Qualtrics software

(version April, 2016; copyright, 2016). The questionnaires were piloted with the

first 15 patients and reviewed based on their feedback. The baseline (TIME 1)

questionnaire assessed demographic (age, gender, time living together, parenthood

status, professional status, and education level) and clinical variables (duration of

infertility, time since seeking medical help, types and number of previous fertility

treatments and infertility cause). It also assessed child-wish, subjective goal

blockage, self-regulation strategies of goal disengagement and reengagement and

wellbeing (anxiety and depression). The clinical variables, type of treatment done,

outcome of treatment (i.e. objective goal blockage) and treatment expenses were

assessed at TIME 2. Child-wish, subjective goal blockage, self-regulation strategies

of goal disengagement and reengagement and wellbeing (anxiety and depression)

were also reassessed at TIME 2.

Socio-demographic variables.

The socio-demographic characteristics assessed at baseline were age (in

years), gender, time living together (in years), parenthood status (with

children/childless), professional status (employed, non-employed, other), and

education level (if participants held a university degree or not).

Chapter 4

Clinical variables.

Clinical variables assessed at baseline were years of infertility, time since seeking medical help (in years), type (IUI or IVF/ICSI) and number of previous fertility treatment cycles done, if any, and infertility cause (female factor, male factor, mixed or idiopathic). At TIME 2 the clinical variables investigated were whether patients started the treatment cycle (yes/no), the type of treatment done (IUI, IVF or ICSI), and the outcome of the treatment (pregnant/not pregnant).

Level of parenthood goal blockage.

Objective goal blockage at TIME 1 was assessed based on the chances of pregnancy given by the doctor to the patients before undergoing the first treatment cycle (extracted from the medical records). When the doctor did not communicate the chances of pregnancy to the patient, a probability of pregnancy was calculated based on the patient's medical data and according to the biomedical predictive model proposed by van Loendersloot, van Wely, Repping, Bossyut, & der Veen (2013). This model takes into account several parameters to calculate the probability of conception with a treatment cycle of IVF or ICSI. Due to missing medical data, only the following predictors of the predictive model could be used to calculate chances of pregnancy in the present study: age, age x age, age x age x age, duration of infertility (in years), previous ongoing pregnancies (yes/no), male subfertility (yes/no), endometriosis (yes/no), number of previous failed IVF cycles, age x male subfertility. Objective goal blockage at TIME 2 was calculated taking into account the outcome of the treatment cycle patient undertook. A dummy variable was created with 0 being the group of patients who achieved pregnancy and 1 being the group of patients who did not achieved pregnancy.

Subjective goal blockage was assessed with a single item ('*How blocked do you feel in your goal of becoming a parent?*') developed by (Thompson et al., 2011). Patients rated how much they considered their parenthood goal to be blocked on a Likert scale from 1 = 'not blocked at all' to 7 = 'completely blocked'.

Child-wish.

Child-wish was assessed with one question ('*To what extent do you want to become a parent?*'). Participants rated how much they wanted to become a parent on a Likert scale from 0 = 'not at all' to 10 = 'Very much'.

Self-regulation strategies.

Self-regulation strategies were assessed with the Goal Disengagement and Goal Reengagement Scale (GDGRS, Wrosch, Scheier, Miller, Schulz & Carver, 2003). The GDGRS is a 10-item scale with 2 subscales: disengagement (4 items) and reengagement (6 items). The Disengagement scale measures the relinquishment of commitment (two items, e.g. '*I find it difficult to stop trying to achieve the goal.*') and the reduction of effort towards the goal (two items, e.g. '*It's easy to reduce my effort toward the goal.*'). The Goal reengagement scale assesses the ability to identify new life goals (two items, e.g. '*I think about other new goals to pursue.*'), to commit to new goals (two items, e.g. '*I start working on other new goals.*') and to start an active pursuit of new goals (two items, e.g. '*I convince myself that I have other meaningful goals to pursue.*'). Participants were asked to answer on a five-point scale from 1 = 'strongly disagree' to 5 = 'strongly agree'. Items 3 and 6 of the Goal Disengagement Scale (see Appendix C) were reverse coded prior to the analyses. The total range of scores attainable for the goal disengagement and goal reengagement subscales were between 4 and 20 and 6 and 30, respectively. Higher scores in the subscales indicate greater goal disengagement from parenthood goal

Chapter 4

and greater goal reengagement in other meaningful goals. The Goal Disengagement

subscale showed good internal consistency in the present sample at TIME 1 and

TIME 2 (α = .81 and .74, respectively). The Goal Reengagement subscale showed

excellent internal reliability in both assessment times (α = .91 and .90).

Wellbeing.

Anxiety and depression were assessed using the Hospital Anxiety and

Depression Scale (HADS, Zigmond, & Snaith, 1983). The HADS comprises 14

items, 7 measuring anxiety (e.g., *'I feel tense or wound up'*) and 7 measuring

depression (e.g., *'I feel as if I am slowed down'*). Higher scores in the HADS scale

indicate higher anxiety and depression. The response scale ranges from 0 (e.g. 'only

occasionally') to 3 (e.g. 'a great deal of time') and thus the total range for both

subscales was between 0 and 21. Items 1, 3, 5, 6, 8, 10, 11, and 13 (see Appendix C)

were reverse coded before the analyses were performed, as recommended. The

HADS subscales of anxiety and depression showed good internal consistency at

TIME 1 (α = .87 and .81, respectively) and at TIME 2 (α = .87 and .85, respectively).

Data Analyses

The analyses were performed using SPSS Statistics for Windows (Version

20.0., Armonk, 2011). Before starting with data analyses, the variables age and time

seeking medical help for infertility were screened for outliers beyond 3.29 standard

deviations from the mean (Tabacknick & Fidel, 1989). The data were also screened

for normality. Two variables, HADS depression at TIME 1 and TIME 2 were found

to have significant positive skew (SKEW/S.E. SKEW $> \pm2.58$). To correct for this

the variables were transformed using a log(10) transformation. The variables Goal

Reengagement at TIME 1 and TIME 2 showed a significant negative skew and were

thus transformed with a reversed square-root transformation. Power analyses were performed for the main analyses using G*Power software (Version 3.1.9.2).

Socio-Demographic Data.

To investigate differences between the two countries from which data was collected (UK and Spain) independent t-tests and non-parametric tests were performed for the different socio-demographic and clinical variables. When Levene's test for equal variances was found to be significant, equal variance was not assumed and corrected degrees of freedom and values of t were reported. For categorical variables Chi-square tests were applied with the exception of when the expected frequencies were below 5. In these instances a Fisher's exact test was applied.

Study Goal 1.

A Pearson correlation analysis was used to evaluate the congruence between the variables subjective and objective goal blockage at TIME 1 and TIME 2. Power calculations revealed that a minimum of 68 participants would be necessary to achieve the recommended value of .80 for sufficient power (Cohen, 1988) to detect medium effect sizes. Consequently, there was enough power in the present study (n = 85).

The effect of objective goal blockage at TIME 2 on subjective goal blockage was investigated using a 2 x 2 ANOVA with the within-subjects factor Time (TIME 1 and TIME 2) and between-subjects factor Objective Goal Blockage at TIME 2 (pregnant vs. non-pregnant participants). A power calculation indicated that the number of participants included in the analyses (n= 83) was not sufficient to detect a medium effect size and a sample size of 97 participants would be required to achieve power of .80.

Chapter 4

Hierarchical multiple regression analyses were used to investigate study goals 2, 3 and 4.

Study Goal 2.

First, to investigate the association between goal blockage and wellbeing, objective goal blockage at TIME 1 and subjective goal blockage at TIME 1 were entered into two different regression models as predictors of the dependent variables anxiety and depression. Power calculations showed that the required sample size for the analyses performed with anxiety and depression to have sufficient power to detect a medium effect size was 68 participants indicating that there was sufficient power in the present study (n= 85).

Second, in order to identify possible predictors of anxiety at TIME 2, a two-step regression model was performed. In the first step of this model, anxiety at TIME 1, objective goal blockage at TIME 1, and subjective goal blockage at TIME 1 were entered as predictors. In the second step subjective goal blockage at TIME 2 and objective goal blockage at TIME 2 were added to the model. A similar model was applied to depression at TIME 2 with the only difference of including depression at TIME 1 in the first step of the model instead of anxiety at TIME 1. Power calculations showed that the sample size of the present study (n= 80) was not large enough to achieve the necessary power required to detect a medium effect size for anxiety and for depression. To achieve sufficient power a sample size of 92 would be required.

Study Goal 3.

To investigate the associations between goal blockage and self-regulation strategies (goal disengagement and goal reengagement), subjective goal blockage and objective goal blockage at TIME 1 were first entered into a regression model as

predictors of goal disengagement at TIME 1. The same model was performed with goal reengagement at TIME 1 as a dependent variable. Power calculations showed that the sample size of the present study (n = 85) was higher than the sample size required (n= 68) to achieve a power of .80 for a medium effect size.

To identify the predictors of goal disengagement at TIME 2, a two-step regression model was performed. In the first step, goal disengagement at TIME 1 and objective and subjective goal blockage at TIME 1 were entered as predictors. In the second step, objective goal blockage at TIME 2 and subjective goal blockage at TIME 2 were added to the model. A similar model was run for the dependent variable goal reengagement at TIME 2 with the only difference being the inclusion of goal reengagement at TIME 1 in step 1 instead of goal disengagement at TIME 1. Power calculations showed that the sample size (n = 81) was not sufficiently large to detect a medium effect size with a power of .80 (required sample size = 92).

Study Goal 4.

To investigate the association between self-regulation strategies and wellbeing, to identify whether the self-regulation strategies of goal disengagement and goal reengagement were associated with anxiety at TIME 1 a three-step regression analysis was performed. Objective and subjective goal blockage were entered in the first step and goal disengagement and reengagement were added in the second step of the model. In the third step, four interaction terms were entered: subjective goal blockage x goal disengagement, subjective goal blockage x goal reengagement, objective goal blockage x goal disengagement, objective goal blockage x goal reengagement. The same regression model was run for the dependent variable depression at TIME 1. Power calculations showed that the

sample sizes for anxiety and depression (n = 85) were not sufficiently large to detect a medium effect size at a power level of .80 (required sample size = 109).

A four-step regression analysis was performed to identify the predictors of anxiety at TIME 2. In the first step, anxiety at TIME 1, goal disengagement at TIME 1, and reengagement at TIME 1 were entered as predictors into the model. In the second step, objective and subjective goal blockage at TIME 2 were entered into the model and in the third step goal disengagement and reengagement at TIME 2 were added. In the fourth and last step, the following interaction terms were entered into the model: subjective goal blockage TIME 2 x goal reengagement TIME 2, subjective goal blockage TIME 2 x goal disengagement TIME 2, objective goal blockage TIME 2 x goal reengagement TIME 2, objective goal blockage TIME 2 x goal disengagement TIME 2. A similar four-step regression model described for anxiety (predictors entered in the same order) was also performed for depression at TIME 2 with the only difference being to include depression at TIME 1 in the first step instead of anxiety at TIME 1. When interactions were found to be significant, the analysis of the simple slopes was done in accordance with Aiken & West (1991). For anxiety and depression, power calculations showed that for the significant model the number of participants was lower (n = 84) than that required to achieve a power of .80 for a medium effect size. In this instance 123 participants are required to reach this level of power for the total number of predictors.

Chapter 4

Results

Participants Included

From the 840 patients approached at the UK clinic between December 2014 and March 2016, and at the clinic in Spain between December 2013 and September 2015, 246 returned questionnaires at TIME 1 (a response rate of 29.3%). At the clinic in Spain, only heterosexual couples were included due to difficulties in the recruitment of same sex couples, single women and patients using donated gametes. Of all the participants that responded at TIME 1, 127 participants (51.6%) also responded at TIME 2. From these, 11 participants were excluded for not starting the planned treatment cycle due to unanticipated reasons (e.g. illness). Ten participants from the UK clinic sample were excluded because they responded at TIME 1 after starting treatment. A further 13 participants were excluded for responding at TIME 2 too early, i.e. less than 2 weeks after the end of treatment (N = 3), or after starting a new treatment cycle (N = 10). In total, 2 participants were identified as outliers for the variable time seeking and also excluded. After all exclusions were made 91 participants remained eligible for data analyses.

Participants Demographic and Clinical Characteristics

Table 4.1 displays the demographic and clinical characteristics of the participants (*N* = 91). In total, 58 patients were recruited from the UK and 33 from Spain. As a combined sample, the participants were approximately 36 years old, had been living together for about 7 years and had been trying to conceive for 3 years. The majority of the participants were women (64%), did not have any biological children (81%), were employed (92%) and held a university degree (70%). The average number of previous IVF and IUI treatments was lower than 1.

Chapter 4

Demographic and Clinical Variables Differences

Tests to compare the differences in socio-demographic and clinical variables between participants recruited in Spain and in the UK are reported in the far-right column of Table 4.1. Participants from the UK reported being infertile for a significantly longer time than those from Spain, $t(86.94) = -3.91$, $p < .001$. A separate test revealed that patients from Spain had done more previous IVF treatments ($t(55.25) = 3.11$, $p = .003$) than patients in the UK. No significant differences were found for age, time living together, duration of time since patients start seeking for medical help and previous number of IUI treatment cycles.

Fisher's exact tests indicated that there was a higher proportion of female factors causing infertility in participants from Spain and a greater proportion of male factors causing infertility in participants from the UK ($p = .02$) and that in Spain the predominant type of treatment was IVF (81.8%) while in the UK, ICSI was the main type of treatment (65.5%), $p < .001$. There was also a significant difference between countries in terms of whether participants had a university education, $X^2(1) = 11.98$, $p = .001$. Based on the odds ratio, participants from Spain were 12.17 times more likely to have a university education than those from the UK. Finally, there were significant differences in whether participants paid for their treatment based on country, $X^2(1) = 43.6$, $p < .001$. This was based on the fact that the clinic in Spain was private, and therefore all Spanish patients paid for treatment, while in the UK the majority of patients did not pay for their treatment. Gender, professional and parenthood status did not indicate any significant differences between the samples.

Chapter 4

Study Variables

Independent samples t-tests were conducted to compare differences in the study variables between participants who did and did not achieve pregnancy at TIME 2. These values are presented in Table 4.2. Those who achieved pregnancy were found to have significantly lower subjective goal blockage (M = 3.36, SD = 1.99) than those who did not achieve pregnancy (M = 4.36, SD = 1.63; $t(84)$ = 2.56, p = .01, d = 0.56). No other variables were found to be significantly different.

Statistics for each country (UK and Spain) are presented in Table 4.3. Differences were only observed in terms of goal blockage. Levels of subjective and objective goal blockage were different between countries at TIME 1, with patients from the UK presenting higher levels of subjective blockage (M_{Spain} = 3.44, SD = 2.21; M_{UK} = 4.51, SD = 1.60; $t(50)$ = -2.40) and higher objective chances of conceiving (M_{UK} = 31.55, SD = 12.13; M_{Spain} = 26.24, SD = 9.31; $t(80.9)$ = -2.31) than those from Spain. At TIME 2, there were significant differences between the two countries in terms of objective goal blockage only with a higher number of patients from the UK achieving pregnancy comparing to the patients in Spain ($X^2(1)$ = 8.11).

Chapter 4

Table 4.1. *Demographic and clinical characteristics of the sample*

	UK (N=58)		Spain (N=33)		Total (N=91)		Between-country comparison test
	N	M(SD)	N	M(SD)	N	M(SD)	
Age	57	36.02(4.18)	33	36.21(4.55)	90	36.09(4.29)	$t(88) = 0.21$
Time living together	57	6.55(3.49)	33	6.94(6.91)	90	6.69(4.99)	$t(88) = 0.36$
Duration of infertility	57	3.53(2.00)	32	2.23(1.14)	89	3.06(1.84)	$t(86.94) = -3.91***$
Duration seeking medical help	50	1.56(0.80)	28	1.31(0.36)	78	1.47 (0.73)	$t(77) = -1.44$
Number of previous IVF/ICSI cycles	54	0.17(0.57)	33	0.64(0.74)	87	0.34(0.68)	$t(55.25) = 3.11**$
Number of previous IUI cycles	54	0.43(1.00)	33	0.76(1.60)	87	0.55(1.26)	$t(85) = 1.19$
	N(%)		N(%)		N(%)		
Gender:							
Female	42 (72.4%)		16 (48.5%)		58 (63.7%)		$X^2(1) = 5.21*$
Male	16 (27.6%)		17 (51.5%)		33 (36.3%)		
Parenthood Status:							
No	48 (82.8%)		26 (78.8%)		74 (81.3%)		$X^2(1) = 0.42$
Yes	9 (15.5%)		7(21.2%)		16 (17.6%)		
Professional Status:							
Employed	55 (94.8%)		29 (87.9%)		84 (92.3%)		Fisher's exact test, $p = .06$
Unemployed	1 (1.7%)		3 (9.1%)		4 (4.4%)		
Student	0 (0%)		1 (3.0%)		1 (1.1%)		
University Education:							
No	22 (37.9%)		2 (6.1%)		24(26.4%)		$X^2(1) = 11.98**$
Yes	33 (56.9%)		31 (93.9%)		64 (70.3%)		
Reason for Infertility:							
Female	12 (20.7%)		12 (36.4%)		24 (26.4%)		Fisher's exact test, $p = .02*$
Male	19 (32.8%)		5 (15.2%)		24 (26.4%)		
Mixed	19 (32.8%)		15 (45.5%)		34 (37.4%)		
Ideopathic	7 (12.1%)		0 (0%)		7 (7.7%)		
Type of Cycle:							
IVF	15 (25.9%)		27 (81.8%)		42 (46.7%)		Fisher's exact test, $p < .001***$
ICSI	38 (65.5%)		0 (0%)		36 (40.0%)		
IUI	0 (0%)		6 (18.2%)		8 (8.9%)		
Expenses paid by patient:							$X^2(1) = 43.6***$
No	41 (70.7%)		0 (0%)		41 (47.3%)		
Yes	16 (27.6%)		33 (100%)		49 (53.8%)		

Note. N= sample size; M= mean; *SD* = standard deviation; UK= United Kingdom; *p<.05; **p<.01; ***p<.001

Table 4.2. *Descriptive statistics of the study variables*

	TIME 1	TIME 2			
		N	Pregnant (*N*=37) M(*SD*)	Non-Pregnant (*N*=54) M(*SD*)	Between-Group Test
	M(*SD*)				
Child-Wish	9.30(1.10)	86	9.17(2.18)	9.16(1.25)	t(84) = -0.04
Objective Goal Blockage (%)	29.58(11.41)	-	-	-	-
Subjective Goal Blockage	4.11(1.91)	86	3.36(1.99)	4.36(1.63)	t(84) = 2.56*, *d* = 0.56
Self-Regulation:					
Goal Disengagement	9.75(2.89)	90	10.49(2.53)	10.15(2.84)	t(88) = -0.56
Goal Reengagement	21.78(4.10)	90	21.67(3.96)	20.94(3.94)	t(88) = -0.85
HADS:					
Depression	2.75(2.96)	88	3.57(3.21)	3.77(3.91)	t(86) = 0.26
Anxiety	6.89(4.35)	88	6.23(4.02)	6.66(4.40)	t(86) = 0.47

Note. N = sample size; M = mean; *SD* = standard deviation; *p<.05; **p<.01; ***p<.001

Chapter 4

Table 4.3. *Descriptive statistics of the study variables in Spain and UK and differences between countries*

	TIME 1					TIME 2				
	SPAIN		UK		Between-Group Test	SPAIN		UK		Between-Group Test
	(*N*=33)		(*N*= 58)			(*N*=33)		(*N*= 58)		
	N	M(*SD*)	*N*	M(*SD*)		*N*	M(*SD*)	*N*	M(*SD*)	
Child-Wish	*33*	*9.18(1.01)*	*56*	*9.38(1.09)*	$t(87) = -0.83$	*31*	9.35(.95)	55	*9.05(1.98)*	$t(84) = 0.79$
Self-Regulation:										
Goal Disengagement	33	10.41(3.09)	57	9.37(2.73)	$t(88) = 1.67$	33	10.15(2.40)	57	10.36(2.89)	$t(88) = -0.35$
Goal Reengagement	33	21.55(4.71)	57	21.91(3.73)	$t(88) = -0.41$	33	21.00(3.10)	57	21.37(4.37)	$t(88) = -0.43$
HADS:										
Depression	33	2.24(2.56)	57	3.04(3.15)	$t(88) = -1.24$	33	3.00(3.00)	55	4.11(3.92)	$t(88) = -1.39$
Anxiety	33	7.03(3.47)	57	6.81(4.82)	$t(83.7) = -0.23$	33	6.48(3.92)	55	6.49(4.45)	$t(86) = -0.01$
Goal Blockage:										
Subjective Goal Blockage	32	3.44(2.21)	55	4.51(1.60)	$t(50) = -2.40*$	31	3.45(1.91)	55	4.22(1.76)	$t(84) = -1.88$
						Pregnant (*N*)	Non-Pregnant (*N*)	Pregnant (*N*)	Non-Pregnant (*N*)	
Objective Goal Blockage (% to Conceive)	33	26.24(9.31)	56	31.55(12.13)	$t(80.9) = -2.31*$	7	26	30	28	$X^2 (1) = 8.11**$

Note. N = sample size; M = mean; *SD* = standard deviation; *p<.05; **p<.01; ***p<.001

Chapter 4

Study goal 1: Congruence between Subjective and Objective Goal Blockage

TIME 1.

At TIME 1, there was a weak negative association between subjective and objective goal blockage ($r = -.23$, $p = .03$).

Changes across time in subjective goal blockage according to objective goal blockage at TIME 2.

Figure 4.1 presents the change in subjective goal blockage across time for those who did and those who did not achieve pregnancy at TIME 2. From this figure it is evident that the effect of achieving pregnancy at TIME 2 was to decrease levels of subjective goal blockage in patients who achieved pregnancy whilst to roughly maintain levels of subjective goal blockage in patients who did not achieve pregnancy. This observation was confirmed by a significant time x objective goal blockage at TIME 2 interaction, $F(1,81) = 5.75$, $p = .02$, $\eta_p^2 = .07$. Post-hoc pairwise comparisons revealed no significant change in subjective goal blockage for those who did not achieve pregnancy, $F(1,81) = 1.50$, $p = .22$, but a significant decrease in subjective goal blockage for those who did achieve pregnancy, $F(1,81) = 4.44$, $p = .04$, $\eta_p^2 = .05$.
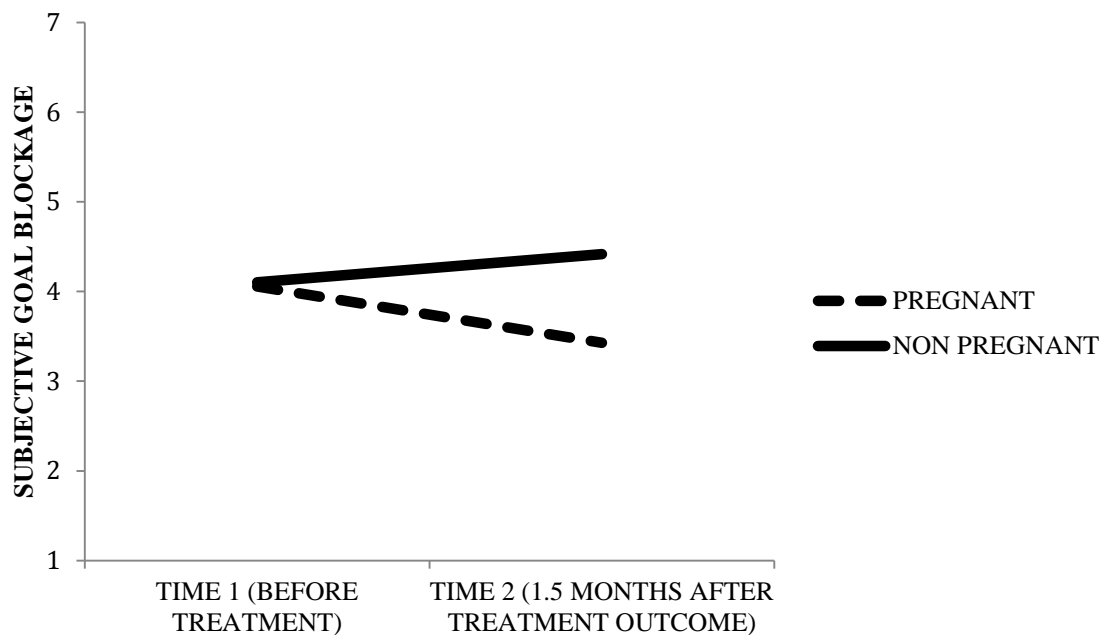
Figure 4.1. Changes in subjective goal blockage across time according to objective goal blockage at TIME 2 (i.e., outcome of treatment).

Study goal 2: Associations between Subjective and Objective Goal Blockage and Wellbeing (anxiety and depression)

TIME 1.

Objective goal blockage at TIME 1 and subjective goal blockage at TIME 1 were entered into a regression model as predictors of anxiety. This model was significant, $F(2,82) = 5.02$, $p = .01$, and accounted for 11% of the variation in anxiety at TIME 1. The same variables were also entered into a second regression model, this time as predictors of depression. This model was also found to be significant, $F(2,82) = 11.27$, $p < .001$, accounting for 22% of the variation in depression at TIME 1. The model coefficients for these two models revealed that higher subjective goal blockage was associated with higher anxiety ($\beta = .32$, $p = .004$) and with higher

depression (β = .46, p <.001), while objective goal blockage was not significantly

associated with anxiety (p = .74) or depression (p = .74).

TIME 2.

Table 4.4 presents the hierarchical regression models used at TIME 2. Step 1

for anxiety was found to predict 59.2% of the variance and was statistically

significant, $F(3, 76) = 36.82$, $p < .001$. To include objective and subjective goal

blockage at TIME 2 did not significantly increase R^2 ($R^2\Delta = .01$, $p = .36$).

Examination of the coefficients from step 1 revealed that only anxiety at TIME 1

predicted anxiety at TIME 2 (β = .76, p <.001).

For the case of depression, adding objective and subjective goal blockage at

TIME 2 did significantly increase the proportion of explained variance ($R^2\Delta = .06$, p

=.02). Step 2 was found to be significant overall, $F (5,74) = 15.09$, p <.001, and

accounted for 50.5% of the variance in depression at TIME 2. The coefficients

showed that, from all the predictors entered in the two models, depression at TIME 1

(β = .66, p <.001) and subjective goal blockage at TIME 2 (β = .29, p = .01) were

positively associated with depression at TIME 2.

Table 4.4. *Summary statistics for hierarchical multiple regression models testing direct associations for levels of anxiety and depression at TIME 2 (Goal 2).*

	Anxiety T2	Depression T2
Step 1:	$R^2\Delta = .59^{***}$	$R^2\Delta = .45^{***}$
Anxiety T1	.76***	NI
Depression T1	NI	.66***
Subjective Goal Blockage T1	-.01	-.18
Objective Goal Blockage T1	.10	.02
Step 2:	$R^2\Delta = .01$	$R^2\Delta = .06^*$
Subjective Goal Blockage T2	NA	.29**
Objective Goal Blockage T2	NA	-.04

Note. Standardised coefficients reported; T1 = TIME 1; T2 = TIME 2; $R^2\Delta = R^2$ change; NA= non-applicable because $R^2\Delta$ for step was non-significant; NI = variable not included in the analyses;*$p<.05$; **$p<.01$; ***$p<.001$.

Study goal 3: Associations between Goal Blockage and Self-regulation

Strategies (goal disengagement and reengagement)

TIME 1.

Subjective goal blockage and objective goal blockage at TIME 1 were entered into a regression model as predictors for goal disengagement at TIME 1, but the model was unable to explain a significant proportion of the variance, $F(2,82) = 2.79$, $p = .07$, $R^2 = .06$.

The same predictors were also entered into a regression model for goal reengagement at TIME 1. The model was found to be significant, $F(2,82) = 3.28$, $p = .04$, $R^2 = .07$, and subjective goal blockage at TIME 1 was found to have a significant negative association with goal reengagement ($\beta = -.28$, $p = .01$).

TIME 2.

Table 4.5 presents the hierarchical regression models used to test the associations of models of goal blockage and self-regulation at TIME 2. At step 1 the model was found to explain 46.2% of the variance in goal disengagement at TIME 2, and was significant, $F(3,77) = 22.07$, $p < .001$. The addition of goal blockage variables at step 2 did not significantly increase the amount of variance predicted by the model ($R^2\Delta = .02$, $p = .23$). From the predictors entered in the model at step 1 only goal disengagement at TIME 1 predicted goal disengagement at TIME 2 ($\beta = .68$, $p < .001$).

For goal reengagement the model was found to be significant at step 1, $F(3,77) = 14.39$, $p < .001$, $R^2 = .36$, but step 2 did not increase the amount of variance accounted for ($R^2\Delta = .03$, $p = .19$). Inspection of the coefficients revealed that only goal reengagement at TIME 1 significantly predicted goal reengagement at TIME 2 ($\beta = .60$, $p < .001$).

Chapter 4

Table 4.5. *Summary statistics for hierarchical multiple regression models testing direct associations for levels of goal disengagement and goal reengagement at TIME 2 (Goal 3).*

	Goal Disengagement T2	Goal Reengagement T2
Step 1:	$R^2\Delta = .46$***	$R^2\Delta = .36$***
Goal Disengagement T1	.68***	NI
Goal Reengagement T1	NI	.60***
Subjective Goal Blockage T1	.07	.03
Objective Goal Blockage T1	-.08	.08
Step 2:	$R^2\Delta = .02$	$R^2\Delta = .03$
Objective Goal Blockage T2	NA	NA
Subjective Goal Blockage T2	NA	NA

Note. Standardised coefficients reported; T1 = TIME 1; T2= TIME 2; $R^2\Delta = R^2$ change; NA= non-applicable because $R^2\Delta$ for step was non-significant ; NI = variable not included in the analyses;*$p<.05$; **$p<.01$; ***$p<.001$.

Study goal 4: Associations between Self-Regulation Strategies (goal disengagement and goal reengagement) with Wellbeing (anxiety and depression)

TIME 1.

Table 4.6 presents the hierarchical regression model used to test the associations between models of self-regulation and wellbeing at TIME 1. For anxiety the model was found to be significant at step 1, $F(2,82) = 5.02$, $p = .01$, $R^2 = .11$, although the model at steps 2 ($R^2\Delta = .02$, $p = .42$), and 3 ($R^2\Delta = .04$, $p = .44$) did not explain significantly more variance. At step 1, subjective goal blockage at TIME 1 was found to have a positive association with anxiety at TIME 1 ($\beta = .32$, $p = .01$). For depression the model was significant at step 1, $F(2,82) = 11.27$, $p < .001$, $R^2 = .22$, although again the model at steps 2 ($R^2\Delta = .01$, $p = .51$), and 3 ($R^2\Delta = .04$, $p = .43$) did not explain significantly more variance. At step 1, subjective goal blockage at TIME 1 was positively associated with depression at TIME 1 ($\beta = .46$, $p < .001$).

Chapter 4

Table 4.6. *Summary statistics for hierarchical multiple regression models testing direct associations for levels of anxiety and depression at TIME 1 (Goal 4).*

	Anxiety T1	Depression T1
Step 1:	$R^2\Delta = .11^{**}$	$R^2\Delta = .22^{***}$
Subjective Goal Blockage T1	.32**	.46***
Objective Goal Blockage T1	.04	.03
Step 2:	$R^2\Delta = .02$	$R^2\Delta = .01$
Goal Disengagement T1	NA	NA
Goal Reengagement T1	NA	NA
Step 3:	$R^2\Delta = .04$	$R^2\Delta = .04$
Subjective Goal Blockage T1 x Goal Disengagement T1	NA	NA
Subjective Goal Blockage T1 x Goal Reengagement T1	NA	NA
Objective Goal Blockage T1 x Goal Disengagement T1	NA	NA
Objective Goal Blockage T1 x Goal Reengagement T1	NA	NA

Note. Standardised coefficients reported; T1 = TIME 1; T2= TIME 2; $R^2\Delta = R^2$ change; NA= non-applicable because $R^2\Delta$ for step was non-significant;;*p<.05; **p<.01; ***p<.001.

TIME 2.

A four-step regression analysis was performed to identify the predictors of anxiety at TIME 2. The model is presented in Table 4.7. In the first step of the model, the model was significant, $F(3,80) = 42.42$, $p < .001$, and able to predict 61.4% of the variance in anxiety. In the second step, the inclusion of objective goal blockage at TIME 2 and subjective goal blockage at TIME 2 did not significantly change the value of R^2 ($R^2\Delta =.01$, $p =.35$). This was also the case in the third step, when goal reengagement at TIME 2 and goal disengagement at TIME 2 were entered into the model ($R^2\Delta =.002$, $p =.83$). In the final step of the model, when the four interaction terms were added, the value of R^2 significantly increased ($R^2\Delta =.06$, $p =.01$), the model now accounting for 68.6% of the variance. The model at this point was found to be significant, $F(11,72) =14.32$, $p <.001$. Inspection of the beta coefficients revealed that anxiety at TIME 1 was associated with anxiety at TIME 2 ($\beta =.69$, $p <.001$), and that the interaction terms objective goal blockage at TIME 2 x goal reengagement at TIME 2 ($\beta = -.27$, $p =.02$), and subjective goal blockage at TIME 2 x goal disengagement interaction ($\beta = -.19$, $p =.02$) were significant.

Figure 4.2 shows the moderation of objective goal blockage at TIME 2 (i.e., pregnant vs. not-pregnant) on goal reengagement and anxiety at TIME 2. To further investigate this interaction, an analysis of simple slopes was performed. This analysis revealed that for patients who achieved pregnancy, the association between goal reengagement and anxiety was positive and not significant ($\beta = .22$, $p =.10$), while for patients who did not achieve pregnancy this association was negative and not significant ($\beta = -.16$, $p =.16$).

Figure 4.3 shows the moderation of subjective goal blockage at TIME 2 (i.e., low vs. high level) on goal disengagement and anxiety at TIME 2. The analysis of

simple slopes revealed that there was no significant moderation effect for

participants with low levels of subjective goal blockage ($\beta = .19$, $p = .21$) and for

participants high levels of subjective goal blockage ($\beta = -.20$, $p = .18$).
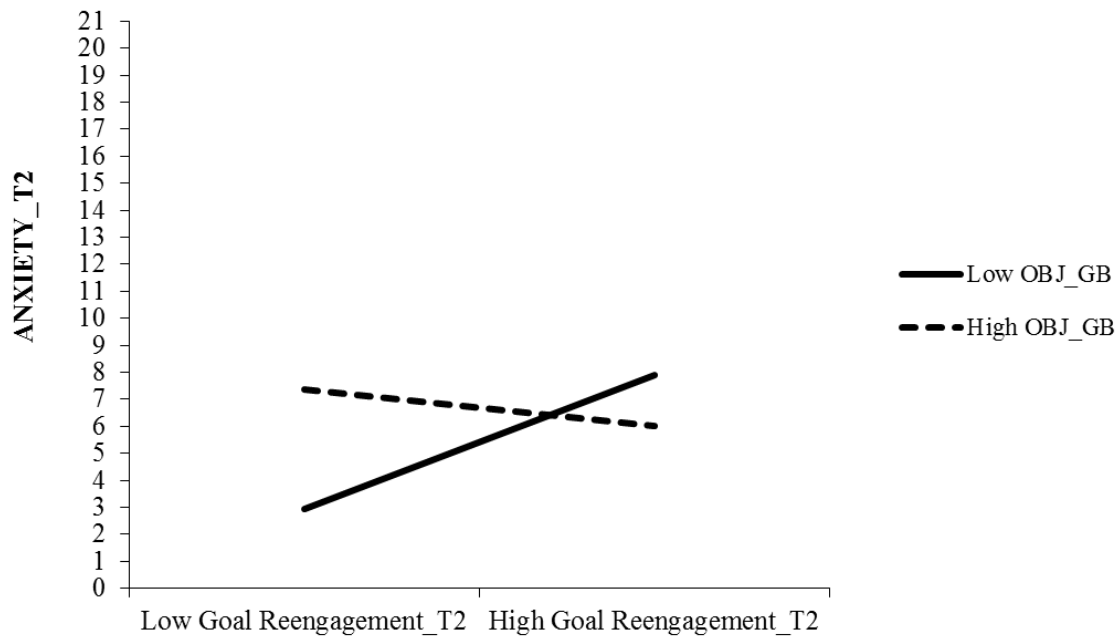
.

Figure 4.2. Moderation of objective goal blockage on goal reengagement and
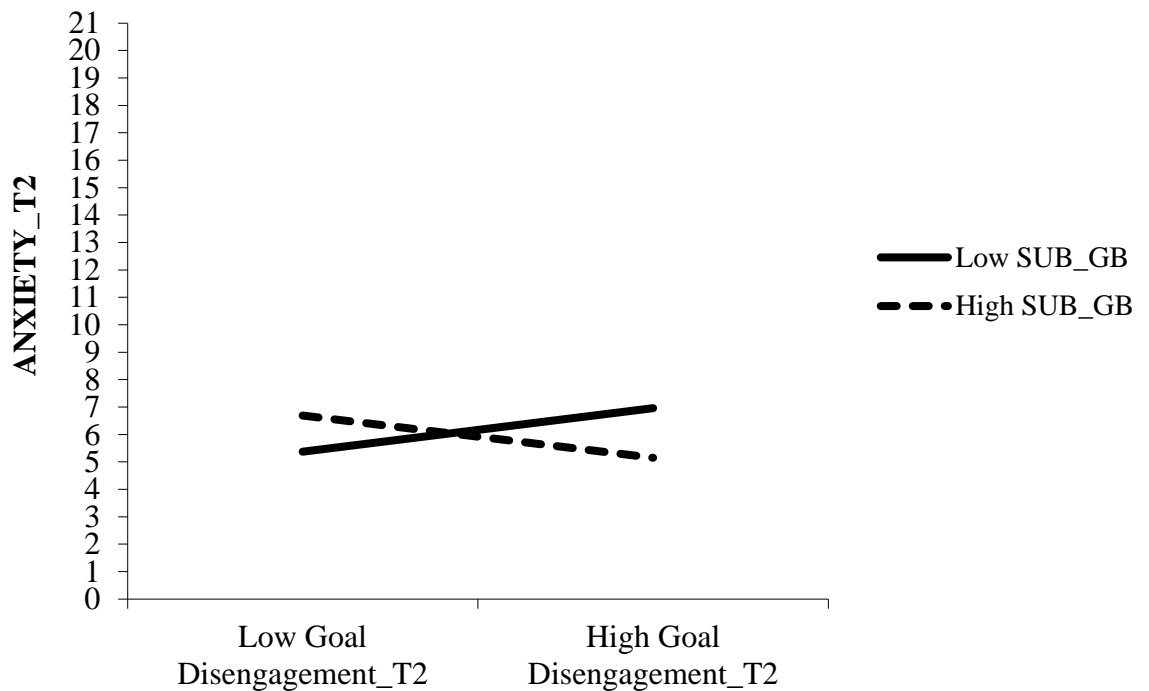anxiety at TIME 2. OBJ_GB = Objective Goal Blockage, T2 = TIME 2.

Figure 4.3. Moderation of subjective goal blockage on goal disengagement and anxiety at TIME 2. SUB_GB = Subjective Goal Blockage; T2 = TIME 2.

For depression, step 1 of the model was found to be significant $F(3,80) = 18.90$, $p < .001$, $R^2 = .42$. Step 2, R^2 ($R^2\Delta = .06$, $p = .02$), but not step 3 ($R^2\Delta = .02$, $p = .21$) significantly increased the predictive value of the model. At step 4 the change in variance accounted for by the inclusion of the interaction terms approached significance ($R^2\Delta = .06$, $p = .053$). At this step of the model the coefficients showed that depression at TIME 1 was positively and significantly associated with depression at TIME 2 ($\beta = .49$, $p < .001$), and that subjective goal blockage at TIME 2 was positively and significantly associated with depression at TIME 2 ($\beta = .20$, $p = .02$). The interaction term subjective goal blockage at TIME 2 x goal disengagement at TIME 2 was also significant ($\beta = -.21$, $p = .03$), and the objective goal blockage at TIME 2 x goal reengagement at TIME 2 interaction approached significance ($\beta = -.26$, $p = .06$). Figure 4.4 shows the moderation of subjective goal blockage at TIME

Chapter 4

2 (i.e., low vs. high level) on the association between goal disengagement and depression at TIME 2. Simple slopes analysis of the significant interaction was performed and revealed that when subjective goal blockage was low the association between goal disengagement and depression was positive and not significant (β = .24, p =.19) and when subjective goal blockage was high, the association between goal disengagement and depression was negative and not significant (β = -.17, p =.34).

Figure 4.5 shows the conceptual representation of the main results, indicating that the study hypotheses were partially supported. In relation to hypothesis 2, only the experience of higher subjective goal blockage (and not objective) was associated with higher levels of anxiety and depression at TIME 1 and TIME 2. Concerning the third hypothesis, as predicted, goal blockage (objective and subjective) was not significantly associated with goal disengagement but only higher perceived goal blockage (and not objective) was associated with lower goal reengagement. Finally, also partially consistent with what was hypothesised, only subjective goal blockage was a significant moderator for the relationship between goal disengagement with anxiety and depression as well as only objective goal blockage was a significant moderator for the association between goal reengagement with anxiety and depression.
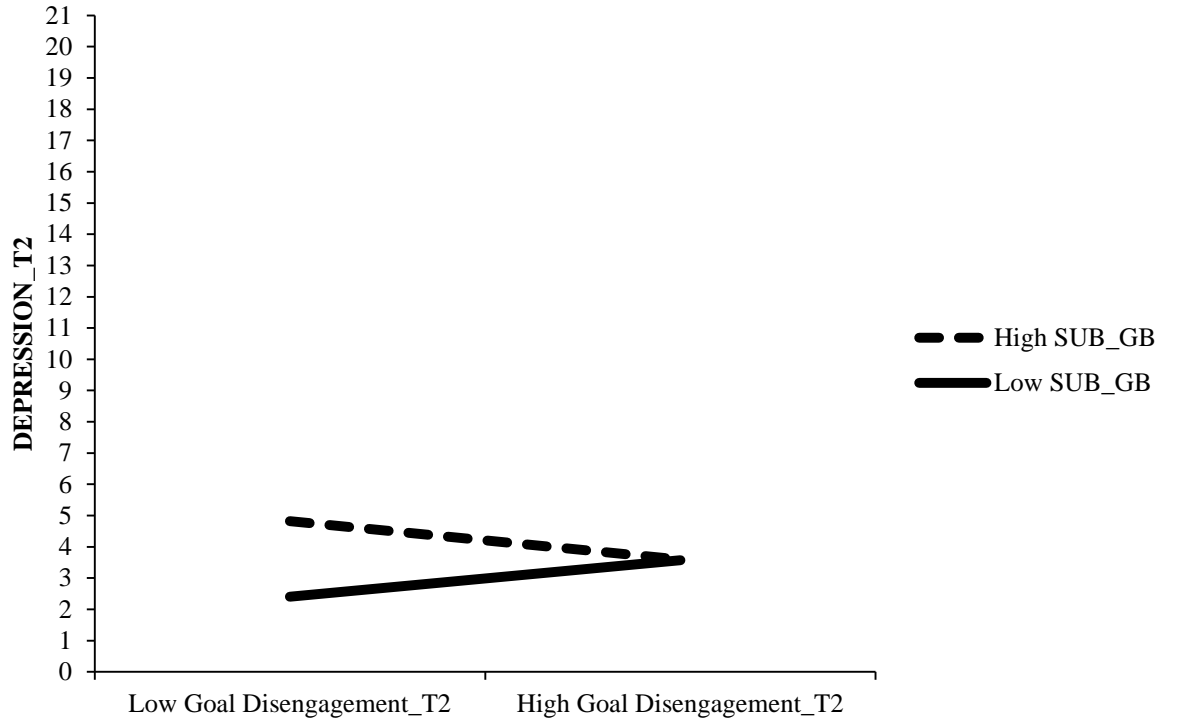
Figure 4.4. Moderation of subjective goal blockage on goal disengagement and
depression at TIME 2. SUB_GB = Subjective Goal Blockage; T2 = TIME 2.

Chapter 4

Table 4.7. *Summary statistics for hierarchical multiple regression models testing direct associations and moderations for levels of anxiety and depression at TIME 2 (Goal 4).*

	Anxiety T2	Depression T2
Step 1:	**R²**Δ = .61***	**R²**Δ =.42***
Goal Disengagement T1	-.09	-.04
Goal Reengagement T1	-.13	.05
Anxiety T1	.69***	NI
Depression T1	NI	.49***
Step 2:	**R²**Δ = .01	**R²**Δ = .06*
Objective Goal Blockage T2	.07	-.03
Subjective Goal Blockage T2	-.03	.20*
Step 3:	**R²**Δ = .002	**R²**Δ = .02
Goal Disengagement T2	.003	.03
Goal Reengagement T2	.22	.08
Step 3: 2-way interactions	**R²**Δ = .06*	**R²**Δ = .06ᵃ
Objective Goal Blockage T2 x Goal Disengagement T2	.06	-.03
Objective Goal Blockage T2 x Goal Reengagement T2	-.27*	-.26 ᵃ
Subjective Goal Blockage T2 x Goal Disengagement T2	-.19*	-.21*
Subjective Goal Blockage T2 x Goal Reengagement T2	-.02	.02

Notes. Regression for anxiety reported with pregnant group as reference group. Standardised coefficients reported; T1 = TIME 1; T2= TIME 2; **R²**Δ = **R²** change; NI = variable not included in the analyses; *$p<.05$; **$p<.01$; ***$p<.001$, [a] $p<.10$
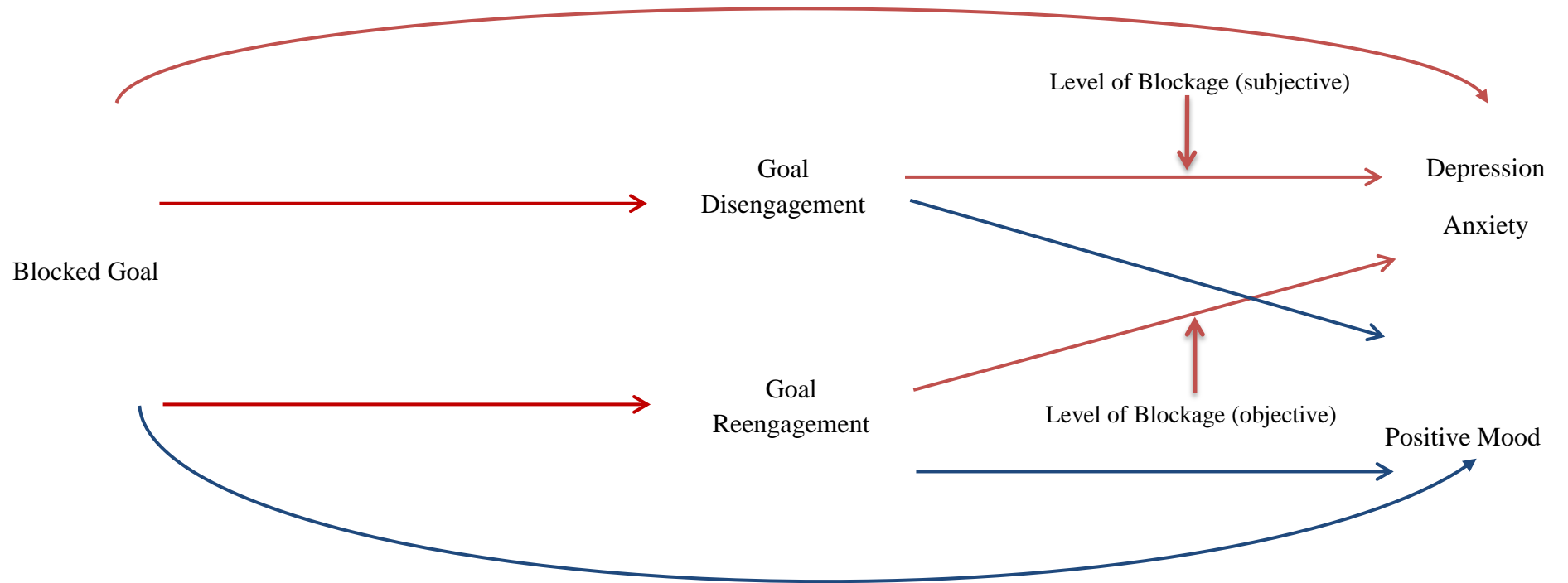
Figure 4.5. **Conceptual representation of the main results.** This is not a structural equation model. Lines refer to proposed associations. red line = results partially in line with study hypotheses; blue line = association not tested

Chapter 4

Discussion

The four hypotheses formulated in the present study were, overall, only partially supported by the study findings. In relation to study goal 1, at the beginning of treatment participants did not have realistic goal blockage perceptions but were able to update them according to their treatment outcome. Concerning study goal 2, only subjective goal blockage was relevant in predicting patients' wellbeing, both at the start of treatment and after its outcome. Patients who perceived the achievement of parenthood goal as harder were more anxious and depressed at the start of treatment as well as more depressed after knowing the treatment outcome. In relation to study goal 3, as predicted, patients with higher subjective goal blockage reengaged less in alternative life-goals although objective goal blockage was not significantly associated with goal reengagement. In relation to goal disengagement, according to what was predicted, goal blockage levels (objective and subjective) were not significantly associated with disengagement from parenthood goal. Finally, concerning goal 4, no moderation effects were found in relation to the pre-treatment period. At TIME 2, after knowing the treatment outcome, the impact of disengaging from parenthood on patients' anxiety was influenced by the way they perceived their chances of achieving parenthood to be more or less likely. At the same time, the impact that investing in alternative life-goals had on anxiety was influenced by the medical chances patients had to achieve parenthood. However, in both instances the analyses of simple slopes did not reach significance and one should be cautious with their interpretation. Overall, the non-significant findings might have been due to conceptual or methodological issues that will be discussed further.

The first hypothesis was that objective and subjective goal blockage would be positively associated at TIME 1 and TIME 2. At TIME 1, the study results were not consistent with what was hypothesised since patients' perceptions of goal blockage were inconsistent with their prognosis. Although the effect size of the negative association between objective and subjective goal blockage was small, this finding also contrasts with some past research that has shown objective and subjective levels of goal blockage not to be significantly associated (e.g. Thompson et al., 2011). This difference might be due to the use of different measures to assess the levels of objective goal blockage. Indeed, an important issue that future research should take into account is the importance of using a valid operationalisation of objective goal blockage variable. For instance, Thompson et al., (2011) considered the number of previous unsuccessful cycles as a measure for objective goal blockage. In contrast, in the present chapter a more valid measure of objective goal blockage was used since it corresponded to the chances of conception given by the doctor or, when missing, to a chance of conception calculated using a predictive model of success for fertility treatment. There are several medical models available that one can use to predict success through IUI and IVF/ICSI incorporating a large diversity of predictive factors, a few of which such as women's age, and cause and duration of infertility, are common to most of these models (e.g., Custers et al., 2007; Leushuis et al., 2009; van Loendersloot et al., 2013). For these reasons, future research trying to evaluate objective goal blockage should do so based on the chances calculated by the doctors or based on validated predictive models of treatment success.

In relation to the time after knowing the treatment outcome, patients who achieved pregnancy had lower levels of subjective goal blockage, a finding

Chapter 4

consistent with past research that showed that once pregnancy was achieved the levels of parenthood goal attainability increased compared to previous stages of treatment such as the embryo transfer day (Salmela-Aro et al., 2008). In Salmela-Aro and colleagues' study, the level of parenthood goal attainability decreased for patients who did not achieve pregnancy (Salmela-Aro et al., 2008). However, in this chapter, the level of subjective blockage for those who did not achieve pregnancy remained stable. This was not in line with the decrease expected and may be because patients were, on average, starting their first treatment and consequently their objective chances of achieving parenthood decreased only slightly (e.g. the chances are 22% per cycle but increase to 49% if patients undergo three treatment cycles, Stern et al., 2010). Furthermore, this finding could correspond to an attempt by patients to avoid decreasing their motivation levels and to maintain engaged with treatment. Consistent with this, in Chapter 3, even after three failed treatment cycles, patients tried to underestimate the existence of an increase on the levels of objective goal blockage after experiencing another failed treatment. Thus, the intention to maintain positive expectations about the treatment outcome after experiencing failure seems to be common among infertile patients.

The results partially supported the second study hypothesis which was that higher levels of goal blockage (subjective and objective) would be associated with higher levels of anxiety at TIME 1 and with higher depression at TIME 2. Overall, the present chapter findings are consistent with the prediction made by developmental regulation theories that higher levels of goal blockage lead to poorer wellbeing (Heckhausen et al., 2010; Haase et al., 2013). The findings are also consistent with studies included in the systematic review performed in Chapter 2, indicating that higher parenthood goal blockage was associated with higher

depression (Thompson et al., 2011). In relation to the start of treatment, these findings are consistent with the idea that the perception of patients of 'spending a chance' to achieve parenthood goal can result in feelings of loss and consequently lead to increased anxiety (Slade et al., 1997) and depressive symptoms (Thiering, Beaurepaire, Jones, Saunders, & Tennant, 1993; Verhaak et al., 2001). After knowing the treatment outcome, the fact that higher subjective goal blockage was associated with higher depressive symptoms is in line with previous research results which showed that high levels of parenthood goal attainability were related to lower depression six-months after experiencing a failed treatment cycle (Salmela-Aro et al., 2008). Furthermore, in accordance with what was found by Thompson et al. (2011), the present study's results reinforce the observation that patient's adjustment seemed mostly to depend on their perceptions of controllability over the achievement of parenthood goal and that this was more important than the objective chances to achieve parenthood. At the start of treatment, the fact that objective goal blockage at TIME 1 (i.e. prognosis) was not significantly associated with patient's wellbeing may be due to the fact that on average the present study sample was undergoing their first treatment cycle, a moment when patients tend to overestimate their chances to conceive (Johnston, Shaw, & Bird, 1987). At TIME 2, even if one would expect that knowing the treatment outcome (pregnant or not pregnant) would be associated with depression (Verhaak et al., 2007), objective goal blockage was not a significant predictor of wellbeing. It is possible that this non-significant finding was a result of the analyses being underpowered. However, the effect size found in the present chapter was small indicating that there is only weak support that objective goal blockage may correspond to a relevant predictor of wellbeing in terms of practical significance.

Chapter 4

According to the predictions made developmental regulation theories, one might expect that higher levels of blockage would lead to higher goal disengagement and reengagement (Wrosch et al., 2003). Previous studies on parenthood also showed that higher levels of parenthood goal blockage were associated with higher goal disengagement from parenthood (Kotter-Grühn et al., 2009). However, the findings from the meta-analyses performed in Chapter 2 and the findings from Chapter 3 showed that parenthood goal blockage was not associated with goal disengagement and that patients only seemed to invest in alternative goals if those did not compromise the achievement of parenthood. Consequently, the third hypothesis of the present chapter was that higher levels of goal blockage (subjective and objective) would lead to lower levels of goal reengagement and would not be associated with goal disengagement at TIME 1 and TIME 2.. This hypothesis was partially supported by the study findings since at TIME 1 only subjective goal blockage was associated with lower goal reengagement. After patients knew the treatment outcome at TIME 2, subjective and objective goal blockage were not significantly associated with goal disengagement or goal reengagement. The fact that patients who perceived their parenthood goal to be more blocked reengaged less in alternative life goals is consistent with previous research (Heckhausen et al., 2001; Thompson et al., 2011). One reason for this finding at the start of treatment might be that patients who were about to undergo a cycle, and who found it harder to achieve parenthood, wanted to avoid distractions caused by other goals. This process, known as the optimisation heuristic, is characterised by the fact that when individuals choose a new goal to engage with they consider the side effects of this investment for other goals in their lives (Heckhausen et al., 2010). Since patients at the start of treatment seemed to be highly motivated to achieve parenthood (e.g. presented high

levels of child-wish), investing effort in other goals could have negative effects for achieving parenthood. Indeed goal shielding, which corresponds to the ability to not start pursuing alternative goals when pursuing an important goal, was common when people were highly committed to a given goal and increased the likelihood of goal achievement (Shah, Friedman, & Kruglanski, 2002). Therefore, independently of their prognosis, infertility patients who perceive their goal to be highly blocked try to focus their resources on parenthood goal before the start of a cycle by avoiding engagement with other goals during this period.

The fact that patients do not update their self-regulation strategies after experiencing treatment failure is entirely consistent with the results from the systematic review and meta-analysis performed in Chapter 2 and with the findings from the qualitative study performed in Chapter 3. In this chapter, after experiencing an average of 3 failed treatment cycles, patients wanted to remain engaged with parenthood goal by undergoing more treatment. This finding showed once more that even if patients acknowledged the existence of a change in goal blockage, the objective level of blockage they were facing did not influence their decisions about giving up on parenthood goal. One reason for this could be the high levels of child-wish present in the study sample contributing to the difficulty in disengaging from parenthood goal. Indeed, higher levels of child-wish at TIME 1 showed to be associated with lower goal disengagement at TIME 2 in the present study sample ($r = -.32$, $p = .002$). Another reason may be that the change in perceived and objective goal blockage was not large enough to influence the existence of a shift in the self-regulatory strategies used by patients. For instance, the group of patients who did not achieve pregnancy may still perceive their opportunities as greater than the constraints since on average they were experiencing their first treatment failure. For

Chapter 4

the group of patients who achieved pregnancy, one would expect that since there was

an acknowledgement of the change in objective goal blockage levels evident by the

lower levels of subjective goal blockage, patients would present lower levels of goal

disengagement. However, pregnant patients also did not update their self-regulatory

strategies. This might be explained by the existence of a higher risk in pregnancies

conceived by IVF such as the risk of ante-partum haemorrhage (Pandey et al., 2012).

Indeed, distancing and self-protection are common strategies of goal disengagement

(Haase et al., 2013) and patients could be using these in order to protect themselves

from the risk of an eventual failure of goal achievement. Overall, in combination

with the findings of Chapter 3, these results indicate that patients do not seem to shift

their self-regulatory strategies after a change in goal blockage, regardless of the

number of failed cycles experienced. Since the present study included patients that

were, on average, starting their first treatment cycle, future research should

investigate this hypothesis with patients who experienced consecutive treatment

failure using quantitative methods.

The fourth hypothesis was not supported for TIME 1 and was only partially

supported for TIME 2 since two of the hypothesised moderation effects were

significant and in the same direction of what was hypothesised. In the meta-analyses

performed in Chapter 2, the associations between self-regulation strategies and

wellbeing were not significantly moderated by the level of goal blockage. In the

present chapter, although the direction of the associations was consistent with the

present study hypotheses and previous research, the strength of the associations

suggests that even if patients might experience a benefit from implementing goal

disengagement and reengagement strategies, this benefit seems to be weak. Another

important result is that objective goal blockage was a significant moderator for the

associations between goal reengagement and wellbeing whilst subjective goal

blockage was a significant moderator for the association between goal

disengagement and wellbeing. This difference seems to suggest that the impact of

goal reengagement on wellbeing might possibly be more linked to behavioural

regulatory processes while the impact of goal disengagement on wellbeing may be

more associated with cognitive regulatory processes. This might be because goal

disengagement decreases depressive symptoms when individuals cognitively

perceive their resources as not sufficient to overcome the consequences of loss

(Haase et al., 2013). Indeed, failing to disengage often involves rumination (Carver,

La Voie, Kuhl, Ganellen, 1988). Alternatively, the contribution of goal

reengagement to the existence of lower depressive symptoms seems to depend less

on deliberate processes, and more on behavioural efforts, which is in line with the

fact that setting and pursuing new goals correspond to a positive action-plan that

mostly provides purpose for living (Ryff, 1989). The impact of the different

cognitive and behavioural processes involved in goal disengagement and

reengagement strategies on individual's wellbeing has not received much attention in

past research and therefore should be investigated further, particularly in the context

of blocked parenthood goals.

One limitation of the present research is that it included two heterogeneous

samples (Spain/UK) that differed in terms of treatment expenses. The fact that in

Spain patients were using private care, while in the UK the majority of patients were

using a public system, could have introduced some degree of bias in terms of their

level of engagement with parenthood goal. However, even if not part of the

analytical plan, the differences between countries were calculated and no differences

between the two countries were found in terms of goal disengagement levels ($t(88) =$

1.67, $p = .10$) indicating that participants from both countries seemed similarly engaged with parenthood goal. The two samples also differed in terms of chances of conception, pregnancy achievement, and perceived goal blockage, with patients from the UK presenting greater chances of conception and greater subjective goal blockage at TIME 1 and more pregnancies at TIME 2. These differences in goal blockage could influence the level of goal disengagement and reengagement strategies used by each sample. However, the absence of any difference between patients from the UK and Spain for self-regulatory strategies suggests that this was not a problem for the overall sample.

Another limitation is the presence of low power for the analyses that included a higher number of predictors suggesting that the present study sample size was too small to detect significant associations of medium effect sizes. To deal with this, the relevant hypotheses should be investigated in the future with larger samples. Additionally, the existence of a poor response rate introduces a further problem of representativeness and, consequently, the existence of a possible bias in the estimates. The levels of goal disengagement of the non-completers (i.e. those who were excluded because they only responded at TIME 1) seemed to be on average higher than those of the completers (completers = 9.70; non-completers = 10.47). However, when comparing completers and non-completers of follow-up, the difference between the disengagement levels only approached significance ($t(234) = -1.90$, $p = .059$). One possible reason for the low response rates might have been the existence of other studies in which patients were invited to take part at the same time as the present one. Alternatively, patients were invited to take part in the present study when they were attending a medical appointment or session and many of them did not feel motivated to fill out the questionnaire at that time. This time gap

between the invitation and the moment when patients consider completing the

questionnaire may have decreased their motivation to take part. It could be that only

patients who were more engaged with treatment replied to the present study

questionnaires as a reflex of their motivation to invest on parenthood goal.

Therefore, the results of the present study should be interpreted with caution.

From the results of the present study one might say that patients do not seem

to engage in active self-regulation from cycle-attempt to cycle-attempt. Future

research should investigate if patients update their perceptions of their chances to

achieve pregnancy based on the information provided by their physicians and if this

information is sufficient and clear.

Chapter 5

Chapter 5: General Discussion

The overall aim of the present thesis was to investigate individuals' regulatory strategies (self and dyadic) and wellbeing when experiencing a blocked goal. This aim was achieved by testing the three main predictions of developmental regulation theories in the context of a blocked parenthood goal. These predictions were that (1) the experience of a blocked parenthood goal will lead to poor wellbeing; (2) when facing a blocked goal individuals will disengage from the goal and reengage in alternative life-goals; and (3) the use of these regulatory strategies will lead to better wellbeing.

This thesis utilised a variety of methodologies. In Chapter 2, a systematic review and meta-analysis was conducted to allow an evaluation and meta-synthesis of the existing evidence on the topic. In Chapter 3, Interpretative Phenomenological Analysis (IPA) was conducted to investigate the individual and dyadic regulatory approaches used by couples to sustain or change their regulatory strategies after experiencing a failed IVF treatment cycle. Finally, a prospective study was conducted in Chapter 4 to test the three main predictions of developmental regulation theories at two time-points (i.e. pre and post-treatment) in a clinical sample of infertile patients undergoing fertility treatment. In general, the research detailed in these chapters provides little support for developmental regulation theories in the domain of a blocked parenthood goal.

In the following General Discussion the main findings of the thesis will be discussed in light of the three main predictions of developmental regulation theories. This will be followed by a discussion of the key methodological limitations of the research presented in Chapters 2 to 4, and finally, some recommendations for future research and practical implications will be presented.

Chapter 5

Goal Blockage and Wellbeing

According to the predictions made by developmental regulation theories, one would expect that people facing a blocked goal would experience poorer wellbeing compared to individuals without a blocked goal (Heckhausen et al., 2010; Wrosch et al., 2003). In the parenthood goal blockage domain, studies included in the systematic review of Chapter 2 indicated that experiencing a blocked parenthood goal resulted in higher depression (Salmela-Aro et al., 2008; Thompson et al., 2011) and lower life satisfaction and positive states of mind (Kotter-Grühn et al., 2009; Thompson et al., 2011). In total 10 associations between goal blockage (subjective and objective) and wellbeing (indicators were negative and positive mood, depression and anxiety) were tested in the present thesis. Six of these were found to be non-significant, including the associations between goal blockage and positive mood (Chapter 2), objective goal blockage and depression, and objective goal blockage and anxiety at the pre and post-treatment, and the association between subjective goal blockage and anxiety at the post-treatment. In contrast, four significant associations were found across Chapters 2 and 4 indicating that patients who perceived parenthood goal as more blocked experienced poorer wellbeing. In Chapter 2, higher goal blockage was associated with higher negative mood, and the strength of this association was moderate ($r = .33$). This significant association was replicated in Chapter 4, this time with anxiety and depression as wellbeing indicators. In this chapter higher subjective goal blockage was associated with higher anxiety and depression at pre-treatment and with higher depression at post-treatment. The strength of these associations was between close to moderate and large (β ranging from .29 to .46). From the results of Chapter 4 one can also conclude that individuals' perceptions of their chances to achieve parenthood (i.e.,

their subjective goal blockage) play a more important role for patient's wellbeing than prognosis and treatment outcome (i.e. objective goal blockage). One reason for why subjective goal blockage (but not objective goal blockage) was associated with patient's wellbeing could be that patients' perceptions of their chances of achieving parenthood were not aligned with the objective chances of achieving it as subjective and objective goal blockage were negatively associated in the pre-treatment phase of Chapter 4. Although one should be aware that the strength of the association between subjective and objective goal blockage was weak, this finding suggests that patients did not have realistic perceptions of their objective chances to achieve parenthood.

The results of Chapter 4, which indicate that objective goal blockage did not significantly impact on wellbeing, are inconsistent with the vast majority of the evidence from development regulation field (Wrosch et al., 2003) and the infertility field (Verhaak et al., 2007). However, in the specific domain of parenthood, it is also known that the majority of people are able to adjust to a failed treatment and that, for instance, the proportion of women suffering from relevant clinical depression symptoms after a failed cycle is low, ranging from 10 to 25% (Lok et al., 2002; Verhaak et al., 2005). Indeed, a more recent study has shown that women undergoing fertility treatment were actually at a lower risk of experiencing depressive symptoms (and recurrent depression) than a sample of non-patient females of the same age (Sejbaek, Hageman, Pinborg, Hougaard, & Schmidt, 2013). It was further argued that women who are depressed do not seek fertility treatment or if so, undergo fewer cycles.

An alternative reason for the lack of impact of prognosis or treatment failure on the wellbeing of the present thesis sample can be drawn from the findings

obtained in Chapter 3; patients perceived treatment failure as being a beneficial

experience in terms of personal growth. This positive perception of failure perhaps

allowed participants to perceive the existence of more opportunities than constrains

to achieve parenthood. When individuals perceive a higher number of opportunities

than constrains to achieve a given goal, the experience of failure is not expected to

have a strong negative impact for their wellbeing since they still have positive

expectations about goal achievement (Heckhausen et al., 2010). If patients from

Chapter 4 perceived the experience of treatment failure in this manner it is possible

that it was less likely to have a significant impact on their wellbeing. Indeed, past

research conducted with infertility couples has previously reported the use of this

type of benefit-finding strategies when experiencing treatment failure (Abbey &

Halman, 1995). The findings from the present thesis therefore complement this past

research and suggest that one way for infertility patients to find a positive meaning in

the accumulation of treatment failures is to find benefit from the experience (e.g. by

seeing it as a learning opportunity).

Goal Blockage and Regulation (Self and Dyadic)

According to developmental regulation theories predictions, individuals

facing higher levels of goal blockage are expected to disengage from parenthood and

reengage in alternative life-goals (Haase et al., 2013). There is evidence from past

research showing that individuals who experienced different types of goal blockage,

such as a relationship crisis in late midlife (Wrosch & Heckhausen, 1999), started to

disengage from the blocked goal and reengage in new life-goals such as investing in

non-partnership related social relationships. In the context of parenthood, previous

research included in the systematic review of Chapter 2 showed that when facing a

blocked parenthood goal, higher levels of goal blockage were associated with higher

levels of goal disengagement (e.g. Kotter-Grühn, 2009). The main findings of the

present thesis, which are consistent across all chapters, do not support this findings.

Despite changes to the overall level of objective and subjective goal blockage (e.g.

even after having experienced on average three failed cycles) patients did not

consider disengaging from their parenthood goal. Although contra to the predictions

made by developmental regulation theories, this is entirely in keeping with past

research, which has shown that infertility patients try very hard to remain committed

to parenthood and struggle to disengage from it even after having stopped with

treatment (Daniluk, 2001). One possible reason for continued engagement until a

point when all chances have been exhausted may be the existence of not only a

strong goal intention (e.g. wanting to achieve parenthood by undergoing fertility

treatment), but also a clear implementation intention (e.g. having a plan for what to

do if treatment fails) from the beginning of the treatment process. Implementation

intentions correspond to plans about the type of behaviour needed when confronted

with specific situations in order to achieve a given goal or, in other words, the ability

to have an 'if-then' plan, i.e. to anticipate a possible event and to define a plan of

action for when it might occur (Chapman, Armitage, & Norman, 2009). Previous

research has suggested that a person who uses implementation intentions is able to

be persistent during goal pursuit by preserving regulatory ability and by being able to

re-direct their actions to a given goal after experiencing a goal blockage (Martijn et

al., 2008). The results of the present thesis therefore seem to indicate that infertile

patients use implementation intentions. For instance, in Chapter 3 patients said that

the decision to undergo fertility treatment until chances are exhausted was pre-

determined and non-negotiable within the couple. This suggests that infertile

patients use implementation intentions (e.g. "if treatment fails, I will keep trying

until opportunities are exhausted") and that this allows them to conserve regulatory strength and maintain engagement with treatment after facing (another) treatment failure. The maintenance of a high level of engagement and the avoidance of disengagement from parenthood, may also be justified by the high levels of child-wish held by patients undergoing infertility treatment (Chapters 3 and 4). However, in Chapter 3 it was also found that the high importance attributed to parenthood may not always be what encourages goal engagement. For some patients, investment in the parenthood goal was motivated by the importance their partner attributed to it. This indicates that there are dyadic transactive processes (gain) that influence goal engagement.

In relation to goal reengagement, the results from the meta-analysis performed in Chapter 2 were consistent with those of Chapter 4 regarding the direction of the association between goal blockage and goal reengagement, indicating that the higher the blockage, the lower the investment in other goals. However, it must be noted that the effect sizes found were small (i.e., Chapter 2, $r = -.24$; Chapter 4, $\beta = -.28$). In Chapter 3, half of the sample was willing to invest in alternative goals such as career and leisure activities. Although this finding is not consistent with the prediction made by developmental regulation theories that higher goal blockage would lead to higher goal reengagement, in the case of infertility patients it is consistent with previous studies (e.g. Thompson et al., 2011). In addition, this finding seems to be a further indicator that patients want primarily to maintain their engagement with parenthood goal as those who perceived it as hardly achievable reengaged less in alternative life-goals. The intention to maintain engagement could also justify the intention to avoid distractions caused by other goals (Shah, Friedman, & Kruglanski, 2002). In support of this, in Chapter 3 patients

said that they would, if necessary, give up the investment on alternative goals to be fully focused on the pursuit of parenthood. Thus to conclude, independent of the level of blockage being faced, patients want to remain engaged with parenthood goal and the investment on alternative life-goals seems to be dependent on how much they consider it not to interfere with the pursuit of parenthood. The preference for maintained engagement with treatment was also observed at the dyadic level as couples did not feel the need to discuss future treatment after experiencing a failed treatment cycle as the decision to do more treatment was considered to be pre-determined and non-negotiable.

Self-Regulation and Wellbeing

According to the predictions of developmental regulation theories, when people experience a blocked goal, disengagement from it and reengagement in alternative life goals contributes to better wellbeing. This adaptive effect of goal disengagement and reengagement on wellbeing has been found with different types of goal blockage (Heckhausen et al., 2010). For instance, parents dealing with a severe illness of their children (i.e. cancer), benefited from disengaging from goals that became blocked due to the illness (e.g. investing on their career) and reengaging in new activities (e.g. spending more time with their children).

In the present thesis, the effect of self-regulation on wellbeing was expected to vary according to two different moderator variables: the type (anticipated or unanticipated) and level (high or low) of goal blockage. More specifically, it was expected that patients with an unanticipated type of blockage would benefit more from disengaging from parenthood goal or reengaging in alternative goals than for those with an anticipated one. Regarding the level of blockage, it was expected that for patients experiencing a higher level of goal blockage, goal disengagement and

reengagement would contribute to better wellbeing.

Past research has shown that the use of goal disengagement when experiencing a blocked goal such as a severe health condition resulted in better wellbeing (e.g. Moskowitz et al., 1996). Goal reengagement also showed to contribute to better wellbeing when facing different types of blocked goals such as couple's separation in late midlife (Wrosch & Heckhausen, 1999). In the specific domain of blocked parenthood goal, as reported by past studies included in the systematic review presented in Chapter 2, goal disengagement and reengagement showed to be associated with lower depressive symptoms (Heckhausen et al., 2001) and lower negative affect (Kraaij et al., 2009). In studies including infertile couples undergoing treatment, the use of goal disengagement and reengagement was also related with lower infertility-specific thought intrusion and greater positive states of mind (Thompson et al., 2011). However, the results of the present thesis are not in line with the evidence from previous research regarding goal disengagement. The results reported in this thesis, on the most part, showed that disengagement from parenthood did not seem to have wellbeing benefits for patients. However, there is some evidence that reengagement in alternative goals might be beneficial for wellbeing. For instance, in Chapter 2 higher reengagement in alternative life-goals was associated with greater positive mood.

Concerning the aforementioned moderation effect of type of blockage, the direction of the associations presented in the meta-analysis performed in Chapter 2 suggested that only infertile patients with an unanticipated blockage (i.e., infertility) and not those with an anticipated blockage (i.e., delayed parenthood), seemed to benefit when disengaging from parenthood. This result seems to suggest that although infertile patients do not plan to disengage from parenthood, if they did, they

could benefit from it.

Regarding the moderator level of goal blockage, no significant differences were found in the meta-analysis although results from Chapter 4 suggested the existence of two moderation effects that are in accordance with the predictions made by developmental regulation theories. The first indicates that those who were experiencing a high level of subjective goal blockage benefited from disengaging from parenthood goal. The second indicates that those who experienced a failed treatment cycle benefited from reengaging in other meaningful goals. The analyses of the simple slopes were, however, non-significant and the size of the effect of the moderation analyses for type and degree of blockage were small suggesting that the two moderators tested have only weak practical relevance for the associations between self-regulation and wellbeing. For this reason, there is a need to identify stronger versions of these variables or find other relevant variables that could increase the ability to explain the complex interplay between self-regulation and wellbeing.

It is possible that the weak support of developmental regulation theories predictions in respect to the associations between self-regulation and wellbeing is due to the existence of other variables not yet identified in the context of parenthood goal that influence this association. As an example, it may be relevant to investigate whether and how coping strategies influence adaptive self-regulation (de Ridder & de Wit, 2006). This is because the way people deal with short-term frustrations when facing a blocked goal is likely to influence the use of self-regulatory strategies that are more or less adaptive to the individuals. In Chapter 2, it was discussed (although not tested) that the coping strategies used by patients could perhaps facilitate the use of self-regulation strategies and influence its impact on wellbeing. For instance, the

use of positive reappraisal (i.e., positive reframing) after a failed cycle could

moderate the associations between goal engagement and wellbeing. Here, one might

expect that when patients present higher levels of positive reappraisal engagement

with parenthood goal by doing more treatment could result in better wellbeing. On

the other hand, if patients use low levels of positive reappraisal and still perceive

their experience of a failed cycle as mostly negative, engagement with parenthood

goal might result in poor wellbeing.

Other important variables correspond to the dyadic factors not investigated in

this thesis. As undergoing infertility treatment corresponds (at least to the majority

of the couples) to a dyadic experience, the impact that the use of a particular

regulatory strategy has for one's wellbeing is likely to depend on the regulatory

strategies used by the other partner. Previous research on coping with infertility tells

us that when women use coping strategies based on active-confronting (e.g. talk and

express feelings about infertility), which might be linked to the existence of high

levels of goal engagement, men tend to feel more stress (Peterson, Pirritano,

Christensen, & Schmidt, 2008). In contrast, when men use active-avoidance

strategies (e.g. leave when talking about childlessness) that imply the existence of

some temporary disengagement in the form of self-distancing from parenthood goal,

women feel more stressed. In this sense, for women, goal engagement when facing a

blocked parenthood goal might only be adaptive for patients who feel their partner is

invested with parenthood goal. However, in the case of men, if goal engagement

occurs with active-confronting strategies from the partner it might be overwhelming

and therefore would be more adaptive to disengage from treatment.

A further issue is how communication processes within the couple might

influence the impact of the regulatory strategies used on their wellbeing.

Chapter 5

Communication between the two members of the couple about the infertility experience is known to decrease depression (Stammer, Wischmann, & Verres, 2002) and helps partners in the decision-making process while undergoing infertility treatment (Ridenour, Yorgason, & Peterson, 2009). For this reason, the quality of the communication is expected to influence the impact that choosing a given strategy has on their wellbeing. For example, goal engagement may contribute to better wellbeing when one knows his/her partner's intention to maintain engagement, but it can also contribute to higher distress if this decision to keep trying by undergoing more treatment is not openly communicated by the partner. In support of this, past research showed that women felt particularly frustrated when their partners did not communicate about the decision-making process (Greil, Leitko, & Porter, 1988). For the reasons previously presented, the influence of dyadic factors on the association between self-regulation strategies of goal disengagement and reengagement and wellbeing should be taken into account in order to improve the explanation of this association.

To summarise, as shown in Figure 4.6, the three main predictions of developmental regulation theories are offered only weak support from the results in Chapters 2 to 4. Although experiencing a blocked parenthood goal does appear to be related with with poor wellbeing, individuals experiencing this blockage do not plan to disengage from the parenthood goal. Further, patients who experienced higher goal blockage invested less in alternative life-goals. Overall, there is weak support for the practical relevance of developmental regulation theories predictions in the domain of parenthood and key methodological issues and suggestions for future research will be discussed further.
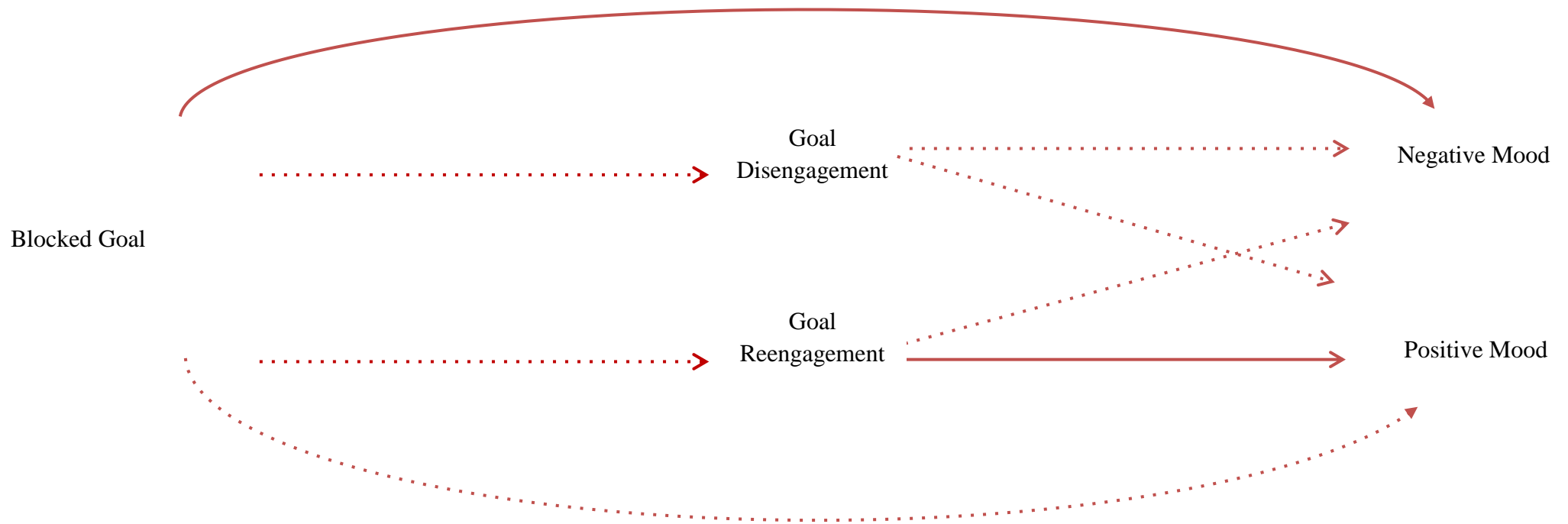
Figure 4.6. Conceptual representation of the main thesis results concerning developmental regulation theories predictions. This is not a structural equation model. Lines refer to proposed associations tested in this thesis. Continuous line = association in line with developmental regulation theories predictions; dashed line = associations not in line with developmental regulation theories predictions.

Chapter 5

Key Methodological Issues

The present thesis adopted three different methodological approaches (i.e., meta-analysis, and qualitative and quantitative empirical studies) that allowed one to ensure for the replication of the findings. Chapter 2 was developed using the PRISMA guidelines ensuring quality control in the execution of the work, and this was complemented by quality assessment of the primary included studies (performed by two independent researchers) using relevant quality assessment criteria. This approach allows one to make inferences about results taking into account the validity and reliability of the studies included in the meta-analyses. In Chapter 3, the recommendations of Smith et al. (2009) for IPA standards were followed in all stages of the research. For instance, the interview schedule was built taking into account specific styles of questions such as descriptive, narrative and prompts that are advised by IPA authors to be used in semi-structure interviews to allow for an empathic interaction with participants. It is through these empathic interactions that detailed information about participants' experiences can emerge (Smith et al., 2009). Additionally, data analysis was done line-by-line according to the six main steps advised by Smith et al. (2009) by two independent coders. General recommendations for quality assessment in qualitative research were also followed across the different stages of research (O'Brien et al., 2014). In Chapter 4 a longitudinal design was used and this type of design is particularly needed in research evaluating developmental regulation theories as it helps tracking for eventual shifts in the regulatory strategies used by individuals across time (Haase et al., 2013; Heckhausen et al., 2010). Additionally, the sample included in this chapter comprised a clinical sample recruited in two fertility clinics for which the submission

of two extensive research proposals to the School of Psychology Ethics Committee

and to the British National Health System Research Committee were necessary. The

process of applying to different Ethics Committees contributed to the existence of a

systematic review of the research and, consequently, enabled a critical

comprehensive consideration of the research process.

Despite the rigour with which the research presented in these chapters was

developed and conducted, a general limitation of this thesis is the presence of low

power. First, in Chapter 2 the studies included in the meta-analyses had, in general,

low power compromising the reliability of the findings due to the high probability of

finding false negative results, as well as the existence of different biases that are

normally associated with low sample sizes such as publication bias and selective

reporting of study results (Button et al., 2013; Dwan et al., 2008). Additionally, in

Chapter 4 the analyses of the associations between goal blockage and wellbeing,

blocked goal and self-regulation, and self-regulation and wellbeing that evaluated the

change from pre- to post-treatment (longitudinal assessments) were also

underpowered and should be tested in the future using larger samples.

Another problem is the omission of the response rate in most of the studies

included in the meta-analyses and the existence of a low response rate in Chapter 4,

which could compromise the generalisation of the findings of the present thesis as

results might differ between respondents and non-respondents. A further issue that

is also likely to have strongly influenced results is that of volunteer bias (Heiman,

2002), i.e. recruited participants are those who are motivated to take part in the

study. As the motivation to invest in the parenthood goal was being assessed it is

possible that patients who were very engaged with treatment and parenthood goal

were more likely to take part in the studies described in Chapters 3 and 4 than those

Chapter 5

who were disengaged with parenthood. As a consequence, the results of the present thesis might only be applicable to patients with a high level of goal engagement.

Suggestions for Future Research

The results provide only weak evidence in support of the predictions made by developmental regulation theories in the context of a blocked parenthood goal. As a result, there are a number of steps that should be taken in future investigations to better test these predictions. First, the present thesis results show that parenthood goal corresponds to a dyadic goal characterised by the occurrence of particular transactive processes of regulation between the couples. However, to date there is lack of studies that permit generalisation and causality inference about dyadic regulatory processes, i.e. longitudinal quantitative studies. This means that the findings of the present thesis concerning dyadic regulation are merely exploratory and need to be further tested using a longitudinal quantitative research design. Although this would be a challenging task, future studies should investigate the three predictions of developmental theories taking into account the dyadic nature of parenthood goal. This would help to develop our understanding of the interpersonal processes involved in the pursuit of parenthood, which have been shown to influence how individuals regulate during goal pursuit, and to avoid the existence of a misrepresentation of the regulatory processes (Fitzsimons et al., 2015). Second, relevant variables such as levels of objective and subjective parenthood goal blockage should be tested using a clear and precise operationalisation. A suggestion for this has been made in Chapter 2 of the present thesis.

In the particular case of research into infertility, the results obtained in this thesis show that infertile patients do not want to disengage from treatment until they know that opportunities are exhausted. It remains to be shown what causes patients

to perceive the chances as being exhausted or not, and whether and how the

information concerning their chances to achieve parenthood is clearly and openly

communicated by their physicians. Future research should investigate how the

chances of achieving pregnancy by undergoing more fertility treatment are

communicated to patients and what type of interpretations patients make of this

information. Previous research has in fact reported that patients complained about

the lack of information received (Peddie, van Teijlingen, & Bhattacharya, 2004).

This is perhaps a worrying finding as the provision of information concerning the

patients' chances to conceive at the right time may well be extremely important as it

would prepare patients to accept childlessness and facilitate the grief process that

they often struggle to deal with even after stopping infertility treatment (Daniluk,

2001). Consequently, physicians and counsellors should be aware that patients

undergoing fertility treatment are highly committed and do not plan to give up until

they are told that their chances are absolutely exhausted. This deserves particular

attention since previous research conducted with couples that finished the treatment

process without achieving parenthood suggested that later on they regretted the

amount of time and energy invested on treatment and not having invested on more

realistic outcomes such as adoption (Daniluk, 2001). For this reason it is important

to clearly discuss the chances that each patient has in order to avoid future regrets

once treatment is over.

Chapter 5

Conclusions

Results from this thesis show that infertile patients are reluctant to disengage from their parenthood goal. This can be regarded as problematic in light of the findings that facing a blocked parenthood goal increases negative mood and that reengaging in alternative goals is associated with better wellbeing. Health professionals should be aware of the costs and benefits of using different regulation strategies during fertility treatment. In particular, they should be informed that before the start of treatment infertile patients who perceive their goal as being more blocked are more likely to suffer from depression and anxiety, and that after a treatment cycle goal blockage is associated with depression. Further, they should be aware that patients will try to read the information they communicate about their chances to achieve parenthood in an optimistic way, even when treatment fails, in order to maintain goal engagement. Finally, they should know that reengaging in alternative life-goals boosts patients' positive mood, although patients only seemed to be willing to use this strategy if it did not interfere with the pursuit of parenthood goal. Due to all the aforementioned reasons, physicians should ensure that the information about patients' chances to achieve parenthood is communicated openly, clearly and that patients are aware of the consequences of continuing to pursuit parenthood. There is a lack of studies investigating self-regulation and wellbeing when facing a blocked parenthood goal. Conceptual and methodological limitations in existing research such as the non-investigation of dyadic processes of regulation, poor design and inadequate test of the research hypotheses therefore need to be addressed in future research.

References

(*studies included in the meta-analyses performed in Chapter 2)

Abbey, A., & Halman, L. J. (1995). The role of perceived control, attributions, and meaning in members of infertile couples' well-being. *Journal of Social and Clinical Psychology*, *14*(3), 271.

Ahern, K. J. (1999). Ten tips for reflexive bracketing. *Qualitative Health Research*, *9*(3), 407-411. doi: 10.1177/104973239900900309

Aiken, L.S. & West, S.G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park: Sage.

Anderson, C. J. (2003). The psychology of doing nothing: Forms of decision avoidance result from reason and emotion. *Psychological Bulletin*, *129*(1), 139–167. https://doi.org/10.1037/0033-2909.129.1.139

Baltes, P. B. (1997). On the incomplete architecture of human ontogeny: Selection, optimization, and compensation as foundation of developmental theory. *American Psychologist*, *52*(4), 366. doi: 10.1037/0003-066X.52.4.366.

Baltes, P.B., & Baltes, M.M. (1990). Psychological perspectives on successful aging: The model of selective optimization with compensation. In P.B. Baltes & M.M. Baltes, (Eds.)*, Successful aging: Perspectives from the behavioral sciences* (pp. 1–34). New York: Cambridge University Press.

Bandura, A. (2004). Health Promotion by Social Cognitive Means. *Health Education & Behavior*, *31*(2), 143–164. https://doi.org/10.1177/1090198104263660

References

Bavel, J. V., & Nitsche, N. (2013). "The Proper Age for Parenthood" and Second
Birth Rates in Europe. *European Sociological Review*, *29*(6), 1149–1161.
https://doi.org/10.1093/esr/jct003

Berrington, A. (2004). Perpetual postponers? Women's, men's and couple's fertility
intentions and subsequent fertility behaviour. *Population trends*, *117*, 9-19.

Boivin, J., & Takefman, J. E. (1995). Stress level across stages of in vitro
fertilization in subsequently pregnant and nonpregnant women. *Fertility and
Sterility*, *64*(4), 802-810. doi:10.1016/S0015-0282(16)57858-3

Boivin, J., Bunting, L., Collins, J. A., & Nygren, K. G. (2007). International
estimates of infertility prevalence and treatment-seeking: potential need and
demand for infertility medical care. *Human Reproduction*, *22*(6), 1506–1512.
https://doi.org/10.1093/humrep/dem046

Borenstein, M., Hedges, L. V., Higgins, J. P.T., & Rothstein, H. R. (2009).
Introduction to meta-analysis. West Sussex, UK: John Wiley & Sons, Ltd.

Brandtstädter, J. (1989). Personal self-regulation of development: Cross-sequential
analyses of development-related control beliefs and emotions. *Developmental
Psychology*, *25*(1), 96-108. http://dx.doi.org/10.1037/0012-1649.25.1.96

Brandtstädter, J., & Rothermund, K. (2002). The Life-Course Dynamics of Goal
Pursuit and Goal Adjustment: A Two-Process Framework. *Developmental
Review*, *22*(1), 117–150. https://doi.org/10.1006/drev.2001.0539

Brandtstädter, J., Wentura, D., & Rothermund, K. (1999). Intentional self-development through adulthood and later life: Tenacious pursuit and flexible adjustment of goals. In J.L. Brandtstädter & R.M. Lerner, (Eds.), *Action & self-development: Theory and research through the life span* (pp. 373-400). Thousand Oaks, CA, US: Sage Publications.

Brocki, J. M., & Wearden, A. J. (2006). A critical evaluation of the use of interpretative phenomenological analysis (IPA) in health psychology. *Psychology and Health*, *21*(1), 87-108. http://dx.doi.org/10.1080/14768320500230185

Broekmans, F. J., Knauff, E. A. H., te Velde, E. R., Macklon, N. S., & Fauser, B. C. (2007). Female reproductive ageing: current knowledge and future trends. *Trends in Endocrinology & Metabolism*, *18*(2), 58–65. https://doi.org/10.1016/j.tem.2007.01.004

Button, K. S., Ioannidis, J. P., Mokrysz, C., Nosek, B. A., Flint, J., Robinson, E. S., & Munafò, M. R. (2013). Power failure: why small sample size undermines the reliability of neuroscience. *Nature Reviews Neuroscience*, *14*(5), 365-376. doi:10.1038/nrn3475

Cameron L.D., & Leventhal H. (2003). Self-regulation, health and illness: An overview. In L.D. Cameron & H. Leventhal, (Eds.)*, The Self-regulation of Health and Illness Behaviour* (pp. 1-13). London: Routledge.

Carver C.S., & Scheier M.F. (1998). *On the self-regulation of Behavior*. New York: Cambridge University Press.

140 **References**

Carver, C. S., La Voie, L., Kuhl, J., & Ganellen, R. J. (1988). Cognitive

concomitants of depression: A further examination of the roles of

generalization, high standards, and self-criticism. *Journal of Social and*

Clinical Psychology, *7*(4), 350-365.

http://dx.doi.org/10.1521/jscp.1988.7.4.350

Chapman, J., Armitage, C. J., & Norman, P. (2009). Comparing implementation

intention interventions in relation to young adults' intake of fruit and

vegetables. *Psychology and Health*, *24*(3), 317-332.

http://dx.doi.org/10.1080/08870440701864538

Christakis, N. A., & Fowler, J. H. (2007). The Spread of Obesity in a Large Social

Network over 32 Years. *New England Journal of Medicine*, *357*(4), 370–379.

https://doi.org/10.1056/NEJMsa066082

Cohen, J. (1988). *Statistical power analysis for the behavior sciences* (2nd ed.).

Hillsdale, NJ: Erlbaum.

Comprehensive Meta-Analysis (Version 2). Englewood, NJ: Biostat.

Custers, I. M., Steures, P., van der Steeg, J. W., van Dessel, T. J., Bernardus, R. E.,

Bourdrez, P., ... & Mol, B. W. (2007). External validation of a prediction

model for an ongoing pregnancy after intrauterine insemination. *Fertility and*

Sterility, *88*(2), 425-431. doi:10.1016/j.fertnstert.2006.12.007

da Silva, S. M., Boivin, J., & Gameiro, S. (2016). Self-Regulation and Wellbeing

When Facing a Blocked Parenthood Goal: A Systematic Review and Meta-

Analysis. *PLoS ONE*, *11*(6): e0157649. doi: 10.1371/journal.pone.0157649

Dancet, E. A. F., Nelen, W. L. D. M., Sermeus, W., De Leeuw, L., Kremer, J. A. M., & D'Hooghe, T. M. (2010). The patients' perspective on fertility care: a systematic review. *Human Reproduction Update*, *16*(5), 467-487. doi: 10.1093/humupd/dmq004

Daniluk, J. C. (2001). Reconstructing their lives: A longitudinal, qualitative analysis of the transition to biological childlessness for infertile couples. *Journal of Counseling and Development, 79*(4), 439–449. http://dx.doi.org/10.1002/j.1556-6676.2001.tb01991.x

De Mouzon, J., Lancaster, P., Nygren, K. G., Sullivan, E., Zegers-Hochschild, F., Mansour, R., ... Adamson, D. (2009). World collaborative report on assisted reproductive technology, 2002. *Human Reproduction, 24*(9), 2310-2320.doi:10.1093/humrep/dep098

de Ridder, D., & de Wit, J. (Eds.). (2006). *Self-regulation in health behavior*. John Wiley & Sons.

Duval, S., & Tweedie, R. (2000). Trim and Fill: A Simple Funnel-Plot–Based Method of Testing and Adjusting for Publication Bias in Meta-Analysis. *Biometrics*, *56*(2), 455–463. https://doi.org/10.1111/j.0006-341X.2000.00455.x

Dwan, K., Altman, D. G., Arnaiz, J. A., Bloom, J., Chan, A. W., Cronin, E., ... & Ghersi, D. (2008). Systematic review of the empirical evidence of study publication bias and outcome reporting bias. *PloS one*, *3*(8), e3081. http://dx.doi.org/10.1371/journal.pone.0003081

References

Edelmann, R. J., Connolly, K. J., & Bartlett, H. (1994). Coping strategies and

    psychological adjustment of couples presenting for IVF. *Journal of*

    Psychosomatic Research, *38*(4), 355-364. http://dx.doi.org/10.1016/0022-

    3999(94)90040-X

Eriksson, C., Larsson, M., Svanberg, A. S., & Tydén, T. (2013). Reflections on

    fertility and postponed parenthood—interviews with highly educated women

    and men without children in Sweden. *Upsala Journal of Medical Sciences*,

    118(2), 122–129. https://doi.org/10.3109/03009734.2012.762074

ESHRE Capri Workshop Group. (2005). Fertility and ageing. *Human Reproduction*

    Update, *11*(3), 261-276. doi: 10.1093/humupd/dmi006

Faul, F., Erdfelder, E., Lang, A.-G., & Buchner, A. (2007). G*Power 3: A flexible

    statistical power analysis program for the social, behavioral, and biomedical

    sciences. *Behavior Research Methods*, *39*(2), 175–191.

    https://doi.org/10.3758/BF03193146

Fitzsimons, G. M., & Finkel, E. J. (2010). Interpersonal influences on self-

    regulation. *Current Directions in Psychological Science*, *19*(2), 101-105. doi:

    10.1177/0963721410364499

Fitzsimons, G. M., Finkel, E. J., & vanDellen, M. R. (2015). Transactive goal

    dynamics. *Psychological Review*, *122*(4), 648–673.

    https://doi.org/10.1037/a0039654

Freeman, E. W., Rickels, K., Tausig, J., Boxer, A., Mastroianni, L., & Tureck, R. W. (1987). Emotional and Psychosocial Factors in Follow-Up of Women After Ivf-Et Treatment: A pilot investigation. *Acta Obstetricia et Gynecologica Scandinavica*, *66*(6), 517–521. https://doi.org/10.3109/00016348709015727

Freund A.M., & Baltes, P.B. (2000). The orchestration of selection, optimization and compensation: An action-theoretical conceptualization of a theory of developmental regulation. In W.J. Perrig & A. Grob, (Eds.)*, Control of human behavior, mental processes, and consciousness: Essays in honor of the 60th birthday of August Flammer* (pp. 32-53.). Mahwah, NJ: Lawrence Erlbaum Associates.

Fulford, B., Bunting, L., Tsibulsky, I., & Boivin, J. (2013). The role of knowledge and perceived susceptibility in intentions to optimize fertility: findings from the International Fertility Decision-Making Study (IFDMS). *Human Reproduction*, *28*(12), 3253–3262. https://doi.org/10.1093/humrep/det373

Gameiro, S., Belt-Dusebout, A. W. van den, Bleiker, E., Braat, D., Leeuwen, F. E. van, & Verhaak, C. M. (2014). Do children make you happier? Sustained child-wish and mental health in women 11–17 years after fertility treatment. *Human Reproduction*, deu178. https://doi.org/10.1093/humrep/deu178

Gameiro, S., Boivin, J., Peronace, L., & Verhaak, C. M. (2012). Why do patients discontinue fertility treatment? A systematic review of reasons and predictors of discontinuation in fertility treatment. *Human Reproduction Update*, *18*(6), 652-669. doi: 10.1093/humupd/dms031

References

Gameiro, S., Verhaak, C. M., Kremer, J. A. M., & Boivin, J. (2013). Why we should
talk about compliance with Assisted Reproductive Technologies (ART): a
Systematic Review and Meta-Analysis of ART compliance rates. *Human
Reproduction Update, 19*(2), 124-135. doi: 10.1093/humupd/dms045

Graham, M., Hill, E., Shelly, J., & Taket, A. (2013). Why are childless women
childless? Findings from an exploratory study in Victoria, Australia. *Journal
of Social Inclusion*, *4*(1), 70-89.

Greil, A. L., Leitko, T. A., & Porter, K. L. (1988). Infertility: His and hers. *Gender
& Society*, *2*(2), 172-199. doi: 10.1177/089124388002002004

Gross, J. J. (2001). Emotion Regulation in Adulthood: Timing Is Everything.
Current Directions in Psychological Science, *10*(6), 214–219.
https://doi.org/10.1111/1467-8721.00152

Haase, C. M., Heckhausen, J., & Wrosch, C. (2013). Developmental regulation
across the life span: Toward a new synthesis. *Developmental Psychology*,
49(5), 964–972. https://doi.org/10.1037/a0029231

Habbema, J. D. F., Eijkemans, M. J., Leridon, H., & te Velde, E. R. (2015).
Realizing a desired family size: when should couples start?. *Human
Reproduction*, *30*(9), 2215–2221. doi: 10.1093/humrep/dev148

Hamilton, B. E., Martin, J. A., Osterman, M. J., Curtin, S. C., & Matthews, T. J.
(2015). Births: Final Data for 2014. *National vital statistics reports: from the
Centers for Disease Control and Prevention, National Center for Health
Statistics, National Vital Statistics System*, *64*(12), 1-64.

References

Hammarberg, K., Astbury, J., & Baker, H. W. G. (2001). Women's experience of IVF: a follow-up study. *Human Reproduction*, *16*(2), 374-383. doi: 10.1093/humrep/16.2.374

Haynes, T. L., Heckhausen, J., Chipperfield, J. G., Perry, R. P., & Newall, N. E. (2009). Primary and secondary control strategies: Implications for health and well-being among older adults. *Journal of Social and Clinical Psychology*, *28*(2), 165-197. http://dx.doi.org/10.1521/jscp.2009.28.2.165

Heaton, T. B., Jacobson, C. K., & Holland, K. (1999). Persistence and Change in Decisions to Remain Childless. *Journal of Marriage and Family*, *61*(2), 531–539. https://doi.org/10.2307/353767

Heckhausen, J. (1997). Developmental regulation across adulthood: Primary and secondary control of age-related challenges. *Developmental Psychology, 33,* 176-187. http://dx.doi.org/10.1037/0012-1649.33.1.176

Heckhausen, J. (1999). *Developmental regulation in adulthood: Age- normative and sociostructural constraints as adaptive challenges.* New York: Cambridge University Press.

Heckhausen, J., & Tomasik, M. J. (2002). Get an Apprenticeship before School Is Out: How German Adolescents Adjust Vocational Aspirations When Getting Close to a Developmental Deadline. *Journal of Vocational Behavior*, *60*(2), 199–219. https://doi.org/10.1006/jvbe.2001.1864

References

*Heckhausen, J., Wrosch, C., & Fleeson, W. (2001). Developmental regulation before and after a developmental deadline: The sample case of "biological clock" for childbearing. *Psychology and Aging*, *16*(3), 400–413. https://doi.org/10.1037/0882-7974.16.3.400

Heckhausen, J., Wrosch, C., & Schulz, R. (2010). A motivational theory of life-span development. *Psychological Review*, *117*(1), 32–60. https://doi.org/10.1037/a0017668

Heiman, G. W. (2002). Research Methods in Psychology (3rd ed.). Boston, MA: Houghton Mifflin.

Higgins, J. P. T., & Green, S. (2011). *Cochrane Handbook for Systematic Reviews of Interventions* Version 5.1.0 [updated March 2011]. The Cochrane Collaboration. Retrieved from http://www.cochrane-handbook.org

IBM Corp. Released 2011. IBM SPSS Statistics for Windows, Version 20.0. Armonk, NY: IBM Corp.

Johnston, M., Shaw, R., & Bird, D. (1987). "Test-tube baby" procedures: Stress and judgements under uncertainty. *Psychology and Health*, *1*(1), 25-38. doi: http://dx.doi.org/10.1080/08870448708400312

*Kotter-Grühn, D., Scheibe, S., Blanchard-Fields, F., & Baltes, P. B. (2009). Developmental emergence and functionality of Sehnsucht (life longings): The sample case of involuntary childlessness in middle-aged women. *Psychology and Aging*, *24*(3), 634–644. https://doi.org/10.1037/a0016359

*Kraaij, V., Garnefski, N., & Schroevers, M. J. (2009). Coping, Goal Adjustment, and
Positive and Negative Affect in Definitive Infertility. *Journal of Health
Psychology, 14*(1), 18–26. doi: 10.1177/1359105308097939

Lampic, C., Svanberg, A. S., Karlström, P., & Tydén, T. (2006). Fertility awareness,
intentions concerning childbearing, and attitudes towards parenthood among
female and male academics. *Human Reproduction*, *21*(2), 558–564. doi:
10.1093/humrep/dei367

Lazarus R.S., & Folkman S. (1984) *Stress, appraisal, and coping*. New York:
Springer publishing company.

Leahey, T. M., Kumar, R., Weinberg, B. M., & Wing, R. R. (2012). Teammates and
Social Influence Affect Weight Loss Outcomes in a Team-Based Weight Loss
Competition. *Obesity*, *20*(7), 1413–1418. https://doi.org/10.1038/oby.2012.18

Leushuis, E., van der Steeg, J. W., Steures, P., Bossuyt, P. M., Eijkemans, M. J., van
der Veen, F., ... & Hompes, P. G. (2009). Prediction models in reproductive
medicine: a critical appraisal. *Human Reproduction Update*, *15*(5), 537-552.
doi: 10.1093/humupd/dmp013

*Light, J., & Isaacowitz, D. (2006). The effect of developmental regulation on visual
attention: The example of the "biological clock." *Cognition and Emotion*, *20*(5), 623–
645. https://doi.org/10.1080/02699930500336540

References

Lok, I. H., Lee, D. T. S., Cheung, L. P., Chung, W. S., Lo, W. K., & Haines, C. J. (2002). Psychiatric morbidity amongst infertile Chinese women undergoing treatment with assisted reproductive technology and the impact of treatment failure. *Gynecologic and Obstetric Investigation*, *53*(4), 195-199. doi: 10.1159/000064560

Martijn, C., Alberts, H., Sheeran, P., Peters, G. J. Y., Mikolajczak, J., & De Vries, N. K. (2008). Blocked goals, persistent action: Implementation intentions engender tenacious goal striving. *Journal of Experimental Social Psychology*, *44*(4), 1137-1143. http://dx.doi.org/10.1016/j.jesp.2008.01.005

Martinez, G. M., Chandra, A., Abma, J. C., Jones, J., & Mosher, W. D. (2006). Fertility, contraception, and fatherhood: data on men and women from cycle 6 (2002) of the 2002 National Survey of Family Growth. *Vital and health statistics. Series 23, Data from the National Survey of Family Growth*, (26), 1-142. Retrieved from: http://www.cdc.gov/nchs/pressroom/06facts/fatherhood.htm

McQueeney, D. A., Stanton, A. L., & Sigmon, S. (1997). Efficacy of Emotion-Focused and Problem-Focused Group Therapies for Women with Fertility Problems. *Journal of Behavioral Medicine*, *20*(4), 313–331. https://doi.org/10.1023/A:1025560912766

Moher, D., Liberati, A., Tetzlaff, J., & Altman, D. G. (2009). Preferred Reporting Items for Systematic Reviews and Meta-Analyses: The PRISMA StatementThe PRISMA Statement. *Annals of Internal Medicine*, *151*(4), 264–269. https://doi.org/10.7326/0003-4819-151-4-200908180-00135

Moskowitz, J. T., Folkman, S., Collette, L., & Vittinghoff, E. (1996). Coping and mood during aids-related caregiving and bereavement. *Annals of Behavioral Medicine*, *18*(1), 49–57. https://doi.org/10.1007/BF02903939

National Institute for Health and Care Excellence (NICE) (2004). Clinical Guideline Fertility: Assessment and treatment for people with fertility problems.

Nicoletti, C., & Tanturri, M. L. (2008). Differences in delaying motherhood across European countries: empirical evidence from the ECHP. *European Journal of Population/Revue européenne de Démographie*, *24*(2), 157-183. doi: 10.1007/s10680-008-9161-y.

Noord-Zaadstra, B. M. van, Looman, C. W., Alsbach, H., Habbema, J. D., Velde, E. R. te, & Karbaat, J. (1991). Delaying childbearing: effect of age on fecundity and outcome of pregnancy. *BMJ*, *302*(6789), 1361–1365. https://doi.org/10.1136/bmj.302.6789.1361

O'Brien, B. C., Harris, I. B., Beckman, T. J., Reed, D. A., & Cook, D. A. (2014). Standards for reporting qualitative research: a synthesis of recommendations. *Academic Medicine*, *89*(9), 1245-1251. doi: 10.1097/ACM.0000000000000388

Ordóñez, L. D., & Connolly, T. (2000). Regret and Responsibility: A Reply to Zeelenberg et al. (1998). *Organizational Behavior and Human Decision Processes*, *81*(1), 132–142. https://doi.org/10.1006/obhd.1999.2834

Qualtrics software (April, 2016). Provo, Utah, USA: Qualtrics.

References

Pandey, S., Shetty, A., Hamilton, M., Bhattacharya, S., & Maheshwari, A. (2012).
Obstetric and perinatal outcomes in singleton pregnancies resulting from
IVF/ICSI: a systematic review and meta-analysis. *Human Reproduction
Update*, *18*(5), 485-503. doi: 10.1093/humupd/dms018

Pasch, L. A., Dunkel-Schetter, C., & Christensen, A. (2002). Differences between
husbands' and wives' approach to infertility affect marital communication
and adjustment. *Fertility and Sterility*, *77*(6), 1241-1247. doi:10.1016/S
0015-0282(02)03097-2

Peddie, V. L., Van Teijlingen, E., & Bhattacharya, S. (2004). Ending in-vitro
fertilization: women's perception's of decision making. *Human Fertility*, *7*(1),
31-37. http://dx.doi.org/10.1080/1464727042000198069

Peddie, V. L., Van Teijlingen, E., & Bhattacharya, S. (2005). A qualitative study
of women's decision-making at the end of IVF treatment. *Human
Reproduction*, *20*(7), 1944-1951. doi: 10.1093/humrep/deh857

Peterson, B. D., Newton, C. R., Rosen, K. H., & Skaggs, G. E. (2006). Gender
differences in how men and women who are referred for IVF cope with
infertility stress. *Human Reproduction*, *21*(9), 2443-2449. doi:
10.1093/humrep/del145

Peterson, B. D., Pirritano, M., Christensen, U., & Schmidt, L. (2008). The impact
of partner coping in couples experiencing infertility. *Human Reproduction*,
23(5), 1128-1137. doi: 10.1093/humrep/den067

Phillips, E., Elander, J., & Montague, J. (2014). Managing multiple goals during

    fertility treatment: An interpretative phenomenological analysis. *Journal of*

    Health Psychology, *19*(4), 531-543. doi: 10.1177/1359105312474915

Poulin, M., Haase, C. M., & Heckhausen, J. (2005). Engagement and disengagement

    across the life span: An analysis of two-process models of developmental

    regulation. In W. Greve, K. Rothermund, & D. Wentura (Eds.), *The adaptive*

    self: Personal continuity and intentional self- development (pp. 117–135).

    New York, NY: Hogrefe & Huber.

Reis, S., Xavier, M. R., Coelho, R., & Montenegro, N. (2013). Psychological impact

    of single and multiple courses of assisted reproductive treatments in couples:

    a comparative study. *European Journal of Obstetrics & Gynecology and*

    Reproductive Biology, *171*(1), 61-66.

    http://dx.doi.org/10.1016/j.ejogrb.2013.07.034

Ridenour, A. F., Yorgason, J. B., & Peterson, B. (2009). The infertility resilience

    model: Assessing individual, couple, and external predictive factors.

    Contemporary Family Therapy, *31*(1), 34-51. doi: 10.1007/s10591-008-

    9077-z

Riskind, R. G., & Patterson, C. J. (2010). Parenting intentions and desires among

    childless lesbian, gay, and heterosexual individuals. *Journal of Family*

    Psychology, *24*(1), 78–81. https://doi.org/10.1037/a0017941

Ryff, C. D. (1989). Happiness is everything, or is it? Explorations on the meaning of

    psychological well-being. *Journal of Personality and Social Psychology*,

    57(6), 1069-1081. http://dx.doi.org/10.1037/0022-3514.57.6.1069

References

*Salmela-Aro, K., & Suikkari, A.-M. (2008). Letting go of your dreams—Adjustment of child-related goal appraisals and depressive symptoms during infertility treatment. *Journal of Research in Personality*, *42*(4), 988–1003. https://doi.org/10.1016/j.jrp.2008.02.007

Salmela-Aro, K. (2009). Personal goals and well-being during critical life transitions: The four C's—Channelling, choice, co-agency and compensation. *Advances in Life Course Research*, *14*(1), 63-73. doi: 10.1016/j.alcr.2009.03.003

Schmidt, L., Holstein, B., Christensen, U., & Boivin, J. (2005). Does infertility cause marital benefit?: An epidemiological study of 2250 women and men in fertility treatment. *Patient Education and Counseling*, *59*(3), 244-251. doi:10.1016/j.pec.2005.07.015

Sejbaek, C. S., Hageman, I., Pinborg, A., Hougaard, C. O., & Schmidt, L. (2013). Incidence of depression and influence of depression on the number of treatment cycles and births in a national cohort of 42 880 women treated with ART. *Human Reproduction*, *28*(4), 1100-1109. doi: 10.1093/humrep/des442

Shah, J. Y., Friedman, R., & Kruglanski, A. W. (2002). Forgetting all else: on the antecedents and consequences of goal shielding. *Journal of Personality and Social Psychology*, *83*(6), 1261. doi: http://dx.doi.org/10.1037/0022-3514.83.6.1261

Slade, P., Emery, J., & Lieberman, B. A. (1997). A prospective, longitudinal study of emotions and relationships in in-vitro fertilization treatment. *Human Reproduction*, *12*(1), 183-190. doi: 10.1093/humrep/12.1.183

Smith, A. D., Tilling, K., Nelson, S. M., & Lawlor, D. A. (2015). Live-Birth Rate Associated With Repeat In Vitro Fertilization Treatment Cycles. *JAMA*, *314*(24), 2654. https://doi.org/10.1001/jama.2015.17296

Smith, J. A. (2011). Evaluating the contribution of interpretative phenomenological analysis. *Health Psychology Review*, *5*(1), 9-27. http://dx.doi.org/10.1080/17437199.2010.510659

Smith, J. A., Flowers, P., & Larkin, M. (2009). *Interpretative Phenomenological Analysis: theory, method and research*. London: Sage.

Stammer, H., Wischmann, T., & Verres, R. (2002). Counseling and couple therapy for infertile couples. *Family Process*, *41*(1), 111-122. doi: 10.1111/j.1545-5300.2002.40102000111.x

Stern, J. E., Brown, M. B., Luke, B., Wantman, E., Lederman, A., Missmer, S. A., & Hornstein, M. D. (2010). Calculating cumulative live-birth rates from linked cycles of assisted reproductive technology (ART): data from the Massachusetts SART CORS. *Fertility and Sterility*, *94*(4), 1334-1340. doi:10.1016/j.fertnstert.2009.05.052

Szabo, S., Orley, J., & Saxena, S. (1997). An approach to response scale development for cross-cultural questionnaires. *European Psychologist*, *2*(3), 270–276. https://doi.org/10.1027/1016-9040.2.3.270

Tabachnik, B.G. & Fidel, L.S. (1989). Using multivariate statisitics. (2nd ed). New York: Happer and Row.

154 **References**

Terry, D. J., & Hynes, G. J. (1998). Adjustment to a low-control situation: Reexamining the role of coping responses. *Journal of Personality and Social Psychology*, *74*(4), 1078–1092. https://doi.org/10.1037/0022-3514.74.4.1078

Testa, M. R. (2007). Childbearing preferences. *Vienna Yearbook of Population Research*, 357-379.

The Practice Committee of the American Society for Reproductive Medicine (2015a). Diagnostic evaluation of the infertile female: a committee opinion. *Fertility and Sterility*, *103*(6), e44–e50. https://doi.org/10.1016/j.fertnstert.2015.03.019

The Practice Committee of the American Society for Reproductive Medicine (2015b). Diagnostic evaluation of the infertile male: a committee opinion. *Fertility and Sterility*, *103*(3), e18–e25. https://doi.org/10.1016/j.fertnstert.2014.12.103

Thiering, P., Beaurepaire, J., Jones, M., Saunders, D., & Tennant, C. (1993). Mood state as a predictor of treatment outcome after in vitro fertilization/embryo transfer technology (IVF/ET). *Journal of Psychosomatic Research*, *37*(5), 481-491. doi:10.1016/0022-3999(93)90004-Y

Thompson, C. (2005). *Making parents: The ontological choreography of reproductive technologies*. MIT press.

*Thompson, E. H., Woodward, J. T., & Stanton, A. L. (2011). Moving forward during major goal blockage: situational goal adjustment in women facing infertility. *Journal of Behavioral Medicine*, *34*(4), 275–287. https://doi.org/10.1007/s10865-010-9309-1

Thompson, E. H., Woodward, J. T., & Stanton, A. L. (2012). Dyadic Goal Appraisal During Treatment for Infertility: How Do Different Perspectives Relate to Partners' Adjustment ?. *International journal of behavioral medicine*, *19*(3), 252-259. doi: 10.1007/s12529-011-9172-7

van Loendersloot, L. L., van Wely, M., Repping, S., Bossuyt, P. M. M., & van der Veen, F. (2013). Individualized decision-making in IVF: calculating the chances of pregnancy. *Human Reproduction*, *28*(11), 2972-80. doi: 10.1093/humrep/det315

Verhaak, C. M., Smeenk, J. M., Eugster, A., van Minnen, A., Kremer, J. A., & Kraaimaat, F. W. (2001). Stress and marital satisfaction among women before and after their first cycle of in vitro fertilization and intracytoplasmic sperm injection. *Fertility and Sterility*, *76*(3), 525-531. doi:10.1016/S0015-0282(01)01931-8

Verhaak, C. M., Smeenk, J. M. J., Evers, A. W. M., Kremer, J. A. M., Kraaimaat, F. W., & Braat, D. D. M. (2007). Women's emotional adjustment to IVF: a systematic review of 25 years of research. *Human Reproduction Update*, *13*(1), 27-36. doi: 10.1093/humupd/dml040

Verhaak, C. M., Smeenk, J. M. J., Van Minnen, A., Kremer, J. A. M., & Kraaimaat, F. W. (2005). A longitudinal, prospective study on emotional adjustment before, during and after consecutive fertility treatment cycles. *Human Reproduction*, *20*(8), 2253-2260. doi: 10.1093/humrep/dei015

References

Visser, A. P., Haan, G., Haan, G., & Wouters, I. (1994). Psychosocial aspects of

    in vitro fertilization. *Journal of Psychosomatic Obstetrics & Gynecology*,

    15(1), 35-43. http://dx.doi.org/10.3109/01674829409025627

Vohs, K. D., & Baumeister, R. F. (2004). Understanding self-regulation: An

    introduction. *Handbook of self-regulation: Research, theory, and*

    applications, 1-9.

Weitzenkamp, D. A., Gerhart, K. A., Charlifue, S. W., Whiteneck, G. G., Glass,

    C. A., & Kennedy, P. (2000). Ranking the criteria for assessing quality of life

    after disability: Evidence for priority shifting among long-term spinal cord

    injury survivors. *British Journal of Health Psychology*, *5*(1), 57–69.

    https://doi.org/10.1348/135910700168766

Wrosch, C., Bauer, I., & Scheier, M. F. (2005). Regret and quality of life across

    the adult life span: The influence of disengagement and available future

    goals. *Psychology and Aging*, *20*(4), 657–670. https://doi.org/10.1037/0882-

    7974.20.4.657

Wrosch, C., & Heckhausen, J. (1999). Control processes before and after passing

    a developmental deadline: Activation and deactivation of intimate

    relationship goals. *Journal of Personality and Social Psychology*, *77*(2), 415–

    427. https://doi.org/10.1037/0022-3514.77.2.415

Wrosch, C., Scheier, M. F., Miller, G. E., Schulz, R., & Carver, C. S. (2003).

    Adaptive Self-Regulation of Unattainable Goals: Goal Disengagement, Goal

    Reengagement, and Subjective Well-Being. *Personality and Social Psychology*

    Bulletin, *29*(12), 1494–1508. https://doi.org/10.1177/0146167203256921

Zegers-Hochschild, F., Adamson, G.D., de Mouzon, J., Ishihara, O., Mansour, R.,

    Nygren, K... van der Poel, S. on behalf of ICMART and WHO (2009). The

    International Committee for Monitoring Assisted Reproductive Technology

    (ICMART) and the World Health Organization (WHO) Revised Glossary on

    ART Terminology, 2009. *Human Reproduction, 24,* 2683-2687.

    doi:10.1093/humrep/dep343

Zigmond, A. S., & Snaith, R. P. (1983). The hospital anxiety and depression scale.

    Acta Psychiatrica Scandinavica, *67*(6), 361-370. doi: 10.1111/j.1600-

    0447.1983.tb09716.x

APPENDIX A

Table 1. *Full search strategy*

	Search Term	Number of records
1	(block$ or unattain$ or unachiev$ or impossib$ or inaccessib$ or unreach$ or unfeasib$ or deadline or fail$ or "life transition" or infertil$ or steril$ or subfert$ or childless$).ab,ti.	3816344
2	((goal adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (aim adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (objective adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (reach adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (task adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (achiev$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (try$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (pursui$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (attempt$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or childbearing).ab,ti.	167482
3	(wellbeing or well-being or "mental health" or mental-health or "quality of life" or quality-of-life or anxi$ or depress$ or stress$ or adjust$ or distress$ or fulfil$ or satisf$ or meaning).ab,ti.	5318355
4	1 and 2 and 3	3947
5	(block$ or unattain$ or unachiev$ or impossib$ or inaccessib$ or unreach$ or unfeasib$ or deadline or fail$ or "life transition" or infertil$ or steril$ or subfert$ or childless$).ab,ti.	3816344
6	((goal adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (aim adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (objective adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (reach adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (task adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (achiev$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (try$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (pursui$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or (attempt$ adj5 (parent$ or mother$ or maternity$ or fertil$ or pregnan$ or child$ or gestat$ or conceiv$ or conception or birth)) or childbearing).ab,ti.	167482
7	(engag$ or disengag$ or "letting go" or "let go" or "give up" or "giving up" or "gave up" or "stop try" or "stop trying" or "stopped trying" or reengag$ or adjust$ or "primary control" or "secondary control" or assimilat$ or accomodat$ or select$ or optimiz$ or compens$ or attain$ or regulat$ or channeling or choice or co-agency or co-regulat$).ab,ti.	8583615
8	5 and 6 and 7	5361
9	4 or 8	7628
10	limit 9 to humans	6554

Table 2. *List of excluded studies and reasons for exclusion*

Manuscript	Reason*
Fisher JRW, Baker GHW, Hammarberg K. Long-term health, well-being, life satisfaction, and attitudes toward parenthood in men diagnosed as infertile: challenges to gender stereotypes and implications for practice. Fertil Steril. 2010 Jul;94(2):574-80. Epub 2009 Apr 1. doi: 10.1016/j.fertnstert.2009.01.165.	1
Baor L, Blickstein I. (2005). En route to an "instant family": Psychosocial considerations.Obstet Gynecol Clin North Am. 2005 Mar;32(1):127-39. PMID:15644294	4
Monga M, Alexandrescu B, Katz SE, Stein M, Ganiats T. Impact of infertility on quality of life, marital adjustment, and sexual function. Urology. 2004 Jan;63(1):126-30. PMID:14751363	1
Callan VJ, Kloske B, Kashima Y, Hennessey JF. Toward understanding women's decisions to continue or stop in vitro fertilization: The role of social, psychological, and background factors. J In Vitro Fert Embryo Transf. 1988 Dec;5(6):363-9. PMID: 3221127	1
Daniluk, JC (2001). Reconstructing their lives: A longitudinal, qualitative analysis of the transition to biological childlessness for infertile couples. Journal of Counseling & Development. 2001 Fall;79(4): 439-49. doi:10.1002/j.1556-6676.2001.tb01991.	1
Terry, DJ, Hynes, GJ. Adjustment to a Low-Control Situation: Reexamining the Role of Coping Responses. J Pers Soc Psychol. 1998;74(4):1078-1092. doi:.1037/0022-3514.74.4.1078	1
Wu AK, Elliott P, Katz PP, Smith JF. Time costs of fertility care: The hidden hardship of building a family. Fertil Steril. 2013 Jun;99(7):2025-30. Epub 2013 Feb 28. doi: 10.1016/j.fertnstert.2013.01.145.	1
Moura-Ramos M, Gameiro S, Soares I, Santos TA, & Canavarro MC. Does infertility history matter? Complex effects of infertility history in psychological adjustment during assisted reproductive treatments. Proceedings of the 27th Annual Meeting of the European Society of Human Reproduction and Embryology; 2011 Jul 3-6; Stockholm, Sweden. Hum. Reprod: 26 (suppl 1): i78-i80. doi: 10.1093/humrep/26.s1.52	1
McQueeney DA, Stanton AL, Sigmon S. Efficacy of emotion-focused and problem-focused group therapies for women with fertility problems. J Behav Med. 1997 Aug;20(4):313-31. PMID: 9298432	1
Freeman EW, Rickels K, Tausig J, Boxer A, Mastroianni L Jr, Tureck RW. Emotional and psychosocial factors in follow-up of women after IVF-ET treatment. A pilot investigation. Acta Obstet Gynecol Scand. 1987;66(6):517-21. PMID:3425253	1
McLaney MA, Tennen H, Affleck G, Fitzgerald T. Reactions to impaired fertility: the vicissitudes of primary and secondary control appraisals. Womens Health. 1995 Summer;1(2):143-59. PMID: 9373377	1
Clark LF, Henry SM, Taylor, DM. Cognitive examination of motivation for childbearing as a factor in adjustment to infertility. In: Stanton AL, Dunkel-Schetter C, editors. Infertility: Perspectives from stress and coping research. New York: Springer Science+Business Media New York; 1991. p.157-80.	1
Benyamini Y. Hope and fantasy among women coping with infertility and its treatments. In: Jacoby R, Keinan J, editors. Between stress and hope: from a disease-centered to a health-centered perspective. US: Praeger Publishers; 2003. p.141-60.	3
Tennen H, Affleck G, Mendola R. Causal explanations for infertility: Their relation to control appraisals and psychological adjustment.In: Stanton AL, Dunkel-Schetter C, editors. Infertility: Perspectives from stress and coping research. New York: Springer Science+Business Media New York; 1991. p.109-31.	1
Thompson EH, Woodward JT, Stanton AL. Dyadic Goal Appraisal During Treatment for Infertility: How Do Different Perspectives Relate to Partners' Adjustment?. Int J Behav Med. 2012 Sep;19(3):252-9. doi: 10.1007/s12529-011-9172-7.	3

Note. Reasons for exclusion classified as: (1) It is not based on developmental regulation theory; (2) Does not refer to the specific situation of parenthood goal blockage; (3) Does not report at least one quantitative association (significant or not) among goal blockage, wellbeing and self-regulation strategies; (4) Does not report original quantitative data.

Table 3. *Score details of Quality Assessment of Studies*

	Representativeness of the study sample	Adequate theoretical framework	Measurement	Evaluation of the hypotheses	Overall quality
	(0-4 points)	(0-1 point)	(0-2 points)	(0-4 points)	(0-11)
Heckhausen (2001) (1)	- sample included experiencing a blockage to parenthood goal (0) - response rate (NM - 0) - FU response rate (NA) - FU participants compared with baseline participants (NA)	- Aims and hypotheses clearly derived from the Action-phase Model of Developmental Regulation (1)	- validated measures used (SR – no; GB – NA; WB – yes) (0.5) -reliable measures used (SR – yes; GB –NA; WB – no) (0.5)	- causal relationship between variables assessed (0) - enough power to detect significant associations (0) - all possible confounders assessed (0) - statistics analysis plan (0)	2 (low)
Heckhausen (2001) (2)	- sample included experiencing a blockage to parenthood goal (0) - response rate (NM - 0) - FU response rate (NA) - FU participants compared with baseline participants (NA)	- Aims and hypotheses clearly derived from the Action-phase Model of Developmental Regulation (1)	- validated measures used (SR – yes; GB – NA; WB – yes) (1) - reliable measures used (SR – yes; GB – NA; WB – yes) (1)	- causal relationship between variables assessed (0) - enough power to detect significant associations (0) - all possible confounders assessed (0) - statistics analysis plan (0)	3 (low)
Kraaij (2009)	- sample included experiencing a blockage to parenthood goal (1) - response rate (NM - 0) - FU response rate (NA) - FU participants compared with baseline participants (NA)	- Aims and hypotheses clearly derived from the theoretical assumptions of Adaptive Goal Adjustment (1)	- validated measures used (SR – yes; GB – NA; WB – yes) (1) - reliable measures used (SR – yes; GB – NA; WB – yes) (1)	- causal relationship between variables assessed (0) - enough power to detect significant associations (0) - all possible confounders assessed (0) - statistics analysis plan (1)	5 (average)

Table 3. *Score details of Quality Assessment of Studies (continued)*

Salmela-Aro (2008)	- sample included experiencing a blockage to parenthood goal (1) - response rate (NM - 0) - FU response rate (55% - 0) - FU participants compared with baseline participants (1)	- Aims and hypotheses clearly derived from several different theoretical frameworks about child-related goal appraisals (1)	- validated measures used (SR – NA; GB – no; WB – yes) (0.5) -reliable measures used (SR – NA; GB – no; WB – yes) (0.5)	- causal relationship between variables assessed (1) - enough power to detect significant associations (1) - all possible confounders assessed (0) - statistics analysis plan (0)	6 (average)
Thompson (2011a)	- sample included experiencing a blockage to parenthood goal (1) - response rate (87% - 1) - FU response rate (60% - 0) - FU participants compared with baseline participants (1)	- Aims and hypotheses clearly derived from the theoretical assumptions of Adaptive Goal Adjustment (1)	- validated measures used (SR - yes; GB – no; WB – yes) (0.66) -reliable measures used (SR –yes; GB – NA; WB – yes) (1)	- causal relationship between variables assessed (1) - enough power to detect significant associations (0) - all possible confounders assessed (1) - statistics analysis plan (1)	8.7 (average)
Kotter-Grühn (2009)	- sample included experiencing a blockage to parenthood goal (1) - response rate (NM - 0) - FU response rate (NA) - FU participants compared with baseline participants (NA)	- Aims and hypotheses clearly derived from the theoretical assumptions of Adaptive Goal Adjustment (1)	-validated measures used (SR – yes; GB – no; WB – yes) (0.66) -reliable measures used (SR –yes; GB – yes; WB – yes) (1)	- causal relationship between variables assessed (0) - enough power to detect significant associations (1) - all possible confounders assessed (1) - statistics analysis plan (0)	5.7 (average)
Light (2006)	- sample included experiencing a blockage to parenthood goal (0) - response rate (NM - 0) - FU response rate (NA) - FU participants compared with baseline participants (NA)	- Aims and hypotheses clearly derived from the Action-phase Model of Developmental Regulation (1)	-validated measures used (SR – no; GB – NA; WB – yes) (0.5) -reliable measures used (SR – yes; GB – NA; WB – yes) (1)	- causal relationship between variables assessed (0) - enough power to detect significant associations (0) - all possible confounders assessed (0) - statistics analysis plan (1)	3.5 (low)

Note. FU, Follow-up; SR, Self-Regulation; GB, Goal Blockage; WB, Wellbeing; NA, Not Applicable; NM, Not Mentioned; Quality ratings were grouped into low (0–4), average (5–9) and high (10–11).

Table 4. *Random Effect Model Results of Associations between Goal Blockage and Wellbeing and Goal Blockage and Self-regulation Strategies*

| | | | Blocked Goal with Wellbeing | | | | | | | Blocked Goal with Self-Regulation Strategies | | | | | |
| | | | Blocked Goal with Negative Mood | | | Blocked Goal with Positive Mood | | | Goal Disengagement | | | Goal Reengagement | | |
Studies	*N*	*r*	95% CI [*LL, UL*]	*p*	*r*	95% CI [*LL,UL*]	*p*	*r*	95% CI [*LL, UL*]	*p*	*r*	95% CI [*LL, UL*]	*p*
Heckhausen (study 1) Urgent group[a]	51		NI			NI		.42	[.16, .62]	.002	-.34	[-.56, -.07]	.01
Heckhausen (study 1) Passed group[a]	43		NI			NI		-.40	[-.63, -.11]	.007	-.45	[-.66, -.17]	.002
Heckhausen (study 2) Urgent group[a]	47		NI			NI			NI			NI	

Table 4. *Random Effect Model Results of Associations between Goal Blockage and Wellbeing and Goal Blockage and Self-regulation Strategies (continued)*

	N	r	CI	p	r	CI	p	r	CI	p	r	CI	p
Heckhausen (study 2) Passed group[a]	79	NI			NI			NI			NI		
Kraaij (2009)	83	NI			NI			NI			NI		
Salmela-Aro (2008)	97	.35	[.16, .51]	<.001	NI			NI			NI		
Thompson (2011a)	47	.29	[.00, .53]	.05	-.10	[-.38, .19]	.51	.05	[-.24, .33]	.74	- .29	[-.53, -.00]	.05
Light (2006) Urgent group[a]	29	NI			NI			NI			NI		
Light (2006) Passed group[a]	28	NI			NI			NI			NI		
Kotter-Grühn (2009)	**168**	NI			-.10	[-.25, .05]	.20						
	102							.34	[.16, .50]	<.001	.09	[-.12, .28]	.37
Pooled estimate		.33	[.18, .47]	**<.001*****	-.10	[-.23, .04]	.15	.12	[-.24, .44]	.53	-.24	[-.48, .03]	**.08**

Note. N = sample size; *r* = correlation coefficient; *CI* = Confidence Interval; *LL* = lower limit; *UL* = upper limit; *p* = significance level; NI = not investigated in the study; [a]Group labels verbatim from studies; Urgent group, group of women approaching parenthood deadline; Passed group, group of women who missed parenthood deadline; ***p <. 001.

Table 5. *Random Effect Model Results of Associations between Self-regulation Strategies and Negative Mood*

Studies	N	Goal Disengagement with Negative mood			Goal Reengagement with Negative mood		
		r	95% CI [*LL, UL*]	p	r	95% CI [*LL, UL*]	p
Heckhausen (study 1) Urgent group[a]	51	.11	[-.17, .37]	.44	-.11	[-.37, .17]	.44
Heckhausen (study 1) Passed group[a]	43	.38	[.09, .61]	.01	.14	[-.17, .42]	.37
Heckhausen (study 2) Urgent group[a]	47	.32	[.04, .56]	.03		NI	
Heckhausen (study 2) Passed group[a]	79	-.26	[-.46, -.04]	.02		NI	

Table 5. *Random Effect Model Results of Associations between Self-regulation Strategies and Negative Mood (continued)*

	N	r	[LL, UL]	p	r	[LL, UL]	p
Kraaij (2009)	83	-.35	[-.53, -.15]	.001	-.01	[-.23, .21]	.93
Salmela-Aro (2008)	97		NI			NI	
Thompson (2011a)	47	-.21	[-.47, .08]	.16	-.44	[-.65, -.18]	.002
Light (2006) Urgent group[a]	29	.23	[-.15, .55]	.23		NI	
Light (2006) Passed group[a]	28	.38	[.01, .66]	.05		NI	
Kotter-Grühn (2009)	102		NI			NI	
Pooled estimate		.06	[-.17, .28]	.61	-.11	[-.34, .13]	.37

Note. N = sample size; r = correlation coefficient; CI = Confidence Interval; LL = lower limit; UL = upper limit; p = significance level; NI = not investigated in the study; [a]Group labels verbatim from studies; Urgent group, group of women approaching parenthood deadline; Passed group, group of women who missed parenthood deadline.

Table 6. *Random Effect Model Results of Associations between Self-regulation Strategies and Positive Mood*

Studies		Goal Disengagement with Positive Mood			Goal Reengagement with Positive Mood		
	N	*r*	95% CI	*p*	*r*	95% CI	*p*
			[*LL, UL*]			[*LL, UL*]	
Heckhausen (study 1) Urgent group[a]	51	.16	[-.12, .42]	.26	.14	[-.14, .40]	.33
Heckhausen (study 1) Passed group[a]	43	-.09	[-.38, .22]	.57	.37	[.08, .60]	.01
Heckhausen (study 2) Urgent group[a]	47		NI			NI	
Heckhausen (study 2) Passed group[a]	79		NI			NI	

Table 6. *Random Effect Model Results of Associations between Self-regulation Strategies and Positive Mood (continued)*

	N	r	CI	p	r	CI	p
Kraaij (2009)	83	.01	[-.21, .23]	.93	.23	[.02, .43]	.04
Salmela-Aro (2008)	97		NI			NI	
Thompson (2011a)	47	-.05	[-.33, .24]	.74	.29	[.00, .53]	.05
Light (2006) Urgent group[a]	29	.01	[-.36, .38]	.96		NI	
Light (2006) Passed group[a]	28	.46	[.11, .71]	.01		NI	
Kotter-Grühn (2009)	102	.19	[-.01, .37]	.06	.23	[.04, .41]	.02
Pooled estimate		.09	[-.03, .21]	.14	.24	[.14, .35]	**<.001*****

Note. N = sample size; r = correlation coefficient; CI = Confidence Interval; LL = lower limit; UL = upper limit; p = significance level; NI = not investigated in the study; [a]Group labels verbatim from studies; Urgent group, group of women approaching parenthood deadline; Passed group, group of women who missed parenthood deadline;***p < .001

Table 7. *Associations between Self-regulation and Negative Mood according to Subgroup and Sensitivity Analysis*

		Goal Disengagement with Negative Mood				Goal Reengagement with Negative Mood		
	k	r	95% CI [*LL, UL*]	X^2	k	r	95% CI [*LL, UL*]	X^2
Nature of goal blockage								
Type of blockage								
Anticipated	6	.18	[-.04, .38]		2	.01	[-.36, .38]	
				4.867*				0.753
Unanticipated	2	-.29	[-.58, .07]		2	-.22	[-.53, .15]	
Degree of blockage								
High	4	.01	[-.31, .33]	0.175	2	.05	[-.20, .30]	
								3.194
Low	4	.11	[-.22, .42]		2	-.28	[-.51, -.02]	

Table 7. *Associations between Self-regulation and Negative Mood according to Subgroup and Sensitivity Analysis (continued)*

Study Design[a]	K	r	CI	X^2	K	r	CI	X^2
Cross-sectional or Quasi-experimental	7	.10	[-.16, .34]		3	-.00	[-.15, .15]	
				(NA)				(NA)
Longitudinal	1	-.21	[-.71, .43]		1	-.44	[-.65, -.18]	
Study Quality[b]								
Low	6	.18	[-.04 .38]		2	.01	[-.36, .38]	
				4.867*				0.753
Average	2	-.29	[-.58, .07]		2	-.22	[-.53, .15]	

Note. K = number of studies; r = correlation coefficient; CI = confidence Interval; LL = lower limit; UL = upper limit; X^2 = chi-square; NA = not applicable because at least one of the groups only has one or no study; *p < .05. [a]Cross-sectional and quasi-experimental studies were included in the same category in sensitivity analysis since both provide none or little evidence to infer causality. [b]The quality of a study was categorized in the analyses as low, average or high according to the score obtained in the quality assessment.

Table 8. *Associations between Self-regulation and Positive Mood according to Subgroup and Sensitivity Analysis*

	Goal Disengagement with Positive Mood				Goal Reengagement with Positive Mood			
	k	r	95% CI [*LL, UL*]	X^2	k	r	95% CI [*LL, UL*]	X^2
Nature of goal blockage								
Type of blockage								
Anticipated	4	.13	[-.07, .31]		2	.25	[.04, .43]	
				0.820				0.001
Unanticipated	2	-.02	[-.24, .22]		2	.25	[.08, .41]	
Degree of blockage								
High	3	.09	[-.14, .31]		2	.28	[.11, .43]	
				0.079				0.250
Low	3	.05	[-.19, .28]		2	.21	[.01, .40]	

Table 8. *Associations between Self-regulation and Positive Mood according to Subgroup and Sensitivity Analysis (continued)*

Study Design[a]	k	r	CI	X^2	k	r	CI	X^2
Cross-sectional or quasi-experimental	6	.12	[-.02, .25]		4	.24	[.12, .35]	
				(NA)				(NA)
Longitudinal	1	-.05	[-.38, .29]		1	.29	[.00, .53]	
Study Quality[b]								
Low	4	.13	[-.07, .32]		2	.25	[.04, .43]	
				0.196				0.002
Average	3	.07	[-.12, .25]		3	.24	[.12, .36]	

Note. k = number of studies; r = correlation coefficient; CI = Confidence Interval; LL = lower limit; UL = upper limit; X^2 = chi-square; NA = not applicable because at least one of the groups only has one or no study. [a]Cross-sectional and quasi-experimental studies were included in the same category in sensitivity analysis since both provide none or little evidence to infer causality. [b]The quality of a study was categorized in the analyses as low, average or high according to the score obtained in the quality assessment.
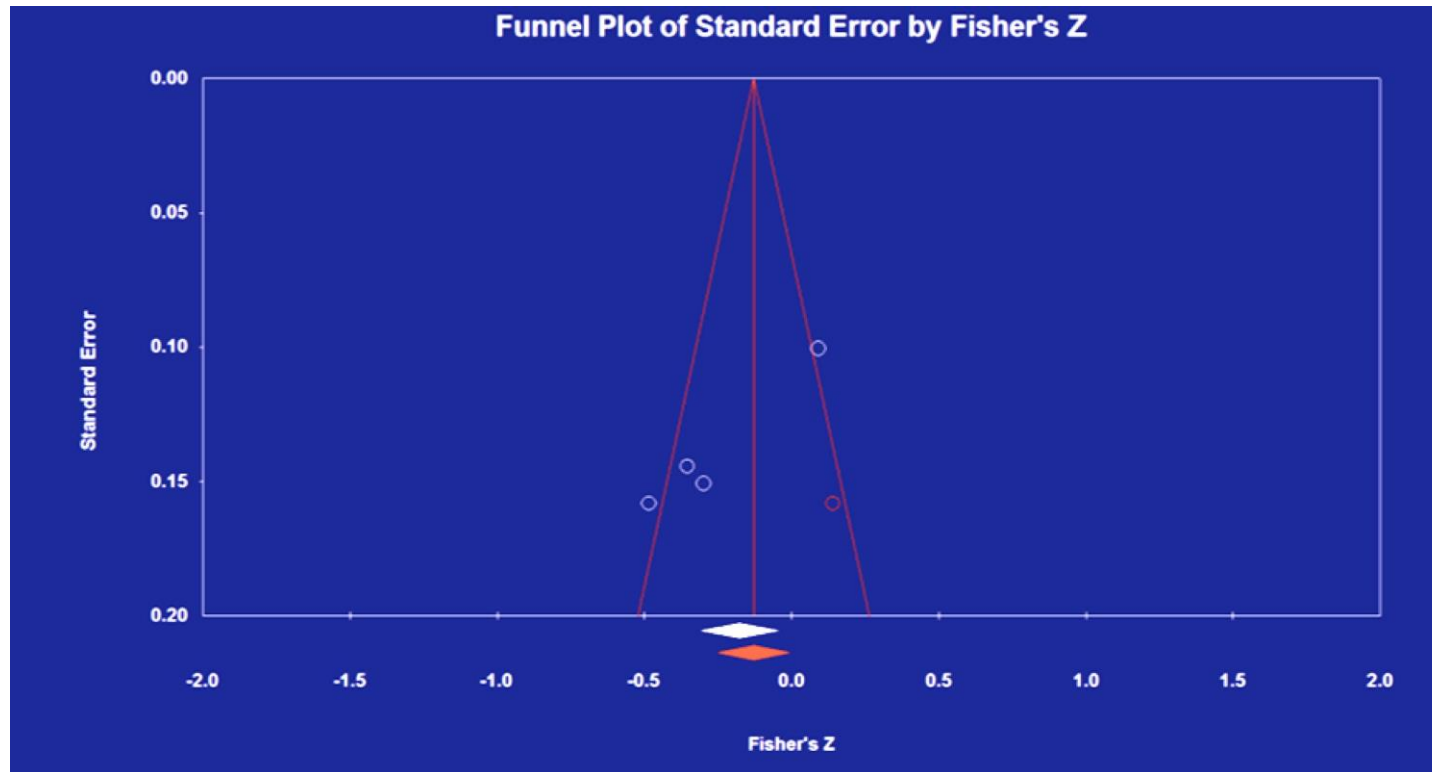
Figure 1. Publication Bias Funnel Plot for the Association between Goal Blockage and Goal Reengagement.
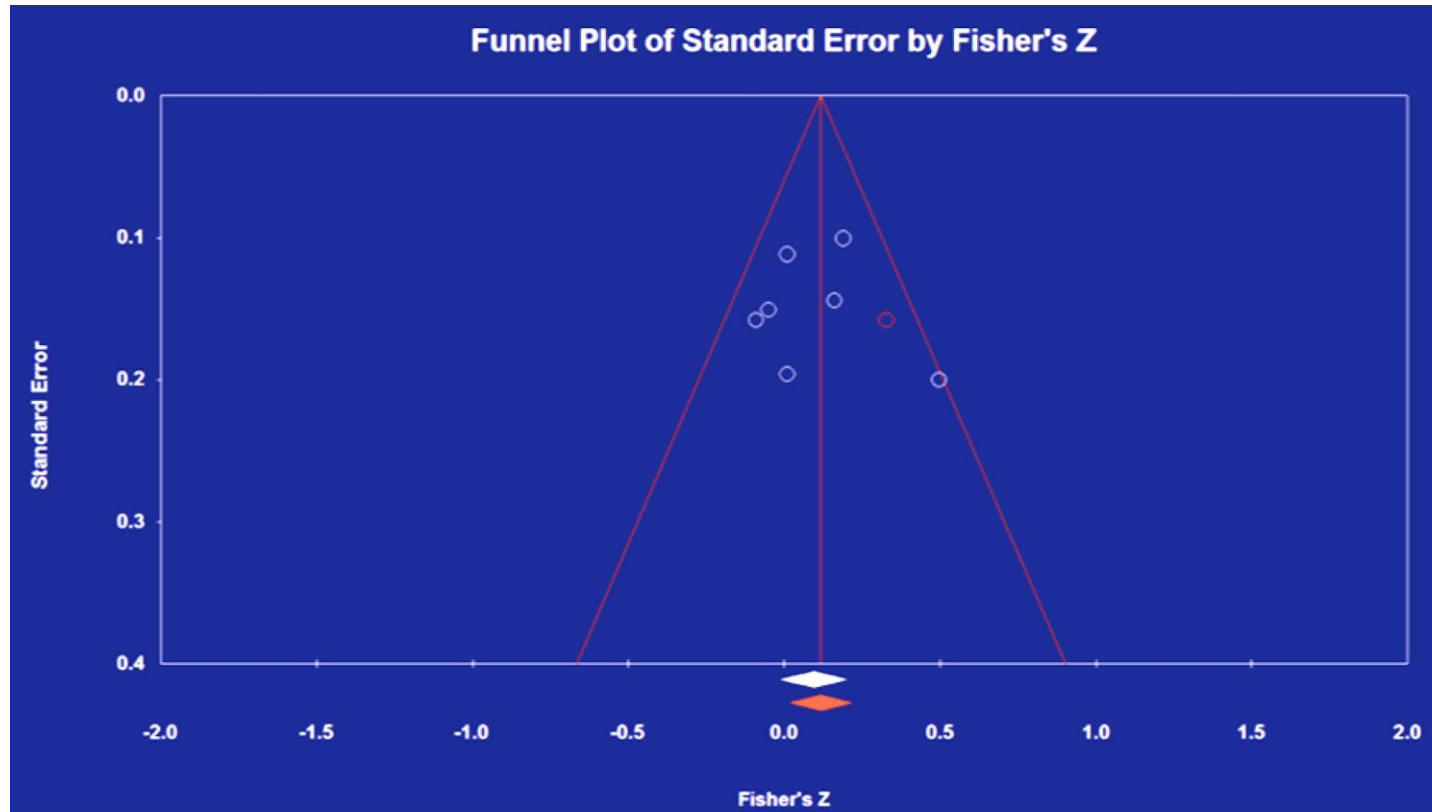
Figure 2. Publication Bias Funnel Plot for the Association between Goal Disengagement and Positive Mood.

Table 9. *Prisma Checklist*

Section/topic	#	Checklist item	Reported on page #
TITLE			
Title	1	Identify the report as a systematic review, meta-analysis, or both.	10
ABSTRACT			
Structured summary	2	Provide a structured summary including, as applicable: background; objectives; data sources; study eligibility criteria, participants, and interventions; study appraisal and synthesis methods; results; limitations; conclusions and implications of key findings; systematic review registration number.	NA
INTRODUCTION			
Rationale	3	Describe the rationale for the review in the context of what is already known.	10-15
Objectives	4	Provide an explicit statement of questions being addressed with reference to participants, interventions, comparisons, outcomes, and study design (PICOS).	15
METHODS			
Protocol and registration	5	Indicate if a review protocol exists, if and where it can be accessed (e.g., Web address), and, if available, provide registration information including registration number.	15
Eligibility criteria	6	Specify study characteristics (e.g., PICOS, length of follow-up) and report characteristics (e.g., years considered, language, publication status) used as criteria for eligibility, giving rationale.	16
Information sources	7	Describe all information sources (e.g., databases with dates of coverage, contact with study authors to identify additional studies) in the search and date last searched.	16
Search	8	Present full electronic search strategy for at least one database, including any limits used, such that it could be repeated.	15-16
Study selection	9	State the process for selecting studies (i.e., screening, eligibility, included in systematic review, and, if applicable, included in the meta-analysis).	16-17

Data collection process	10	Describe method of data extraction from reports (e.g., piloted forms, independently, in duplicate) and any processes for obtaining and confirming data from investigators.	17-18
Data items	11	List and define all variables for which data were sought (e.g., PICOS, funding sources) and any assumptions and simplifications made.	17
Risk of bias in individual studies	12	Describe methods used for assessing risk of bias of individual studies (including specification of whether this was done at the study or outcome level), and how this information is to be used in any data synthesis.	19
Summary measures	13	State the principal summary measures (e.g., risk ratio, difference in means).	20
Synthesis of results	14	Describe the methods of handling data and combining results of studies, if done, including measures of consistency (e.g., I^2) for each meta-analysis.	20-21
Risk of bias across studies	15	Specify any assessment of risk of bias that may affect the cumulative evidence (e.g., publication bias, selective reporting within studies).	20-21
Additional analyses	16	Describe methods of additional analyses (e.g., sensitivity or subgroup analyses, meta-regression), if done, indicating which were pre-specified.	20-21
RESULTS			
Study selection	17	Give numbers of studies screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally with a flow diagram.	21-22
Study characteristics	18	For each study, present characteristics for which data were extracted (e.g., study size, PICOS, follow-up period) and provide the citations.	23
Risk of bias within studies	19	Present data on risk of bias of each study and, if available, any outcome level assessment (see item 12).	30
Results of individual studies	20	For all outcomes considered (benefits or harms), present, for each study: (a) simple summary data for each intervention group (b) effect estimates and confidence intervals, ideally with a forest plot.	30
Synthesis of results	21	Present results of each meta-analysis done, including confidence intervals and measures of consistency.	31
Risk of bias across studies	22	Present results of any assessment of risk of bias across studies (see Item 15).	33

Additional analysis	23	Give results of additional analyses, if done (e.g., sensitivity or subgroup analyses, meta-regression [see Item 16]).	32
DISCUSSION			
Summary of evidence	24	Summarize the main findings including the strength of evidence for each main outcome; consider their relevance to key groups (e.g., healthcare providers, users, and policy makers).	33
Limitations	25	Discuss limitations at study and outcome level (e.g., risk of bias), and at review-level (e.g., incomplete retrieval of identified research, reporting bias).	39
Conclusions	26	Provide a general interpretation of the results in the context of other evidence, and implications for future research.	41
FUNDING			
Funding	27	Describe sources of funding for the systematic review and other support (e.g., supply of data); role of funders for the systematic review.	NA

APPENDIX B

Consent Form

"How do couples decide about doing another fertility treatment cycle"

I understand that my participation in this project will involve participating in an individual interview with the research team member Sara Mesquita. In the interview I will be asked by Sara Mesquita about my thoughts and feelings regarding undergoing or not another fertility treatment cycle attempt as well as about the way me and my partner decide about that. The whole interview should take around 60 minutes.

I understand that participation in this study is entirely voluntary and that I can withdraw from the study at any time without giving a reason. I understand that I can refuse to answer to any of the interview questions if I do not feel comfortable with it.

I understand that I am free to abstain from answering any interview questions or to stop the interview at any moment without giving any explanation. I understand that I am free to discuss any questions at any time with the research team.

I understand that apart from the research team, no one else will have access to the information I will provide during the interview.

I understand that the interview will be audio-recorded so that the topics raised can be transcribed and synthesised by the research team. The information will be stored in a password-protected computer that belongs to Sara Mesquita. After the transcription of the interview information, the data I provided will become fully anonymous as my name will be replaced by a pseudonym and the recording will be deleted. The anonymised transcribed data will be retained indefinitely.

Do you accept to take part in the present study?

YES [ ] NO [ ]

<u>If yes:</u>

How would you prefer to be contacted in order to arrange a suitable day and time to participate in the study interview by the research team member (Sara Mesquita)?

      [ ] Email: _____
      [ ] Contact Number: _____

Appendices

Information Sheet

Study title:

"How do couples decide about doing another fertility treatment cycle"

We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. We'd suggest this should take about 10 minutes.

Please talk to others about the study if you wish. (Part 1 tells you the purpose of this study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study). Ask the research team if there is anything that is not clear (Please find the contact details below).

Part 1 of the information sheet

What is the purpose of the present study?

Parenthood is an important life goal for many people. While some couples achieve biological parenthood spontaneously, other couples need to seek medical treatment. During this process, individuals and couples need to decide whether they want to do treatment or if a cycle is not successful another fertility treatment cycle. The present study aims to understand how couples decide about undergoing or not another fertility treatment cycle.

Why have I been invited?

You have been chosen to participate in this study because you experienced a recent failed fertility treatment cycle of IVF or ICSI.

Do I have to take part?

It is up to you to decide to join the study. If you decide to take part now, you will be asked to sign a consent form.

What do I have to do to take part in the present study?

If you decide to take part you will be asked to participate in an individual interview with one of the research team members (Sara Mesquita). Your partner will also be asked by Sara Mesquita to participate in an individual interview. You and your partner can only participate in the present study if both agree to participate in the individual interview with Sara Mesquita and your partner will not have access to your information. The interview will take one hour approximately. During the interview you will be asked to provide thoughts and feelings about undergoing or not another fertility treatment cycle as well as about the way you and your partner make that decision. In the end of the interview, you will be asked to answer to some socio-demographic questions (about your gender, age, if you have biological or adoptive children, how long you and your partner have been together, for how long have you been trying to get pregnant and the number of fertility treatment cycles you have already undergone). If you agree to take part you only have to say "yes" in the study consent form and after you will be asked to provide a contact number or email address. A research team member (Sara Mesquita) will then contact you and try to arrange a suitable day and time to conduct the interview.

Will the information I provide in this study be kept confidential?

The data from the interview will be audio-recorded so that the topics raised can be transcribed and synthesised. A part from the research team, no one else will have access to the information you will provide during the interview. After the interview, the information you provided will be transcribed to a text file and in that moment your name will be replaced by a pseudonym in order to fully anonymise your interview data. The text file will be stored on a password-protected computer that belongs to one of the members of the research team (Sara Mesquita) and will be held anonymously. Once the recording of the session has been transcribed the recording will be deleted and the transcribed data will be retained indefinitely. You will also have the opportunity to ask the research team member (Sara Mesquita) to delete or revise any comments you have made in the interview till the moment the information becomes fully anonymous (i.e., transcription stage). The research team can use some verbatim extracts from the interview to publish in scientific journals but all the information will be fully anonymised.

What will happen to the results of the present study?

The results of the present study will be published in peer reviewed health journals.

Part 2 of the information sheet

What are the possible disadvantages and risks of taking part?

If you do not want to participate, you can just check "no" in the study consent form.

What are the side effects of taking part this study?

There are some questions to be made during the interview that can cause upset or distress because they are related with your thoughts and feelings about the experience of fertility problems. If participating in our research study causes any concern about your health or your emotions then please contact the Portuguese National Health Service (217 984 200/ http://www.portaldasaude.pt/portal). You can also contact the Portuguese Fertility Society (22 935 0845). If you start feeling negative emotions during the interview you can tell the research team member who will be conducting the interview (Sara Mesquita) at that moment or to contact the members of the research team later (Sara Mesquita and Sofia Gameiro, both Clinical Psychologists).

What are the possible benefits of taking part?

We cannot promise the present study will help you but the information we get from this study will possibly help to understand what influence couples to make decisions about undergoing or not another fertility treatment cycle. Moreover, past research has shown that to participate in research interviews can help patients understanding their thoughts and emotions. In case you decide to take part, you will receive 50 euros as a reward for taking part in the present study.

What should I do if there is a problem during my participation?

If you have any problem or any concern about our study, please contact the researchers who will do their best to answer your questions (029 208 70479). You can also contact the Research Ethics Committee (School of Psychology, Cardiff

University) who has reviewed the research project. Please find the contact details above.

Who is organising and funding the research?

Sara Mesquita (PhD student in the School of Psychology, Cardiff University) is conducting the research with the supervision of Dr Sofia Gameiro (School of Psychology, Cardiff University) and Professor Jacky Boivin (School of Psychology, Cardiff University). Sara Mesquita (PhD student of the research team) was awarded with a scholarship by the Portuguese Foundation for Science and Technology (FCT) to conduct this research.

Who has reviewed the research project?

This project was reviewed by the Research Ethics Committee from the School of Psychology (Cardiff University), to protect your interests. This study has been reviewed and given favourable opinion by the School of Psychology (Cardiff University) Research Ethics Committee.

Further Information and Contact details

Research team contact	
Sara Mesquita, MSc PhD Student	Sofia Gameiro, Ph.D. Lecturer Jacky Boivin, Ph.D. Professor
School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT.	School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT.
Tel: +44(0)29 208 70479 Email: DaSilvaSM@cardiff.ac.uk	Tel: +44(0)29 208 75376 Email: gameiros@cardiff.ac.uk

If you want to complain formally please contact

Natalie Moran   Secretary of the Ethics Committee   School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT.   Tel: 029 2087 0360   Email: psychethics@cardiff.ac.uk

Appendices

Debriefing

"How do couples decide about doing another fertility treatment cycle"

Thank you for participating in this study. It is important to remember that the information you provided during the interview will be transcribed to a text file and then become fully anonymous since your name will be replaced by a pseudonym. After that, the recording will be deleted and your information will be kept safe in a locked password-protected computer which belongs to a researcher team member (Sara Mesquita). It is also important to mention that the research team can use some verbatim extracts you provided during the interview to be published in a scientific journal but they will be fully anonymised.

Past research has been shown that some couples drop-out fertility treatment even when they have a favourable medical prognosis. There is little research about how couples decide together about undergoing or not more fertility treatment cycle attempt as well as about the factors that influence this decision. It is important to investigate how couples make the decision of undergoing more treatment in order to help fertility clinics developing decision-support technologies that can help couples during the decision process.

There were some questions made during the interview that could cause upset or distress because they were related with your thoughts and feelings about the experience of fertility problems. If participating in our research study causes any concern about your health or your emotions then please contact the Portuguese National Health Service (217 984 200/ http://www.portaldasaude.pt/portal). You can also contact the Portuguese Fertility Society (22 935 0845) or the research team members (please find the contact details below).

Further Information and Contact details

Research team contact Sara Mesquita, MSc PhD Student School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT. Tel: +44(0)29 208 70479 Email: DaSilvaSM@cardiff.ac.uk	Sofia Gameiro, Ph.D. Lecturer Jacky Boivin, Ph.D. Professor School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT. Tel: +44(0)29 208 75376 Email: gameiros@cardiff.ac.uk

If you want to complain formally please contact:

Natalie Moran Secretary of the Ethics Committee School of Psychology, Cardiff University, Tower Building, Park Place, Cardiff, CF10 3AT. Tel: 029 2087 0360 Email: psychethics@cardiff.ac.uk

Appendices

Interview Schedule

__Introduction__

Welcome!

Bem-vindo!

As you were already informed in the study consent form and information sheet you received by email, in this interview I will ask you questions about your thoughts and feelings regarding the decision of doing or not another fertility treatment cycle, as well as about the way you and your partner decide this together.
As mentioned on the consent form, this interview is being audio recorded. After, it will be transcribed to a text document and your name will be replaced by a pseudonym (false name) to ensure that your data remains anonymous. The audio record will be destroyed. You can tell us to delete your data until the moment it becomes anonymous.

The identifying information given in this interview is confidential and, apart from me, no one will have access to it, including your partner. Myself and the other members of the research team (Dr Sofia Gameiro and Prof Jacky Boivin) will have access to the anonymised data file. In case you experience strong negative feelings during the interview, please let me know so I can help you or give you support contacts (as in the information sheet). Also please be aware you can withdraw the interview at any time in case you start experiencing negative feelings

Por favor, esteja ciente de que pode desistir da entrevita a qualquer momento se começar a ter sentimentos negativos.

We really appreciate your contribution to this study. We think that this interview will last around one hour. Please feel completely free to express what you think and feel about the topics as your perspective will help us better understand how couples decide about treatment.

Como já foi informado no consentimento informado do estudo e na folha de informação sobre o estudo que recebeu por email, durante esta entrevista será questionado sobre os seus pensamentos e sentimentos sobre a decisão de realizar outro ciclo de tratamento de fertilidade, assim como sobre a forma como você e o/a seu/sua companheiro/a tomam esta decisão em conjunto.
Tal como foi mencionado no consentimento informado, esta entrevista será gravada. Mais tarde, o conteúdo gravado irá ser transcrito para um document word e o seu nome será substituido por um pseudónimo (nome falso) de modo a assegurar a confidencialidade dos seus dados. O ficheiro gravado será então destruído. Pode pedir à equipa de investigação para apagar o conteúdo da entrevista até ao momento em que este se torne totalmente anónimo. A informação dada durante esta entrevista é confidencial e, para além da equipa de investigação, ninguém terá acesso à mesma (incluindo o/a seu/ sua companheiro/a). Somente eu e os outros membros da equipa de investigação (Dr

Sofia Gameiro e Professora Jacky Boivin) teremos acesso ao ficheiro com os dados anónimos. No caso de começar a sentir sentimentos negativos fortes durante a entrevista, por favor diga à entrevistadora de modo a que esta o/a possa ajudar directamente ou solicitar contactos de ajuda (tais como o que estão presents na folha de informação). Estamos muito gratos pela sua colaboração no presente estudo. A presente entrevista terá a duração de aproximadamente uma hora. Por favor, sinta-se totalmente à vontade para partilhar os seus pensamentos e sentimentos sobre os temas abordados durante a entrevista na medida em que esssa partilha nos irá ajudar a compreender como os casais tomam decisões em relação aos tratamentos.

When undergoing fertility treatment, patients can experience an unsuccessful treatment cycles. According to our knowledge, you have recently experienced an unsuccessful treatment cycle. After experiencing an unsuccessful treatment cycle of IVF/ICSI, people typically have to decide if they want to undergo another cycle attempt or not. In this interview I would like to know your thoughts and feelings about this decision.

Quando se encontram a realizar tratamentos de fertilidade, os pacientes podem obter resultados negativos. Para participar neste estudo, terá que ter tido um resultado negativo de um ciclo de tratamento (FIV/ICSI). Após ter obtido um resultado negativo, as pessoas normalmente tem que decidir sobre a realização de um outro ciclo de tratamento. Nesta entrevista estamos interessados em saber os seus pensamentos e sentimentos sobre esta decisão de realizar outro tratamento de fertilidade.

> So, let's start the interview.

> Vamos então dar inicio à entrevista.

Parenthood goal importance

Biological parenthood is an important life goal for many people but it can have a different meaning for each person.
A parentalidade biológica é um objectivo de vida importante para muitas pessoas mas pode ter significados diferentes para cada uma delas.

- Q1: Would you please tell me about the importance of biological parenthood to you?
  (If it does not address the question of "why", chase-up with the question of why?)
  (*descriptive question*)

  P1: Poderia, por favor, falar-me um pouco acerca da importãncia que ser pai/ser mãe tem para si? (Se não respondem porquê, perguntar: Porque é que ser pai ou mãe significa isso que acabou de descrever?)

- Q2: What about your partner? Would you tell me about the importance of biological parenthood to your partner? (If it does not address the question of "why", chase-up with the question of why) (*descriptive question*)

P2: E em relação ao/à seu/sua companheiro/a.. pode falar-me um pouco sobre a importância que ser pai/mãe tem para ele/ela? (Se não respondem porquê, perguntar: Porque é que acha que ser pai/mãe significa isso que acabou de descrever para o seu companheiro/a?)

- Q3: Would you tell me a bit more about possible similarity OR difference in the importance you and your partner attribute to being biological parents? (*comparative question*)

P3: Gostaria que me falasse um pouco mais sobre as possiveis semelhanças e diferenças que possam existir entre si e o/a seu/sua companheiro/a em relação à importância que atribuem ao facto de virem a ser pais biológicos?

- Q4: How do you think the views you and your partner have on the importance of biological parenthood influences your decision-making about further treatment? (*comparative question*)

P4: Como pensa que a forma como você e o seu companheiro/a vêm a parentalidade (em termos de importância) pode influenciar as decisões que tomam sobre a realização de mais tratamentos de fertilidade no futuro?

While some couples achieve biological parenthood spontaneously, other couples, like you, have to do fertility treatment. This sometimes means doing treatment cycles that do not result in pregnancy.

Enquanto alguns casais alcançam a parentalidade espontaneamente, outros (tal como você), tem que realizar tratamentos de fertilidade para tentar alcançar uma gravidez. No entanto, como sabe, os tratamentos nem sempre resultam numa gravidez e a pessoa pode obter resultados negativos após a realização dos tratamentos.

Parenthood goal blockage

- Q5: How do you feel about eventually achieving your parenthood goal now that you have experienced a treatment failure? (*evaluative question*)

P5: Como se sente agora, isto é, depois de ter obtido um resultado de insucesso no último tratamento, em relação à possibilidade de vir a ser pai ou mãe?

- Q6: Would you tell me about the obstacles you are facing in achieving this goal? (*structural question*)… (if necessary: Of the obstacles you mentioned, which is the main one for you?)

P6: Poderia, por favor, falar-me sobre os obstáculos que tem enfrentado na tentativa de se tornar pai/mãe? (se necessário: Dos obstáculos que referiu, qual seria o mais relevante para si?

- Q7: What do you think your partner thinks about how easy or difficult it seems for you as a couple to become a (biological) parent with treatment? (*circular question*)

  P7: O que é que acha que o seu companheiro/a pensa em relação à facilidade ou dificuldade em tornarem-se pai e mãe biológicos (como casal) através da realização de tratamentos de fertilidade?

- Q8: How do you think the views you and your partner have on eventually achieving the parenthood goal influence your decision-making about further treatment now that you have experienced a treatment failure? (*comparative question*)

  P8: No momento presente (após terem obtido um resultado negativo no último tratamento..) Como pensa que a forma como você e o/a seu/sua companheiro/a consideram provável vir a ser pai/mãe através da realização de mais tratamentos influencia a vossa decisão de realizar mais tratamentos?

Intrapersonal Self-Regulation strategies

Regarding your desire to have biological children, please think about the present moment of your life.

As próximas perguntas serão sobre o seu desejo de vir a ser pai ou mãe. Por favor, pense sempre no momento presente da sua vida.

- Q9: Please would you tell me about your commitment to having a biological child? (If necessary use prompt: for instance, if you feel you want to keep investing in your desire of having biological children) (*narrative question*)

  P9: Poderia, por favor, falar-me sobre a forma como se sente comprometido/a em relação a ter um filho…

  (Se necessário: Com isto queremos saber se, por exemplo, sente que quer continuar a investir no seu desejo de se tornar pai ou mãe biológico..)

- Q10: What are your thoughts and feelings about your partner's commitment to having a biological child? (*circular question*)

  P10: Quais são os seus pensamentos e sentimentos em relação ao comprometimento do/a seu/sua companheiro/a em ter um filho biológico?

- Q11: How do you feel about committing to, and investing in, other possible life goals? (*comparative question*) (If necessary use Prompt: Are there other things you would like to achieve or do in any other area of your life..)

  P11: Como se sente em relação ao seu comprometimento e investimento em relação a outros objectivos de vida? (Se necessário: por exemplo, existem outras áreas da sua vida nas quais gostaria de fazer ou alcançar algo?)

- Q12: Do you feel your partner is committed to investing in other possible life goals (such as career) rather than biological parenthood? (*circular question*) How do you feel regarding your partner's investment in the other life goal/s you just mentioned?

  P12: E em relação ao seu companheiro/a? sente que existem outras áreas na sua vida (tais como a carreira), para além da parentalidade biológica, em relação às quais ele/ela têm investido? Como se sente em relação ao investimento do/a seu/sua parceiro/a no objectivo/os de vida que referiu?

- Q13: How do you think the views you and your partner have on committing and investing in other life goals influence your decision-making about further treatment? (*descriptive question*)

  P13: Como sente que a forma como você e o/a seu/sua companheiro/a se comprometem e investem noutros objectivos de vida (que não tornar-se pais) pode influenciar as vossas decisões sobre a realização de mais tratamentos de fertilidade?

Interpersonal Self-Regulation Strategies

Let's now focus on what you and your partner have been doing together to try to have a biological child.

Vamos agora dar atenção/ focar-nos naquilo que você e o/a seu/sua companheiro/a têm feito juntos no sentido de se tornarem pais biológicos.

- Q14: What are the similarities and differences in the effort you and your partner each make toward trying to conceive? (*contrast question*)

  P14: Quais são as semelhanças e diferenças, em termos de esforço, que você e o/a seu/sua companheiro/a fazem para tentarem ser pais biológicos?

- Q15: Would you tell me about how you manage the difference in the effort you each put in trying to conceive? (*narrative question*)

  P15: Poderia, por favor, falar-me um pouco sobre a forma como tem gerido/lidado com a diferença de esforço que cada um de vocês faz na tentativa de se tornarem pais biológicos?

- Q16: How do you think the individual and joint effort you make to the parenthood goal influences your decision-making about undergoing another treatment cycle more treatment? (*comparative question*)

P16: Como pensa que o esforço individual e colectivo que você e o/a seu/sua comapanheiro/a fazem para alcançar a parentalidade influencia a sua decisão de realizar outro tratamento de fertilidade?

When thinking about the decision to do another treatment cycle after this failed cycle:

Por favor recorde os momentos em que tem vindo a pensar sobre a decisão de realizar (mais) tratmentos após ter recebido o resultado negativo do último ciclo de tratamento realizado..

- Q17: Have you and your partner been deciding together about whether to undergo another treatment? (*narrative question*)

  P17: Você e o/a seu/sua companheiro/a tem vindo a decidir em conjunto sobre a possível realização de mais tratamentos?

- Q18:

  (for those that say yes)
  (para aqueles que responderam sim)

   Would you describe what you mean by "deciding together" (*Probes question*) (prompt: What do you talk about? How do you feel about these discussions?)

  Poderia, por favor, explicar o que significa para si "decidir em conjunto"? Sobre o que costumam falar habitualmente? Como se sente em relação a estas conversas com o/a seu/sua companheiro/a?

  OR

  (for those that say no)
  (para aqueles que respodenram não)

  Would you tell me more about what you mean when you say you are NOT deciding together"?

  Poderia, por favor, falar-me um pouco mais sobre o que significa para si "não decidirem em conjunto"?

  FOR all –
  Para todos

  How do you think your approach to decision-making (together or not) affects the decision of doing another fertility treatment cycle? Would it be a different outcome if you and your partner deliberated in a different way? (*comparative*

question) (prompt: for instance, What would you like to talk about? How do you think the discussion could be satisfying for you?...)

Como acha que a abordagem que você e o/a seu/sua companheiro/a usam para tomar decisões (em conjunto ou separadamente) influencia a decisão de realizar mais tratamentos? Pensa que a decisão poderia ser diferente se adoptassem outra abordagem? (por exemplo, sobre o que é que gostaria de falar? Como acha que esta conversa poderia ser satisfatória para si?)

Please be aware you can withdraw the interview at any time in case you start experiencing negative feelings

Por favor, esteja ciente de que pode desistir desta entrevista a qualquer momento se começar a experienciar sentimentos negativos.

Goal achievement

Please think about you and your partner' desires and efforts made in order to become biological parents.

Por favor, pense agora sobre o desejo que você e o/a seu/sua companheiro/a sentem e os esforços que fizeram em relação a serem pais biológicos.

Q19: Do you feel that the way you and your partner managed joint desire and efforts to become a biological parent helped you to be closer to the biological parenthood goal? (*evaluative question*)

P19: Sente que a forma como você e o/a seu/sua companheiro/a geriram o seu desejo e esforço em conjunto para se tornarem pais biológicos pode tê-los ajudado a ficar mais perto de concretizar o vosso objectivo?

- Q20: Would you tell me what you and your partner decided about undergoing or not another cycle attempt? (*descriptive question*)

  P20: Pode, por favor, dizer-me se você e o/a seu/sua companheiro/a já tomaram alguma decisão sobre a realização de mais um ciclo de tratamentos?

- Q21: What are your thoughts and feelings about this decision (if any) and why? (*evaluative question*)

  P21: O que pensa e sente em relação a esta decisão (no caso de já ter tomado alguma decisão) e porquê?

- Q22 – The interview is about to finish but before I would like to talk to you a bit more about other important life goals you have already achieved.

Would you please tell me more about a particular important goal in your life you have already achieved? What positive things came out of investing on the goal you mentioned?

P22: A entrevista está prestes a terminar.. antes de terminarmos, gostavamos de falar um pouco mais consigo sobre outros objectivos de vida já alcançados que considera importantes para si. Recorda-se de algum em particular? .. Em relação ao objectivo que referiu, o que considera ter sido positivo no facto de ter investido nesse objectivo?

APPENDIX C

(Due to similarity of content between the materials used in the studies performed in the UK and Spain, only the material used in the UK is presented below)

CONSENT FORM

Study title: "Understanding why people discontinue fertility treatments"

Name of Researcher: Sara Mesquita, Sofia Gameiro and Jacky Boivin

Please initial the boxes on the right if you agree with the statements.

I understand that my participation in this project will involve completing questionnaires at three stages: before the start of the next treatment (now) and two and twelve months after the start of the treatment cycle.

I confirm that I have read and understand the information sheet dated 20.07.2014 (version 2) for the above study. I have had the opportunity to consider the information, ask questions and have had these answered satisfactorily.

I understand that my participation in this study is entirely voluntary. I understand that I can omit any questions on the questionnaire that I do not feel comfortable answering.

I understand that the information provided by me will not be anonymous. I understand that in order to protect my information during the implementation of the research study, the research team will use a coding scheme by linking my name to a code (participant number). All data will be identified with this code (and not my name). I understand that at the end of the study data collection the link will be destroyed and then my information will be fully anonymous. I understand that I can withdraw this information up until it is fully anonymised and not after that.

I understand that relevant sections of my medical records will be first extracted by a BCRM staff member and will be looked and stored by the Cardiff University research team. These data will be kept safe in a locked computer which belongs to the School of Psychology, Cardiff University. I authorise to the research teams to access to my medical records.

I agree to take part in the above study.

Would you like to receive the study results at the end of the study?

YES [ ]   NO [ ]

Would you like to be involved in the dissemination of the study results (around 30 months from now) by giving feedback about a leaflet our research team will develop about decision-making about undergoing (more) fertility treatment?

YES [   ]   NO [   ]

If yes, how would you like to receive the leaflet?

[   ]   by email

[   ]   by post

_____   _____   _____

Name   Date   Signature

CONTACT DETAILS - REQUIRED

In the future, I want to be contacted by:

[   ] Post mail

[   ] E-mail

NAME (initial letters): _____

Couple ID Number:_____

Gender :_____

Address:_____

Post Code: _____

E-mail: _____

INFORMATION SHEET

Study title: "Understanding why people discontinue fertility treatments"

<u>**Part 1 of the information sheet**</u>

We would like to invite you to take part in our research study. Before you decide we would like you to understand why the research is being done and what it would involve for you. **One of our research team members (Sara Mesquita) will go through the information sheet with you and answer any questions you have**. We'd suggest this should take about 10 minutes.

Talk to others about the study if you wish. (Part 1 tells you the purpose of this study and what will happen to you if you take part. Part 2 gives you more detailed information about the conduct of the study). Ask us if there is anything that is not clear.

What is the purpose of the present study?

Parenthood is an important life goal for many people. While some couples achieve biological parenthood spontaneously, other couples need to seek medical treatment. During this process, individuals and couples need to decide whether they want to do treatment or if a cycle is not successful another fertility treatment cycle. The present study aims to understand how couples decide to do one or more fertility treatment cycles and also to explore possible factors that can influence their decisions and wellbeing during treatment.

Why have I been invited?

You have been invited to participate in this study because you are considering or undertaking fertility treatment at the fertility centre that is collaborating with our research project, the Bristol Centre for Reproductive Medicine (BCRM).

Do I have to take part?

It is up to you to decide to join the study. We will describe the study and go through this information sheet. If you decide to take part now, you will be asked to sign a consent form. You can also decide whether to take part in the present study later by taking the information sheet home. If you decide to participate later, please find the questionnaire link (https://cardiffunipsych.eu.qualtrics.com/SE/?SID=SV_8j1YSyNlsv5lsTX) or email Sara Mesquita (please find the contact details below). Sara Mesquita will then send you online versions of the consent form and study questionnaires by email.

 If you decide to participate but later change your mind, then you can withdraw your data up until it becomes fully anonymised and not after that. This would not affect the standard of care you receive.

What do I have to do to take part in the present study?

If you decide to take part you will be asked to complete questionnaires at three stages during a year. The first will happen now and then again two and 12 months later. The questionnaires will ask you questions about how much your goal of parenthood is blocked, your ability to let go of blocked goals and start to pursue new goals (e.g. career), as well as measures of coping, wellbeing and goal-related. The questionnaires will take between 25-30 minutes of your time (30 minutes first stage, 25 minutes thereafter).

 You can fill the first questionnaire in BCRM (paper version) or at home (online version). We will not need to meet you in the future. In the study consent form, we will ask you how you prefer to be contacted in order to fill the second and third questionnaires (by email or by post). If you prefer email, we will send you a link and you just need to click on it to complete the next questionnaires. If you prefer to be contacted by post mail, we will send the questionnaire directly to the address that you will give to us with an envelope stamped and pre-addressed to send back to the research team.

In the consent form, you will be asked about the possibility of one of our research team members (Sara Mesquita) to access your medical records that will be first extracted by a BCRM staff member regarding to the treatments you will undergo (diagnosis, the previous treatments you possibly did and your current/next treatment). These data will only be identified by a participant code number and it will be kept safe in a locked computer which belongs to the School of Psychology, Cardiff University. Finally, in the consent form you will be also asked about the possibility to participate in the dissemination of the study findings by giving feedback about a decision-making leaflet developed by the research team. If you agree to participate you will receive the decision-making leaflet by email or post (according to your preference). You can withdraw from the study without giving any justification until the moment your data becomes fully anonymised. This will happen 24 months after the start of the study, which corresponds to the time needed to collect all data across all study assessment moments. Once the information you provided becomes fully anonymised the research team has no way to identify your data and therefore cannot exclude it. The anonymous information you provided may be retained indefinitely. Withdrawing will not disadvantage you on the care you receive at the clinic.

Do I have to take part in the study?

No. Taking part is voluntary and if you do not want to take part you can just say this to the project coordinator, Sara Mesquita. This will not have any disadvantage or risk on the care you will be provided at the clinic and none of the doctors will know about your decision. You can also ask for support from the clinic counsellor during the decision-making process about continuing or discontinuing treatment.

What are the possible disadvantages of taking part in this study?

There are some questions in the written questionnaires that could cause upset or distress because the questionnaires concern thoughts and feelings about the experience of fertility problems. Due to the sensitive nature of the study, it is likely that you might be upset. If

participating in our research study causes any concern about your health or your emotions please contact the BCRM nurse specialist Patricia Cullen (please find the contacts below) or the BCRM Counsellor Wendy Martin (please find the contacts below). You can also contact a member of the research team, Prof Boivin (Health Psychologist registered with the Health Professions Council, please find contact details below) to discuss your concerns. You can find more about negative emotions and a range of mental health problems on the NHS Mental Health Choices Website:

http://www.nhs.uk/nhsengland/NSF/pages/Mentalhealth.aspx. You can also find a support group for people with fertility problems on http://www.infertilitynetworkuk.com, including a group for people that do not achieve the goal of parenthood:

http://www.infertilitynetworkuk.com/more_to_life.

What are the possible benefits of taking part?

We cannot promise the present study will help you but the information we get from this study will possibly help to understand what influence people to continue fertility treatments.

What happens when the research study stops?

When the study stops you will not receive more questionnaires to fill.

What should I do if there is a problem during my participation?

Any complaint about the way you have been dealt during the study or any possible harm you might suffer will be addressed. The detailed information on this is given in part 2 of the information sheet.

Will my participation in this study be kept confidential?

Yes. We will follow ethical and legal practice and all information about will be handled in confidence. Please see the details in Part 2.

Part 2 of the information sheet

What will happen if I don't want to carry on with this study?

If you decide you don't want to carry on the study, you can withdraw your data up until it becomes fully anonymised and not after that.

What should I do if there is a problem during my participation?

Complaints

If you have any problem or any concern about our study, please contact the researchers who will do their best to answer your questions (029 208 70479). If you remain unsatisfied or want to complain in a formal way, you can contact the Advice and Complaints Team (ACT) at North Bristol NHS Trust (0117 323 3741). Please see contact details below.

Harm

In the event that something does go wrong and you are harmed during the research due to someone's negligence you can contact the Sponsor Organization (Cardiff University) of the present research study in order to ask for an insurance/indemnity (029 20 879131).

Will my participation in this study be kept confidential?

The information you provide in the present study will not be anonymous because we will need to link your responses from the first, second and third stage questionnaires. But in order to protect your information we will use a coding scheme to label your data during the sample collection process by linking a specific code (participant number) to your name. This code will be kept separately from the data in a locked space of the School of Psychology (Cardiff University) and only the project researchers (Sara Mesquita, Sofia Gameiro) will have access to that locked space. The link between name and number will be destroyed once the data collection is complete (12 months after filling the first study questionnaire) and then your information will be fully anonymous. You can withdraw your data up until it becomes

fully anonymised and not after that. The data will be retained anonymously by the research team until the end of the present study.

The research team will also ask a BCRM staff member to extract some of your medical records (your diagnosis, the previous treatments you did and the current treatment you are undergoing) but only if you agree and give your permission in the study consent form. If you authorize the access to your medical records by a BCRM staff member, it will be looked and stored by the Cardiff University research team (Sara Mesquita, Sofia Gameiro and Jacky Boivin). These data will be collected and also anonymised once the sample collection is finished and will only be identified by your participant code number. These data will be kept safe in a locked computer which belongs to the School of Psychology, Cardiff University.

What will happen to any data I give?

The data you provide in the three questionnaires will be linked and we will use a coding scheme to label your data during the sample collection process by linking a specific code (participant number) to your name. This code will be kept separately from the data in a locked space of the School of Psychology (Cardiff University) and only the project researchers (Sara Mesquita, Sofia Gameiro) will have access to that locked space. The link between name and number will be destroyed once the data collection is complete (12 months after filling the first study questionnaire) and then your information will be fully anonymous. You can withdraw your data up until it becomes fully anonymised and not after that. The data will be retained anonymously for use until the end of the present study.

What will happen to the results of the present study?

The results of the present study will be published in peer reviewed health journals. You cannot be identified in any of those report or publications. We will send you a summary of the results if you indicate that you would like to receive it.

Who is organising and funding the research?

Sara Mesquita (PhD student in the School of Psychology, Cardiff University) is conducting the research with the supervision of the Chief Investigator, Dr Sofia Gameiro (School of Psychology, Cardiff University) and Professor Jacky Boivin (School of Psychology, Cardiff University). Cardiff University is the official Sponsorship of the present study. Sara Mesquita (PhD student of the research team) was awarded with a scholarship by the Portuguese Foundation for Science and Technology (FCT) to conduct this research.

Who has reviewed the research project?

All research in the NHS is looked at by independent group of people, called Research Ethics Committee, to protect your interests. This study has been reviewed and given favourable opinion by the NRES Committee South West – Frenchay REC.

Further Information and Contact details

Research team contact

Sara Mesquita, MSc
PhD Student   Sofia Gameiro, Ph.D. Lecturer
                                                             Jacky Boivin, Ph.D. Professor
School of Psychology, Cardiff University, Tower   School of Psychology, Cardiff University, Tower
Building, Park Place, Cardiff, CF10 3AT.   Building, Park Place, Cardiff, CF10 3AT.
Tel: +44(0)29 208 70479   Tel: +44(0)29 208 75376
Email: DaSilvaSM@cardiff.ac.uk   Email: gameiros@cardiff.ac.uk

If you have any concern about your health or your emotions, please contact :

BCRM Nurse Specialist   **BCRM Counsellor**

Patricia Cullen,   **Wendy Martin,**
North Bristol NHS Trust   North Bristol NHS Trust
Trust Headquarters   Trust Headquarters
Southmead Hospital   Southmead Hospital
Southmead Road   Southmead Road
Westbury-on-Trym   Westbury-on-Trym
Bristol   Bristol
BS10 5NB   BS10 5NB

Tel: +44(0) 0117 323 2067   Tel: +44(0) 0117 3232005

If you want to complain formally please contact:

North Bristol Trust
North Bristol NHS Trust
Trust Headquarters
Southmead Hospital
Southmead Road
Westbury-on-Trym
Bristol
BS10 5NB
Advice & Complaints Team (ACT)
Beaufort House, Beaufort Way   Tel: 0117 323 3741
Southmead Hospital,
Southmead, Bristol BS10 5NB   Tel: 0117 323 3076
                                           Tel: 0117 323 6646
                                           Fax: 0117 323 6561
                                           Email: complaints@nbt.nhs.uk

Sponsor Organisation (insurance/indemnity)
Mr Chris Shaw
Research Governance Coordinator
Research, Innovation and Enterprise Services
Cardiff University
30-36 Newport Rd
Cardiff CF24 0DE
029 20 879131
email: resgov@cardiff.ac.uk

1st Study Questionnaire

(only questions relevant to Chapter 4 are included below)

> **Couple ID Number**: _____
>
> Name: _____
>
> Gender: _____

SOCIO-DEMOGRAPHIC AND CLINICAL INFORMATION

Socio-demographic information

1. **Gender:** _____

2. **How old are you?** _____

3. **How long have you and your partner been living together?**
   _____

4. **What is the highest level of education you have achieved?**
   _____

5. **Professional Status:**
   [ ] Employed   [ ] Not Employed   [ ] Retired   [ ] Student

Medical History

1. **Do you have biological children** (by biological we mean genetically your own)**?**
   [ ] Yes   [ ] No

   If YES, please state how many: _____

2. **Do you have adoptive children?**
   [ ] Yes   [ ] No
   If YES, please state how many: _____

3. **How long have you been trying to get pregnant?** _____ years and
   _____ months

4. **How long have you waited before seeking medical help**? _____ years
   and _____ months

5. **Before being followed at BCRM, had you ever seek any fertility
   treatment at another clinic (please do not consider the treatment cycle
   you are about to start)?**

   [   ] Yes   [   ] No

6. **If yes, please indicate the number of treatment cycles you did (you can
   tick more than one):**

   [ ] Ovulation Induction (OI) (number: _____)

   [ ] Artificial Insemination (IUI) (number: _____)

   [ ] In Vitro Fertilization (IVF) (number: _____)

<u>Treatment</u>

1. **Have you already started to take the hormonal stimulation prescribed by
   the Bristol Centre for Reproductive Medicine (BCRM) doctor?**

   [   ] Yes   [   ] No

   If yes, how many days ago? _____

2. **Are you covering the expenses for the treatment yourself**?

   YES [   ]   NO [   ]

3. **Concerning the treatment cycle you are about to start, are you
   undergoing third party reproduction (by third party reproduction we
   mean using sperm donation, eggs donation or embryo donation)?**

   YES **[   ]** NO [   ]

PERCEIVED GOAL BLOCKAGE

How blocked do you feel in your goal of becoming a parent?

While some people achieve biological parenthood spontaneously, other people (like you) face obstacles when trying to achieve parenthood goal and need to seek fertility treatment. Obstacles to goal achievement are named as a situation of goal blockage. Please indicate on a response scale where "1" means you do not feel your parenthood goal to be blocked and "7" means you feel your parenthood goal is completely blocked.

Not Blocked						Completely Blocked
1	2	3	4	5	6	7

CHILD-WISH

To what extent do you want to become a parent?

Please indicate on a response scale where "0" means you do want it at all and "10" means you want it very much.

Not at all										Very much
0	1	2	3	4	5	6	7	8	9	10

GOAL DISENGAGMENT AND REENGAGEMENT SCALE

During their lives people cannot always attain what they want and are sometimes forced to stop pursuing the goals they have set. We are interested in understanding how you usually react in what respects to your goal of becoming a parent. **Please indicate the extent to which you agree or disagree with each of the following statements, as it usually applies to you.**

If I have to stop pursuing parenthood goal...	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
It's easy for me to reduce my effort towards the goal.	1	2	3	4	5
I convince myself that I have other meaningful goals to pursue.	1	2	3	4	5
I stay committed to the goal for a long time; I can't let it go.	1	2	3	4	5
I start working on other new goals.	1	2	3	4	5
I think about other new goals to pursue.	1	2	3	4	5
I find it difficult to stop trying to achieve the goal.	1	2	3	4	5
I seek other meaningful goals.	1	2	3	4	5
It's easy for me to stop thinking about the goal and let it go.	1	2	3	4	5
I tell myself that I have a number of other new goals to draw upon.	1	2	3	4	5
I put effort toward other meaningful goals.	1	2	3	4	5

<u>HADS</u>

This questionnaire will help us knowing how you are feeling. Please read every sentence and place an **"X"** on the answer that best describes how you have been feeling during the last week. You do not have to think too much to answer. In this questionnaire, spontaneous answers are important.

I feel tense or wound up	☐ Most of the time ☐ A lot of time ☐ From time to time ☐ Not at all
I still enjoy the things I used to enjoy	☐ Definitely as much ☐ Not quite so much ☐ Only a little ☐ Hardly at all
I get a sort of frightened feeling as if something awful is about to happen	☐ Very definitely and quite badly ☐ Yes, but not too badly ☐ A Little but it doesn't worry me ☐ Not at all
I can laugh and see the funny side of things	☐ As much as I always could ☐ Not quite as much now ☐ Definitely not so much now ☐ Not at all
Worrying thoughts go through my mind	☐ A great deal of time ☐ A lot of time ☐ From time to time but not too often ☐ Only occasionally
I feel cheerful	☐ Not at all ☐ Not often ☐ Sometimes ☐ Most of the time
I can sit at ease and feel relaxed	☐ Definitely ☐ Usually ☐ Not often ☐ Not at all
I feel as if I am slowed down	☐ Nearly all the time ☐ Very often ☐ Sometimes ☐ Not at all
I get a sort of frightened feeling like butterflies in the stomach	☐ Not at all ☐ Occasionally ☐ Quite Often ☐ Very often
I have lost interest in my appearance	☐ Definitely ☐ I don't take as much care as I should ☐ I may not take quite as much care ☐ I take just as much care as ever
I feel restless, as I have to be on the move	☐ Very much indeed ☐ Quite a lot ☐ Not very much ☐ Not at all
I look forward with enjoyment to things	☐ As much as I ever did ☐ Rather less than I used to ☐ Definitely less than I used to ☐ Hardly at all
I get sudden feelings of Panic	☐ Very often indeed ☐ Quite often ☐ Not very often ☐ Not at all
I can enjoy a good TV or radio program or book	☐ Often ☐ Sometimes ☐ Not often ☐ Very Seldom

2nd Questionnaire

(only questions that were not included in the first study questionnaire are stated below)

1. **You have completed a first questionnaire before doing a treatment cycle at BCRM, around 2 months ago. Have you completed that treatment cycle?**

   YES [ ]

   NO [ ]

2. **If yes, did you achieve a pregnancy as a result of the cycle you did at BCRM?**

   YES [ ]

   NO [ ]

3. **Did you undergo any treatment cycle at other clinic(s) after doing the treatment cycle at BCRM?**

   YES [ ]

   NO [ ]

4. **Did you achieve a pregnancy as a result of the cycle(s) you did at other clinic(s) or spontaneously?**

   YES [ ]

   NO [ ]

DEBRIFING

ABOUT THIS STUDY

Thank you for participating in this study, it is important to remember that your data will not be held anonymously. However, in order to protect your information during the research study realization, the responsible for this research study (Sara Mesquita and Sofia Gameiro) will use a coding scheme by linking your name to a code (participant number). At the end of the data collection (12 months after filling the first study questionnaire), that link will be destroyed and then your information will be fully anonymous. You can only withdraw your information until it is fully anonymised and not after. This information may be retained indefinitely.

You completed questionnaires that measured your perception of how much your goal of parenthood is blocked, your ability to let go of blocked goals and start to pursue new goals (e.g. career), as well as measures of coping, wellbeing and goal-related.

There are some questions in the written questionnaires that could make you think about some negative emotions (such as anxiety and sadness). If participating in our research study causes any concern about your health or your emotions please contact the BCRM nurse specialist Patricia Cullen (please find contacts below) or the BCRM Counsellor Wendy Martin (please find the contacts below). You can also contact Prof Boivin (Health Psychologist registered with the Health Professions Council), please find contact details below to discuss your concerns. You can find more about negative emotions and a range of mental health problems on the NHS Mental Health Choices Website:

http://www.nhs.uk/nhsengland/NSF/pages/Mentalhealth.aspx. You can also find a support group for people with fertility problems on http://www.infertilitynetworkuk.com, including a group for people that do not achieve the goal of parenthood:

http://www.infertilitynetworkuk.com/more_to_life.