Strategic Use of Nonverbal Behaviour in the Context of Romantic Attraction

by

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DOCTOR OF PHILOSOPHY

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DECLARATION

This work has not previously been accepted in substance for any degree and is not concurrently submitted in candidature for any degree.

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This thesis is the result of my own independent work/investigation, except where otherwise stated. Other sources are acknowledged by explicit references.

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Summary of Thesis

The main objective of this thesis is to demonstrate that individuals strategically change their facial expressions and other emotional behaviour in order to enhance their image in the eyes of a potential romantic partner. In three empirical chapters I report eight studies examining four different effects. The first two of these effects concern female self-presentational behaviour (Chapters 2 and 3), while the second two concern male self-presentational behaviour (Chapter 4).

More specifically, in Chapter 2 I provide evidence for the hypothesis that when in a romantic mindset, females show less negative emotion to infants. In Chapter 3, I demonstrate that females motivated to attract a long-term partner present themselves in ways that suggest that they are likely to be faithful. Finally, in Chapter 4, I show that in the presence of an attractive female, males present themselves as fearless in reaction to a horror film and as affectionate towards children. I argue that positive reactions to infants, propensity to be faithful and fearlessness are advertised because they are desired by the opposite sex for various evolutionary reasons.

The data I present also show that – with one exception – the presence of a potential romantic partner does not affect participants' emotional experiences despite affecting their emotional expressions. Thus, for example, when males augment their expression of affection towards infants, their feelings towards the infants do not change. Overall, the work described in this thesis adds to the growing body of research showing that individuals engage in self-presentation in romantic contexts using various social and non-social behaviours (Mori, Chaiken, & Pliner, 1987; Griskevicius, Cialdini, & Kenrick, 2006), by showing that they engage in self-presentation using nonverbal behaviour associated with emotional states.

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Chapter 1: Introduction

In this thesis I investigate the way individuals change their emotional reactions to various events and stimuli in order to appear as more desirable to attractive members of the opposite sex. This topic is interesting for several reasons. First, it draws on the recent theoretical advance in the study of emotion that, among other things, provided a framework for studying strategic emotional behaviour (Manstead & Fischer, 2001). Second, it adds to the empirical body of research on strategic use of emotion by concentrating on the dimension of emotion that is notoriously laborious to investigate, i.e., facial behaviour. Third, because I derive hypotheses about the contents of emotional self-presentational behaviour from evolutionary theory, it brings together the two areas of research (emotion research and evolutionary psychology) in a way that has not yet been done: Evolutionary psychology is usually invoked by emotion researchers when they ponder the *origins* of emotions, but not when they theorise about the day-to-day manifestations of emotions.

In the present chapter I provide the theoretical background to my work. I start with a brief account of selected classic theoretical perspectives on emotion. I then give an account of appraisal theory and social appraisal theory. In the final section I describe the key points in evolutionary psychology that relate to this work.

Classic Perspectives on Emotion

Darwin: Expressions as Vestiges

The first attempt to provide a functionalist, non-creationist explanation of emotional expressions was, famously, made by Darwin (1872/1965), who argued that expressions are remnants of actions that had often been associated with a particular emotional state in the past. For example, a domesticated dog doubles up its front leg and keeps it still when in the state of concentration, because in the evolutionary past

the state of concentration usually featured a prey that would be easily scared away by the sound of an incautious step. For Darwin, expressive action is not designed to *communicate* internal states; rather, it is performed to satisfy a certain need or to relieve a certain desire that had arisen because of the presence of an emotionally relevant stimulus.

Thus, Darwin provided an explanation of how expressions might have emerged in the first place, but he did not think it important to provide an adequate reason for why they are *still* present. This is a substantial oversight, because there are, at times, significant costs associated with the production of emotional expressions; for example, communicating an intention to attack when the intention is to kill rather than to scare off is costly, because it gives the would-be victim time to gauge itself (Fridlund, 1992). In the absence of a *currently useful* function, these costs would have created a strong selection pressure against the production of emotion-related facial movements, which would have eventually eliminated these movements from the repertoire of human behaviour.

Ekman: Expressions as Read-Outs

Influenced by Darwin's ideas about the functional significance of emotions, as well as ideas of classical ethology about the fixity of behavioural responses (Tinbergen, 1953), Ekman (1971) postulated that emotions are stereotyped behavioural tendencies that evolved for their adaptive value and are initiated whenever relevant triggers capable of influencing one's welfare are present in the immediate environment. For Ekman there are only 6-7 such basic 'affect programs' (Tomkins, 1962) and they include anger, happiness, surprise, fear, sadness, and disgust/contempt. These emotions are heritable, and they appear very early in development, with no social modelling or reinforcement necessary. The expressions

of these emotions are recognized universally, independently of culture or levels of literacy (Ekman & Friesen, 1971). In fact, one of the criteria for an emotion to be called 'basic' is that it has a distinctive, recognizable expression associated with it (Ekman, 1999). Because the expressions that Ekman describes involve simultaneous contractions of several facial muscles (Ekman & Friesen, 1986), it is clear that in his view *facial configurations*, rather than single facial actions are indicative of particular emotions (Kaiser & Wehrle, 2004). In this framework the variability in expressions of emotions is explained in terms of socially constructed display rules (Ekman & Friesen, 1969) that modify 'true,' biologically determined universal expressions and tailor them to the social demands of the society in which individuals find themselves.

Although Ekman's conceptualization of emotion is intuitively appealing, his claim about high degree of cohesion between experiential and expressive systems has not found much empirical support (Frank & Stennett, 2001; Fridlund, 1996; Motley & Camden, 1988; Russell, Bachorowski, & Fernandez-Dols, 2003). Levels of observed variability in expressions led Ekman to introduce some developments of his original model. For example, he subsequently conceded that each emotion can be associated with dozens of expressions (Ekman & Friesen, 1978; Ekman & O'Sullivan, 1991) and excluded expression from the enumeration of the primary attributes of emotional experience (Ekman, 1994), implying that emotions may occur without any facial 'read-out' of the internal state.

This de-emphasis of the link between emotion and expression suggests that, in his view, expressions are not adaptations in themselves, because emotions can still perform their adaptive function without producing any expressive 'read-outs'. Thus, like Darwin, Ekman views expressions as by-products of emotional experience and he is not primarily concerned with their communicative value (Ekman, 1997). He

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postulates that emotional experiences are adaptive but does not give the same status to expressions.

Fridlund: Expressions as Social Motives

In response to Ekman's theory and its various limitations (for a review see Russell et al., 2003), Fridlund (1994, 1996) developed his *behavioural ecology view*, which maintains that expressions signify social motives that convey probable trajectories of organism's behaviours in the immediate future, and that expressions are not directly related to internal feelings. Letting intentions be known has a very clear function according to Fridlund. In a combat situation, for example, it is more adaptive for both the likely winner and the likely loser to establish their positions (through the use of nonverbal behaviour) without incurring the costs of engaging in an actual fight.

The usual critique of the behavioural ecology view is that humans often express emotions when there is no audience present; however, Fridlund argued that even when we are alone our displays remain *implicitly* social. We treat ourselves, animals, or even physical objects as interactants. He demonstrated that the sociality of the situation predicted the intensity of resulting expressions (Fridlund, 1992), and thus questioned the utility of studying emotional experiences for understanding of emotional communication.

In sum, Fridlund views facial displays as functional, but purely social in nature: He denies emotional experiences the status of a mechanism responsible for engendering expressions.

Appraisal Theory

Appraisal theory has its roots in the work of Arnold (1960), who was one of the first modern thinkers to recognize that emotions are always directed at an object. Since objects need to be cognized by organisms in a very particular way in order to

have an impact on their internal processes, Arnold argued that objects are evaluated,

or *appraised*, in addition to being merely perceived. Arnold's work was further

developed by Lazarus (1991) in his cognitive-motivational theory of emotion. The

theory was partly a response to the early emotion theories (James, 1894; Watson,

1919) that assumed the primacy of emotional reaction to cognitive evaluation. In

order to differentiate his views from these earlier theories, Lazarus coined the slightly

tautological term *cognitive appraisal*.

Appraisal researchers investigate the cognitive evaluations that trigger the

process of emotion. Appraisal theories are varied and sometimes contradictory in

nature, but they all share the same core assumptions. They maintain that cognitive

evaluations of a situation depend on the meaning of the situation to an agent, and that

these evaluations cause emotional experiences. They also maintain that if two people

make identical appraisals, they will feel the same emotion (Ellsworth, 1994), because

each emotion is associated with a particular 'appraisal profile'. Finally, they assume

that there are an infinite number of emotions that can be experienced.

Roseman's (1991, 2001) approach is a good example of an appraisal theory.

He describes seven dimensions of appraisals that, he argues, differentiate at least 17

distinct emotions. These appraisals include evaluations of whether an event (i) is

motivationally consistent; (ii) caused by self/other/circumstances; (iii) is expected;

(iv) is probable; (v) can be controlled by the agent; (vi) involves positive or negative

reinforcement (appetitive/aversive motive); and (vii) is pleasant/aversive because of

its intrinsic or instrumental qualities. Thus, sadness, for example, is felt when the

situation is appraised as not unexpected, motivationally inconsistent, blocking

positive reinforcement (appetitive motive), highly probable, and when the agent has

low control over the outcome. If the appetitive motive in sadness is changed to aversive motive (punishment), the emotion changes to distress.

Appraisal theory is often called 'relational' (Campos, Mumme, Kermoian & Campos, 1994; Lazarus, 1991), because it investigates the relations of individuals' goals to specific features of an emotion-provoking event. This feature of the appraisal theory is both its strength and its weakness. It is a strength because it explains why one and the same event can give rise to different emotions in different people. It is a weakness because the relations concern the meaning of the *event* to an agent and do not involve the contributions of a social setting to emotional experiences. Naturally, the implicit assumption about the a-sociality of emotional *experiences* leaks over to emotional *expressions*. Indeed, appraisal theory shares with Ekman's approach the implicit assumption that expressions are determined by internal events and are largely impervious to the influence of other people present.

Like Ekman (and unlike Fridlund), appraisal researchers (e.g., Kaiser & Wehrle, 2001, 2004) maintain that facial expressions have intrapersonal rather than interpersonal causes. However, unlike Ekman, who argues that it is *configurations* of facial movements that carry decodeable meaning, some appraisal researchers (Kaiser & Wehrle, 2004) argue that every facial action has a meaning of its own and that each one is determined by a specific dimension of appraisal. Researchers adhering to this so-called 'componential approach' have succeeded in showing that some minimal movements of the face are associated with certain appraisals. For example, depressing lip corners and frowning are associated with appraisals of low control potential and goal obstacles, respectively (Scherer, 1984). Within this general approach, it is appraisals of the event rather than of the social context that produce corresponding movements in the face.

Thus, appraisal theories tend to undervalue the influence of other people both on emotional experiences and emotional expressions. Human beings are a social species (Dunbar, 1996), and they depend on communication with conspecifics for their day-to-day survival as well as for their mental well-being. This makes it unlikely that emotions would be unresponsive to the social environment. It is therefore not a surprise that studies exploring the cross-cultural variability in the association between appraisal and emotion usually find that appraisals account for only about 30-40% of the variance in emotions (Frijda, 1995; Smith & Lazarus, 1993).

<div style="text-align:center">Social Appraisal Theory</div>

Building on these and similar critiques of appraisal theory, the concept of "social appraisal" was proposed by Manstead and Fisher (2001), who argued that "behaviors, thoughts or feelings of one or more other persons in the emotional situation are appraised in a addition to the appraisal of the event per se" (p. 222). They distinguished two distinct types of social appraisal: (i) appraisal of another's reaction to a shared emotional event, a process that may lead to assimilation of other's reactions into one's own experience; and (ii) appraisal of the possible social implications of the emotions that we may project, a process that may strategically shape the expression of emotion. Thus, social appraisal can affect both emotional experience and expression (Manstead & Fischer, 2001).

Figure 1 is a schematic representation of various appraisal relations between two agents and an emotional event. Notice that in contrast to classic theories of emotion (James, 1884; Ekman, 1971; Fridlund, 1992; Scherer, 1987, and others), which implicitly assume that the object of an emotion (i.e., the event which gave rise to the emotion) *is* the sole audience of emotional expressions (i.e., the agent at whom emotional expression is directed), social appraisal theory of

emotion explicitly differentiates between the two. The trigger may or may not be

one and the same as the recipient and for the sake of conceptual clarity it is better

to treat them as separate entities.
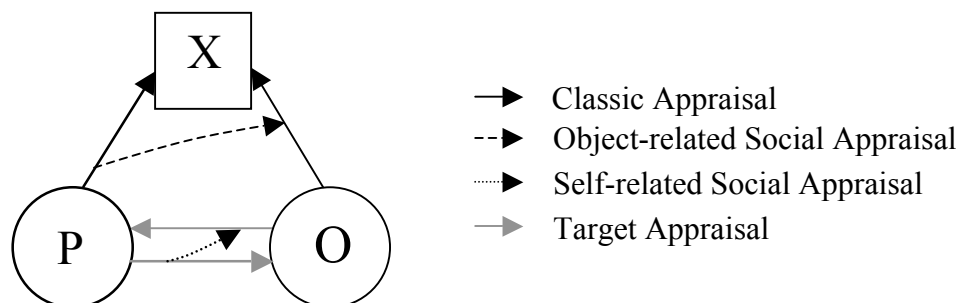
Figure 1. Types of appraisals (adapted from Bruder, 2007)

In Figure 1, P is an agent, X is the situation/object that P appraises as

emotional, and O is another agent, whose appraisals P takes into account. Solid black

arrows denote agents' appraisals of the trigger X, and solid gray arrows denote

agents' appraisals of each other (these appraisals may not be strictly speaking

emotional in nature). Dashed and dotted arrows represent the two types of social

appraisal: the dashed arrow is P's appraisal of O's appraisal of X (such *object-related*

social appraisal may under some circumstances lead to emotional convergence); the

dotted arrow is P's proactive appraisal of possible O's appraisals of P (*self-related*

social appraisal that may strategically shape the expression of emotion).

In self-related social appraisal (dotted arrow), individuals appraise the

potential social reactions to their possible emotional expressions; this route is pro-

active in nature and is temporally displaced. Note that this type of appraisal is

about strategic self-presentation, because there is no point in assessing possible

reactions of O if one is unable to modulate one's behaviour in light of the

assessment.

Thus, social appraisal theory emphasises the socially constructed nature of emotional experiences *and* expressions, thereby bringing the communicative value of nonverbal behaviour to the forefront of emotion research. Unlike earlier theories that attempted to emphasise communicative value (Fridlund, 1994), Manstead and Fischer (2001) do not deny that non-social factors have substantial explanatory power in addition to social factors.

Some Evidence for Social Appraisals

There is much evidence that is consistent with social appraisal theory. For example, adults tend to 'catch' other persons' emotions through unconscious mimicking of facial expressions (Hatfield, 1991). Young children, too, imitate the emotional expressions of their caregivers (e.g., Haviland & Lewicka, 1987). Likewise, children of 10 to 20 months of age who witness inter-parental aggression exhibit anger-like emotional states (Cummings, Zahn-Waxler, & Radke-Yarrow, 1981).

In another line of research, Festinger (1954) argued that individuals are motivated to check their opinions and attitudes against those held by other people, engaging in social comparison. Schachter (1959) extrapolated this idea to include emotions. He argued that people actively search for information about other people's emotional reactions in order to make sense of their own experiences. In their famous experiment, Schachter and Singer (1962) showed that unexplained physiological arousal can be perceived as anger or euphoria by participants depending on the way the confederate in the study behaved in reaction to the shared emotional trigger. These findings imply that our appraisal of an emotional event is dependent, at least to some degree, on appraisals made by other people.

There is also some emerging direct evidence for the social appraisal theory

of emotion. Bruder (2007) investigated object-related social appraisal. He found

that people's emotional reactions and appraisals of emotional events converge

with emotional reactions and appraisals of significant others. Evers, Fischer,

Mosquera, and Manstead (2005) demonstrated the workings of self-related social

appraisal. They showed that angered females (but not males) who expected to

meet their offender expressed less anger (as measured by the amount of hot sauce

participants elected to give to the offender for compulsory consumption) than

females who did not have such an expectation. Thus, females, who tend to care

about social relations more strongly than males, expressed anger only when it

could not damage their future interactions. As predicted by the authors, social

appraisal in this study partially mediated the link between sex and the expression

of anger.

<div align="center">The Present Research</div>

Emotional Expressions. Emotional behaviour can be said to consist of two

dimensions: action tendencies and emotional expressions (Parkinson, 1995). Even

though in this thesis I examine both of these dimensions, I place particular emphasis

on emotional *expressions*. The reason for this unequal treatment is that there is a

scarcity of experimental evidence when it comes to the way emotional expressions are

used to achieve social goals. The few studies that attempted to investigate strategic

emotions prior to social appraisal theory being proposed have various drawbacks.

Some concentrated on self-report. For example, Timmers, Fischer and Manstead

(1998) showed that women are more likely to *report* that they would express

'powerless' emotions such as sadness and fear, because they are in accord with

female motives of enhancing social relations, whereas men are more likely to *report*

that they would suppress these emotions and to exhibit 'powerful' emotions such as

anger and disappointment, because the latter are in accord with males' motivation to stay in control (see also Clark, Pataki & Carver, 1996). Others (e.g., Buss & Kiel, 2004) relied on the judgments of lay observers, who coded the affective content of behaviours rather than facial behaviour itself. Still others (e.g., Devereux & Ginsburg, 2001; Fridlund, 1991; Kraut & Johnson, 1979) investigated strategic behaviour only in the broadest of senses, by looking at the way the sociality of emotional episodes affected nonverbal behaviour. Thus, there is a lack of research when it comes to strategic facial behaviour and one of the main objectives of this thesis is to fill this gap.

Romantic Context. As explained above, the context of self-presentation of emotions that I investigate in this thesis is that of romance. This choice was determined by two practical considerations. First, romance is a context that university students (my main source of participants) can easily relate to. Second, there is ample literature showing that individuals do impression manage to gain favour of potential romantic partners. For example, Mori, Chaiken and Pliner (1987) found that females eat less in the presence of attractive males in order to appear more feminine, and Zanna and Pack (1975) found that females presented themselves as more modern or more traditional, depending on attractive male's preference.

Before investigating the way social goals change individuals' behaviour, one needs to have a thorough theoretical rationale for why a certain social goal would produce certain strategic behaviour (Leary & Kowalski, 1990); in other words, one needs to have hypotheses about the *contents* of self-presentational behaviours. In the next section I describe the basic principles of evolutionary psychology, the theoretical perspective from which I derive my hypotheses.

Evolutionary Theory

Every empirical chapter (Chapters 2 – 4) in this thesis starts with an account of the evolutionary rationale for the hypothesis investigated in that chapter. Here, therefore, I provide only a brief introduction to the key points of evolutionary theory that are relevant to the present work.

Types of Selection

Evolutionary theory assumes that human beings, like other species, have evolved through a process of differential survival and reproduction of organisms (Dawkins, 1999; Buss, 1999). This process, known as natural selection, is the race of each species against its environment, because organisms that are not up to the task of dealing with challenges presented by their environment are unlikely to survive for long or to reproduce successfully. It is important to note that an *environment* is not completely exogenous to species it acts upon. If it were, male and female morphologies would have been as similar as they can be, given different roles in creation of embryos, and we would not have witnessed such sexually dimorphic traits as the peacock's tail or the deer's antlers; after all, both male and female ancestral members of these species would have been faced with exactly the same environmental pressures.

However, sexual dimorphisms do exist (Berglund, Bisazza & Pilastro, 1996), and they can be explained only if we broaden the definition of *environment* to incorporate the behaviour of other organisms in the species, especially the behaviour of opposite sex conspecifics, or those organisms that are vital for our ability to reproduce. Known as sexual selection, this process is a special case of natural selection and is defined as differential reproduction of organisms based on their ability to obtain mates (Trivers, 1972). In species with low paternal investment, this

type of selection involves two processes (Darwin, 1871/2004; Trivers, 1972): (i) male

intra-gender competition for sexual access to females; and (ii) female choice as to

which males to mate with. When paternal investment is high males have more to lose,

so they also become 'choosy,' which means that females in such species also engage

in intra-gender competition.

Reproductive Goals and Obligatory Contributions

The ultimate purpose of mating is the production of viable offspring that are

likely to reproduce themselves. The absolute minima that the two sexes need to do in

order to achieve this end are highly asymmetric in humans. Not only do females

produce larger gametes than males; they are also obliged to go through a lengthy

period of internal gestation following conception.

Simple logic suggests that the sex that has invested less and has an opportunity

to desert first will be tempted to do so, especially in species like humans where

internal fertilization renders paternity uncertain (Buss, 1999). If deserted, the parent

who invests more is left in a *cruel bind*. She stands to lose more if the offspring does

not survive (Trivers, 1972), so she can pay all the costs of raising the child to

maturity; or she can or abandon the child, condemning it to an almost certain death,

thereby allowing her prior investment go to waste.

From this perspective, it makes sense that males are generally more open to

casual sexual encounters than females (Clark & Hatfield, 1989). Unlike females,

males have a lot to gain from sexual variety. Male reproductive success is limited

only by the number of females he can mate with, whereas female reproductive

success is limited by the number of offspring she can raise to maturity.

In a nutshell, the differential minimum obligatory investment leads to a

differential cost-benefit analysis, which in turn gives rise to different sexual strategies.

It is worth noting that the minimal obligatory investment only determines the nature of preferred strategies. It is the actual parental investment that plays a bigger role in determining which strategies are chosen. When male parental investment is high, males' cost-benefit analysis becomes increasingly like that of females.

Sexual Desires

However, it is not only parental investment but also parental genetic quality that affects the viability of the resulting offspring. Because genotypes are not directly observable, people have to rely on outward cues to genetic quality, like stature, quality of skin, teeth, odour, hair, gait, voice, breast size, and so on (Barrett, Dunbar, & Lycett, 2002; Feinberg et al., 2005; Luevano & Zebrowitz, 2007; Marlowe, 1997). Other things being equal, humans discriminate in favour of those who fare well on these dimensions (Scheib, Gangestad, & Thornhill, 1999): We attempt to selectively assort ourselves with physically attractive individuals.

The aforementioned asymmetry in minimal obligatory contributions to child-rearing moderates the importance the two sexes place on physical attractiveness. For example, given that the female's cost-benefit analysis predisposes her to be willing to invest in offspring, males have evolved to desire signs of genetic quality (physical attractiveness) and reproductive quality (age) and attach relatively less weight to the signs of maternal investment.

Unlike males, females have evolved to care about their partner's paternal investment, in addition to his genetic quality (Gangestad & Simpson, 2000; Pillsworth, Haselton, & Buss, 2004). They are thus attracted to males who exhibit signs of good genetic quality, and of ability to take care of offspring (i.e., having access to material resources), as well as of willingness to invest (Kenrick, Groth, Trost, & Sadalla, 1993).

Intersexual Deception and Self-Presentation

Patterns of deception and self-presentation in intersexual relations are consistent with the predictions of evolutionary theory. For example, Tooke and Camire (1991) found that in the beginning stages of relationships, males tend to exaggerate their dominance and emotional sincerity to convince their romantic partners that they are more desirable then they really are; whereas females tend to enhance their physical beauty in order to accomplish the same goal. Indeed, female beauty is such an important evolutionary force that women have evolved a physiological means to fake it to some extent. Fat in female bodies is more likely to be deposited in places like hips and breasts where it would easily be confused with signs of fertility (Low, Alexander, & Noonan, 1987). Pawlowski and Dunbar (1999) also showed the females were more likely to lie about their age. They found that older females who placed personal ads in the *Observer* concealed their age more often than did males. Even though these females offered less but demanded just as much as their younger counterparts, they were several times more successful in eliciting responses than females in the same age-range who declared their true age.

There is also ample literature suggesting that the predictions of evolutionary psychology regarding impression management during romantic encounters are supported by data. It has been shown, for example, that when in a romantic context, males describe themselves as more ambitious and report placing greater importance on financial success (Roney, 2003); become more likely to go against the crowd (Griskevicius, Goldstein, Mortensen, Cialdini, & Kenrick, 2006); and even become more creative (Griskevicius et al., 2006).

Overview of the Thesis

In the present research I examine whether facial expressions of emotion are used strategically to manipulate our image in the eyes of potential romantic partners. I derived hypotheses about the contents of the self-presentational behaviours from evolutionary theory, which provides information about what people value in potential romantic partners.

There are three empirical chapters in this manuscript. Chapters 2 and 3 deal with female strategic emotional behaviour, whereas Chapter 4 reports the investigation of similar dynamics in males. More specifically, in Chapter 2, I examine whether females modulate their reactions to infants in the psychological presence of an attractive male. In Chapter 3, I look at whether females distance themselves from unfaithfulness in other females. Finally, in Chapter 4, I examine two separate effects in males: projections of affection towards infants, and attenuation of fear while watching a horror film.

The primary objective of this research is to show that individuals change their emotional expressions as a function of their social goals. Even though the research was inspired by the social appraisal theory (Manstead & Fischer, 2001), my work is not specifically designed to test this theory. The major reason for this is practical. Previous research suggests that self-presentation in romantic contexts is often unconscious (e.g., Roney, 2003; see also Karremans & Verwijmeren, 2008). This makes theoretical sense because self-presentation is likely to be more convincing if the self-presenter acts strategically without being aware of doing so (Jones, 1964; Trivers, 2000). However, it also means that there is a serious methodological challenge to the quest to uncover the processes underlying such self-presentation. To test social appraisal theory directly one would need to measure participants'

appraisals of the social implications of the emotions being expressed. If these

appraisals operate outside awareness, measuring them is far from straightforward.

Chapter 2: Female emotional reactions to infants[1]

As explained in Chapter 1, I derive hypotheses about the contents of the impression management in the romantic context from evolutionary theory. Its basic tenet states that successful reproduction is the ultimate goal of the existence of any living organism, and humans are no exception (Symons, 1979). This theory allows for many predictions about what humans would want to advertise during courtship, because it states that humans will assort themselves selectively with members of the opposite sex who possess the traits that have been associated with successful reproduction over our evolutionary history. Directly or indirectly, these traits have been selected for because of their beneficial influence on the likelihood that offspring would survive and reproduce themselves. For example, female youth is highly valued (Feingold, 1990), because young females are more likely to bear children (Buss, 2007). Thus, because infants are at the centre of human reproductive efforts, we can expect that in the context of the initiation of certain types of romantic relationships, one of the ways humans will advertise their quality is through their emotional reactions to infants.

In altricial species like human beings, the young are not able to lead independent lives in the first few years of their lives; instead, they rely on parental care for food and protection. This neonatal dependency puts a strong selective pressure both on children, who need to successfully procure parental care, and on primary care-givers, who need to be affectionate enough to provide for their offspring. MacDonald (1992) argued that parental warmth is part of a human affectional system which promotes infant psychological well-being and facilitates their internalization of adult values. In extreme cases, lack of affective disposition

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[1] This chapter is partly based on Dosmukhambetova and Manstead (under review, b).

might lead to child rejection (Schaefer, 1959) which is associated with a plethora of developmental and behavioural problems for the rejected (Bor, Brennan, Williams, Najman, & O'Callaghan, 2003; Mayer, Lavergne, Tourigny, & Wright, 2007).

In adults, the evolutionary pressure to be affectionate should act more strongly on females, because as a consequence of the fundamental asymmetry in minimal obligatory parental investment (Trivers, 1972), it is they who are usually primary caregivers. Two different hypotheses regarding female self-presentation vis-à-vis infants can be derived from this proposition. First, one can argue that if females who feel affectionate towards children tend to do better in producing descendants than females who do not feel affectionate towards children, males should prefer females who demonstrate such a warm and affectionate disposition. This preference should motivate females to advertise their affectionate attitudes towards children during courtship. Thus, Hypothesis 1 is that *in the presence of an attractive male, females will project more nonverbal affection towards infants than in the presence of an unattractive male.*

On the other hand, one can argue that since female reproductive success is bound strictly by the number of children they can raise to maturity, the pressure to be affectionate towards infants is so strong for them that there is likely to be relatively little variation in this trait. This would imply that, until proven otherwise, males can safely assume that any particular female *would* be affectionate towards children, which would in turn imply that females should not waste their energy trying to prove that they are indeed affectionate. There is of course at least some variation in this trait, as evidenced by the fact that most infanticides are committed by mothers (Milner, 2000). Maternal filicide has been shown to be a function of environmental factors, such as socioeconomic status, marital status and age (Friedman, Horwitz, & Resnick,

2005); however, even if it is environmental factors that put females into the 'at risk' category, there is still room for dispositional factors to play a role in determining whether females would cross the boundary between simply being 'at risk' to being guilty of infanticide or infant neglect. This non-affectionate disposition towards children on the part of a female would limit male reproductive success, so males, especially those pursuing long-term reproductive strategies, should show a preference for females who *do not express* negative emotions towards children. Females should therefore attenuate negative emotions towards infants during courtship. Even though females are fond of infants to the degree that this fondness has become stereotypical, they are not unlikely to feel negative emotions towards children (Leygue, Maio, Gebauer, Karremans, & Webb, 2009), so there is a room for the attenuation of negative reactions even for females who are not at risk for being abusive or neglectful mothers. Thus, Hypothesis 2 is that *in the presence of an attractive male, females will attenuate negative reactions towards infants more than in the presence of an unattractive male.*

I conducted three studies to determine (i) whether females alter their emotional behaviour vis-à-vis infants when they find themselves in the presence of an attractive male, and (ii) whether they do so by expressing affection towards infants or by attenuating negative reactions towards them. In Study 1 I manipulated the psychological presence of an attractive male by showing participants different versions of their 'get acquainted' partner; I manipulated the presence of an infant by showing them a film of infants or a neutral film. The results of this study were encouraging and supportive of Hypothesis 1, but ultimately inconclusive, because the confederate manipulation was unsuccessful. In Study 2 I wanted to see whether the behaviour of the females in Study 1 had observable effects on their target audience, so

I showed the footage of the female participants from Study 1 to a number of males, who were asked to rate the females on a number of characteristics. The results of this study identified a confounding variable that was present in Study 1 and thus threw further doubt on the validity of its results. In Study 3, I improved on the manipulation of Study 1 and once again attempted to see whether a romantic mindset would affect female nonverbal behaviour vis-à-vis infants. In this study, I found support for Hypothesis 2, but not Hypothesis 1.

Study 1: Female expressions of affection towards infants

Method

Participants

Eighty-five female psychology students from Cardiff University took part in this experiment. Their average age was 19.95 years (SD = 2.29); 93% of the sample identified themselves as British, 6% as other European, and 1% as other. Thirty-seven per cent reported being single. Only one person reported being bisexual rather than heterosexual; her data was retained in the analysis because her scores did not differ substantially from the mean on any important measures.

Materials

Stimuli used. Two films, each 1 minute long, were prepared in advance of the study. Film 1 (infants film) was an edited version of the Pampers *Peace on Earth* commercial; it depicts sleeping infants with *Silent Night* playing over it; this film served as the target emotional stimulus. Film 2 (neutral film) was designed to be emotionally neutral. It was a recording of Amazonian rainforest with a peaceful classical music piece playing in the background.

Confederates. I pre-tested four potential confederates for physical attractiveness on a population of females (n = 14). A 15-second video of these males

was produced; their behaviour was scripted to include looking around the room,

looking into the camera and waving while giving a tentative smile. A 9-point scale

used ranged from 1 (*the least attractive person you have ever seen*) to 5 (*average*) to

9 (*the most attractive person you have ever seen*). Two males who received most

dissimilar ratings, $t(13) = 2.44$, $p = .022$, $d = 0.96$, were chosen to act as confederates

in this study. The average attractive confederate's attractiveness was 5.57 (SD =

1.91), while the average unattractive confederates attractiveness was 4.00 (SD =

1.47).

Procedure

After participants arrived at the laboratory and signed an informed consent

form they were given the following instructions:

We are interested in the way person-perception unfolds in time. There is

another participant in this session with whom you will get acquainted. There are

three parts in this study, each corresponding to stages of the development of a

relationship. First, you are going to see each other through the camera and

exchange basic information with each other; second, you will watch him watch a

film and then he will watch you watch a film; and at the third stage you will

actually meet. After each stage is complete, you will be required to provide your

evaluations of one another.

Your get-acquainted partner has already arrived and he is sitting in the next

room. It is important for us at this stage that you don't see each other in person

and that the setting is completely non-interactive. So, first you will see him

through the video and then he will see you, but you won't see each other at the

same time. In this way, your evaluations of each other will be uncontaminated by

your interaction.

After these instructions, participants were given the background information questionnaire to fill out. After about one minute the experimenter returned to the room, announced that it was time for the participants to see each other, adjusted the camera to point at the participant and left the room for about 40-50 seconds. During this time she played the video of the confederate. The experimenter then returned with a questionnaire probing participants' impression of their 'get-acquainted partner'; this questionnaire contained manipulation check questions. The experimenter gave the questionnaire to the participant to fill and then collected it after about one minute.

Each participant was told that she was chosen to go first in the second part of the study, so she would be the first to watch films while the 'other participant' would be watching her. The experimenter then left the room and participants viewed the two films (infants film and neutral film, counterbalanced); after they had finished, they filled out a questionnaire probing the emotional impact of the films (see Appendix 1). Finally, participants were debriefed and asked to sign the Video Release form that would allow the use of their data in future experiments.

Design

The design of the study was a 2(Confederate type: attractive vs. unattractive) * 2 (Film type: infants vs. neutral) factorial. Confederate type was a between-subjects factor, while film type was a within-subjects factor.

Results

Manipulation Checks

Film manipulation. Paired-sample t-tests revealed that participants were both happier, $t(75) = 6.20$, $p < .0000005$, $d = 0.69$, and more amused, $t(75) = 6.80$, $p < .0000005$, $d = 0.86$, while watching the infants film. In fact, when asked what they made of the neutral film in the debriefing, many participants put down comments like

'felt neutral about it' and 'relatively neutral'. Thus, this manipulation was considered to be successful.

Confederate manipulation. The manipulation check was included in the questionnaire distributed to participants after they have viewed the confederate on the video. The target items read: "The other person is physically attractive" and "The other person is a desirable romantic partner"; participants rated these items on a 5-point Likert scale ranging from *Strongly Disagree* to *Strongly Agree.*

Although the attractive confederate tended to receive higher scores on both measures, the effect of confederate type was not significant on either physical attractiveness, $t(82) = 0.23$, *ns*, $d = 0.05$, or desirability, $t(82) = 1.58$, $p = .12$, $d = 0.35$. Thus, our confederate manipulation was not successful.

In order to circumvent this problem I decided to use participants' ratings of confederates' physical attractiveness as the independent variable. This measure was used in preference to ratings of 'desirability as a romantic partner' for two reasons. First, even though strictly speaking it is a person's perceptions of another's desirability as a mate that should drive the effect of interest, when it comes to complete strangers physical attractiveness could be equated with desirability. Second, ratings of physical attractiveness are probably less susceptible to social desirability pressures than ratings of desirability as a mate, because they may be perceived to be more 'objective' and thus less consequential for self-image than the ratings of desirability.

It was not possible to use physical attractiveness ratings as a continuous variable because it was not normally distributed. Figure 2 shows that more than 76% agreed with the statement that 'the other person is physically attractive', while only 2 people disagreed with it and only 1 strongly agreed.
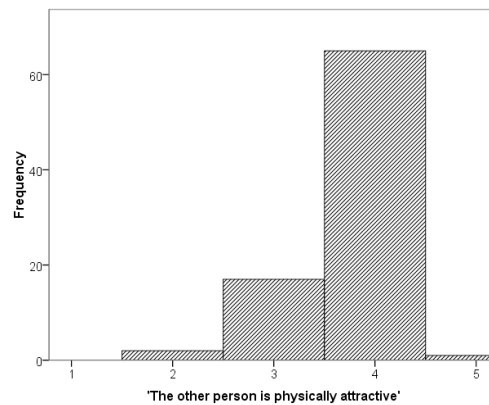
Figure 2. Frequency distribution of ratings of confederates' physical attractiveness (1 – Strongly disagree; 5 – Strongly agree).

Because of this unequal distribution, I decided to perform the following operations to convert our continuous variable into a categorical one: (i) the two participants who 'disagreed' with the statement were excluded because this rating lay beyond 3 SD from the mean; and (ii) the single score of 5 (Strongly Agree) was converted into 4 (Agree). Thus, the continuous predictor variable was transformed into an unbalanced dichotomous one. To distinguish this variable from the original confederate manipulation, I will refer to it as 'confederate attractiveness' rather than 'confederate type'. Although the two confederate attractiveness 'conditions' correspond to 'neither agree nor disagree' and 'agree' on the Likert scale, for the sake of convenience I will refer to them as 'unattractive' and 'attractive', respectively. Theoretically, the fact that the 'unattractive' condition is neutral with respect to attractiveness does not pose a problem for the interpretation of the results, because it serves as a control for the 'attractive' condition.

Measures of Nonverbal Behaviour

All nonverbal behaviour was coded using the Facial Action Coding System (FACS; Ekman, Friesen, & Hager, 2002). Four types of nonverbal expressions were used in this experiment. First, following Carton and Carton (1998), I defined affection

as a number of Duchenne smiles (AU6+AU12: cheek raiser and lip corner puller).

Second, I used slight smiles (AU12A/B) as another measure of affection, because

they tend to 'light up' the face and make it look warm. Notice that I am only

interested in AU12 by itself when it occurs at low intensities. As such this measure

should not be confused with a non-Duchenne smile; it is only when AU12 occurs at

high intensities in the total absence of AU6 that the expression looks like a fake smile.

Third, I used frowning (AU4: brow lowerer) as a measure of negative expressions.

Finally, in addition to nonverbal indicators of warmth, I used head canting

(AU55/56), which has been suggested to be a signal of coy sexual interest (Kendon &

Ferber, 1973). The intra-rater reliability for this dataset was 87%.

Preliminary analysis revealed that the four DVs of interest (Duchenne smiles,

slight smiles, frowning and head canting) were not normally distributed, which

necessitated the use of nonparametric statistics. Tabachnik and Fidell (1999) note that

ANOVA is robust against slight deviations from normality but only when the design

is balanced. As discussed above, our manipulation was not successful which meant

that the group sizes were not equal.

Frowning

There was no significant effect of confederate attractiveness on the amount of

frowning during either the infants film, $z = -0.52$, *ns*, or the neutral film, $z = -0.73$, *ns*.

A Wilcoxon Signed Rank test revealed that there was no significant difference

between infants and neutral film for the unattractive condition, $z = -0.34$, *ns*. The

same test yielded significant results for the simple effect of film for the attractive

condition, $z = -2.09$, $p = .037$, $r = .23$, such that participants frowned less when

watching the infants film (Mean Rank = 10.42) than when watching the neutral film

(Mean Rank = 11.91).

Duchenne Smiles and Head Canting

Mann-Whitney *U* tests yielded no significant effects for either Duchenne smiles, *z* = -0.13, *ns*, or for head canting, *z* = -0.47, *ns*. Predictably, the simple effect of film type on the number of Duchenne smiles was significant both for the attractive confederate, *z* = 4.63, *p* = 0.000004, *r* = .50, and for the unattractive confederate, *z* = 2.37, *p* = .018, *r* = .26, such that participants displayed more Duchenne smiles during the infants film (unattractive Mean Rank = 4.00; attractive Mean Rank = 15.38) than during the neutral film (unattractive Mean Rank = 0.00; attractive Mean Rank = 4.50)

Slight Smiles

Mann-Whitney *U* test revealed a significant effect of confederate attractiveness on slight smiles, *z* = -2.48, *p* =.013, *r* = .27, such that in the presence of a male whom they found attractive (Mean Rank = 42.15) females displayed more slight smiles than in the presence of a male whom they found unattractive (Mean Rank = 27.00). The same test on the effect of confederate attractiveness on the rate of slight smiles during the emotionally neutral film revealed no significant differences, *z* = -1.31, *ns*.

A Wilcoxon Signed Rank test yielded non-significant results for the effect of film type on slight smiles when the confederate was perceived to be unattractive, *z* =-0.67, *ns*; the effect of film became significant when the confederate was perceived to be attractive, *z* = -3.11, *p* = .002, *r* = .34. Females displayed more slight smiles when watching the infants film (Mean Rank = 23.26) as opposed to the neutral film (Mean Rank = 22.18) but only when they were observed by a person whom they found attractive (see Figure 3).
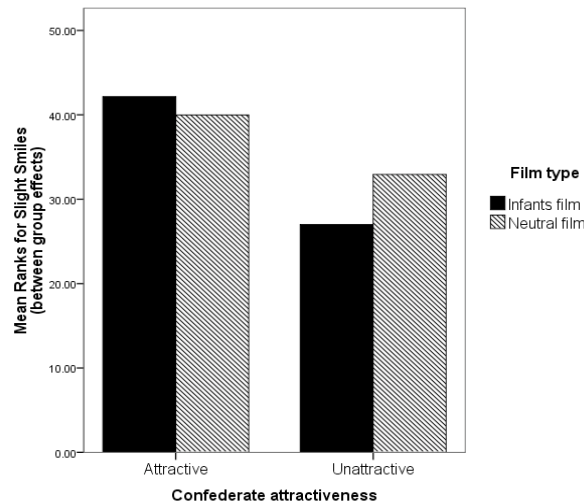
Figure 3. The effects of confederate attractiveness and film type on slight smile displays.

Order Effects

There was no effect of film order on any reported emotions, levels of smiling for the neutral film, or levels of frowning for either film. However, there was a significant effect of film order on levels of smiling for the infants film, such that participants who viewed this film *before* the neutral film tended to smile significantly less than participants who watched the infants film *after* the neutral film (see Table 1).

Film order	Slight Smiles during infants film			Duchenne smiles during infants film		
	Mean Rank	z	p	Mean Rank	z	p
Infants film first	32.75			30.86		
		-2.12	.034		-2.96	.003
Neutral film first	43.44			44.79		

Table 1. The effect of the order of film presentations on smiling during the infants film.

Reported Emotions

Confederate attractiveness had no effect on the level of happiness participants experienced during either the infants film, $t(73) = 0.60$, *ns*, or the neutral film, $t(73) =$

35

1.51, *ns*. Reported happiness during the infants film was significantly positively

correlated with Duchenne smiles, $r_s = .49$, $p = 0.000012$, but was not correlated with

slight smiles, $r_s = .14$, *ns*. Neither of these correlations was significant for the neutral

film (slight smiles: $r_s = .11$, *ns*; Duchenne smiles: $r_s = .04$, *ns*).

Confederate attractiveness also had no effect on the level of amusement

participants experienced during either the infants film, $t(73) = 0.38$, *ns*, or the neutral

film, $t(73) = 0.71$, *ns*.

Discussion

Females displayed more slight smiles when they judged the confederate to be

attractive than when they judged him to be unattractive, but only during the infants

film (vs. neutral film). When participants were observed by the attractive confederate,

they displayed more slight smiles in response to the infants film than in response to

the neutral film. This effect was not evident when participants were being observed

by the confederate whom they judged to be unattractive. In other words, females

expressed more nonverbal affection towards infants in the presence of a male whom

they found attractive, but the presence of an attractive male *in itself* did not lead to

any projections of warmth. Thus, affectionate attitude towards infants was advertised

to potential mates only when the context allowed for it, i.e., there was an appropriate

trigger in the environment at which warmth could be directed. This pattern of results

is in line with Hypothesis 1, which states that in the presence of an attractive male,

females will express more nonverbal affection towards children than in the presence

of an unattractive male.

Hypothesis 2, on the other hand, was not supported, because levels of

frowning did not vary systematically with confederate attractiveness. Moreover, the

pattern of this non-significant difference was in the direction opposite from what was

predicted, such that participants who judged the confederate to be attractive frowned more, not less, than participants who judged the confederate to be unattractive.

Looking at infants in the presence of the attractive confederate did not lead to an increase in head canting (AU 55/56), which suggests that the increase in displays of warmth was not due to activation of generalised class of sexual-interest behaviours.

Duchenne smiles did not follow the pattern predicted for the projections of warmth. Neither the effect of confederate attractiveness nor the simple effect of film type at each level of confederate attractiveness was significant. Even though these results do not support our prediction that Duchenne smiles would respond to the confederate attractiveness in the same way as slight smiles, these results are in line with Ekman and colleagues' argument that Duchenne smiles are honest signals (Ekman, Davidson & Friesen, 1990), in that they are difficult to fake (Ekman, 2003), and that they will therefore not be responsive to strategic concerns. The results suggest that Duchenne smiles were more an expression of internal happiness induced by the infants film rather than strategic expression of warmth towards infants.

Alternative Explanation

An obvious alternative explanation to the observed pattern of results is that people are simply happier when they see an attractive person, and that it is this state of happiness that makes them smile more. If this were true, participants who perceived the confederate to be attractive should have reported more happiness than participants who did not perceive the confederate to be attractive. However, this was not the case. Participants reported being just as happy in the presence of the unattractive confederate as in the presence of the attractive one, so the increase in slight smiles is unlikely to have been caused by the internal feelings of happiness that the presence of attractive people can induce.

Limitations

Order effects. Participants who viewed the neutral film first tended to smile more during the infants film than participants who viewed the infants film first. This pattern is probably due to a contrast effect (Manstead, Wagner, & MacDonald, 1983), whereby the perceived emotional intensity of an event is judged to be higher when it is preceded by the event of a contrasting emotional content. Modern life is replete with seductive visual and audio messages that are designed to attract our attention and tap into our spending power. In such an environment it is only natural that people's threshold for perceiving events/objects as emotional would be substantially elevated; in the absence of any direct comparisons, even the most aesthetically pleasing of stimuli may be perceived as ordinary. Thus, it is not surprising that participants failed to see the infants film as sufficiently emotional when they were exposed to it first; on the other hand, when they saw it after having seen the neutral film, the emotional quality of the film came to the forefront.

Fertility cycle. Research shows that female preferences for romantic partners change as a function of their fertility cycle (e.g., Penton-Voak et al., 1999), such that females at the peak the fertility cycle (i.e., during ovulation) show preference for more masculine faces than females at low points of the cycle. If there was a difference between the two confederates in how dominant or masculine they appeared, the above dynamic could have interfered with my manipulation of confederate attractiveness. It was, therefore, a limitation of this study that participants' fertility cycle was not measured.

Confederate manipulation. The major limitation of the study was the failure to successfully manipulate the physical attractiveness of the confederates. In light of the pre-test analysis that yielded a large-effect difference in physical attractiveness of the

two chosen confederates, the lack of effect of confederate type on female judgments of confederate attractiveness was puzzling. However, during the pre-test our pilot participants rated four potential confederates one after the other, which meant that they had an opportunity to compare at least three of the confederates with what had come before; in contrast, in the experiment itself our participants saw just one confederate, their putative interaction partner. This lack of anchoring might have diminished the effect.

This drawback necessitated the use of participants' ratings of confederates' physical attractiveness as an independent variable. A major consequence of using a measured variable as a factor is that the direction of causal relation remains unclear. Thus, it is possible that, contrary to our interpretation, females who tend to display more warmth are also more likely to perceive the confederate as attractive, or that displays of warmth and perceiving the confederate as attractive are determined by a third variable not measured in this study. However, these interpretations would not completely undermine my argument because I found that both females who perceived the confederate as attractive and females who perceived the confederate as unattractive showed the same levels of slight smiles during the neutral film. Thus, perhaps females who perceive the confederate as attractive *are* more likely to display more warmth; however, they are more likely to do so only in particular situations, i.e. when there is an appropriate stimulus in their immediate environment.

Study 2: Male reactions to female expressions of affection towards infants

If evolutionary processes have indeed selected for the self-presentational behaviour we are studying, it needs to have clear behavioural consequences for observers. It is therefore important to show that males find females who display

affection towards infants more romantically attractive. To achieve this, in Study 2 I showed the footage of the female participants from Study 1 to a sample of males whom I asked to rate the females with respect to a number of characteristics.

The hypotheses for Study 2 were as follows: (i) participants should perceive as warm the females in the attractive confederate/infants film condition, but not in any of the other three conditions, i.e., there should be an interaction effect of confederate attractiveness and film type on the perceptions of female warmth; (ii) since affection towards infants should increase females' desirability as romantic partners, we should also observe interaction effects (albeit weaker ones) of confederate attractiveness and film type on female desirability as short-term and long-term partners; and (iii) there should be no main or interaction effects of confederate attractiveness and film type on male ratings of female objective attractiveness.

<div align="center">Method[2]</div>

Participants

Sixty-eight males took part in this study. Some were students at Cardiff University who participated for credit, and others were members of the wider community, who participated in exchange for £4. Their average age was 22.90 years (SD = 4.87); 88% of the sample identified themselves as British, 2% as other European, and 10% as other. Forty-nine per cent reported that they were single. Four persons reported that they were bisexual, lesbian or gay male; their data were excluded from further analysis.

Materials

Excluding three participants from Study 1 who did not give permission for their videotapes to be used in Study 2 left only 14 female participants in the smaller of

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[2] The data for this study were collected at the same time as data for a study I report In Chapter 3.

the two confederate attractiveness conditions. In order to balance the design of Study 2, I randomly selected 14 participants from the condition with a greater number of participants and used the footage of the resulting 28 participants. The pattern of results reported in Study 1 remained the same for this subsample.

Three sets of videos were created from the chosen footage. Set 1 included 20 10-second extracts from the footage of 10 female participants (2 extracts for each female, one for each film type condition), 5 of whom judged the confederate to be attractive and 5 of whom judged the confederate to be neither attractive nor unattractive. Ten of the 20 extracts were taken while participants were watching the infants film (Set 1a) and the other ten were taken while participants were watching the neutral film (Set 1b). Similarly, Set 2 included 20 10-second extracts from the footage of another 10 female participants, and Set 3 included 16 10-second extracts from the footage of the remaining 8 participants. Each participant in the current study saw only one half of one set (e.g., either Set 1a or Set 1b).

In Study 1 confederate attractiveness was a between-group variable, whereas film type was manipulated within-group. In the present study, on the other hand, the confederate attractiveness is a within-group variable, such that male raters judged females from both confederate attractiveness conditions, while film type is manipulated between-group, such that each male only judged females watching either the infants film or the neutral film.

Procedure

After participants arrived at the laboratory and signed an informed consent form they were asked to view video recordings of females and to report their impressions of the females. The participants were informed about the contents of the films the females had viewed. Participants were asked to rate the females on a number

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of characteristics, including age, physical attractiveness, desirability as a long-term partner, desirability as a short-term partner, and warmth. Participants were also asked to indicate whether they knew any of the females they were rating. At the end, all participants were fully debriefed.

Design

The design of the study was a 2(Confederate attractiveness: attractive vs. unattractive) * 2 (Film type: infants vs. neutral) mixed factorial design with confederate attractiveness as a within-group factor and film type as a between-group factor.

Results

Each male participant made judgments about a number of females from the two confederate attractiveness conditions (either 4 or 5 females from each condition). In order to analyse the effect of the confederate attractiveness on ratings of the females' attractiveness and other personality characteristics, I collapsed data across females. Thus, for each male, two scores were calculated for each item rated, one being the aggregate of ratings for females in the attractive confederate condition and the other being the aggregate of ratings for females in the unattractive confederate condition.

A 2 (confederate attractiveness, within-group) * 2 (film type, between-group) mixed ANOVAs revealed only main effects of confederate attractiveness on the four items (see Table 2). There were no main effects of film type or interaction effects on any of these items.

	Confederate attractiveness	Mean	SD	F	df1	df2	p	H^2
Objective attractiveness	Attractive	5.00	0.98	22.47	1	62	.000013	0.27
	Unattractive	4.42	1.03					
Long-term partner	Attractive	4.10	1.27	12.61	1	62	.001	0.17
	Unattractive	3.69	1.38					
Warmth	Attractive	4.93	0.94	4.12	1	62	.047	0.06
	Unattractive	4.75	1.08					
Short-term partner	Attractive	4.37	1.32	12.27	1	62	.001	0.17
	Unattractive	3.78	1.38					

Table 2. The effect of female ratings of confederate attractiveness in Study 1 on males' ratings of females' characteristics.

Thus, females who had rated the confederate as attractive were rated as more attractive, as more desirable, and as having warmer personalities themselves, independently of the type of film they were watching. This pattern of results and, especially, a very large effect of confederate attractiveness on rating of female objective attractiveness ($\eta^2 = 0.27$) suggests that in Study 1 females who were objectively more attractive to begin with were more likely to rate the confederate as attractive.

Female Attractiveness and Confederate Attractiveness

To test whether attractive females were more likely to rate the confederate as attractive, I transposed the original dataset and collapsed the data across males. This enabled me to derive measures of attractiveness, desirability and warmth for the 28 females who were chosen for Study 2. Analysis revealed that the correlation between female ratings of confederate attractiveness and their own objective attractiveness were marginally correlated for the infants film: $r_b = .38$, $p = .052$, 1-tailed, and

significantly correlated for the neutral film, r_b = .42, p = .039, 1-tailed. The difference

between these correlations was not significant, z = -0.17, p = .87.

Perceptions of Warmth and Female Nonverbal Behaviour

Transposing the dataset also allowed me to explore whether the perceptions of

warmth were related to female nonverbal behaviour. For both films there were

significant correlations between the number of slight smiles and perceived warmth

(infants: r_s = .42, p = .027; neutral: r_s = .48, p = .01). There was also a significant

correlation between perceived warmth and the number of Duchenne smiles during the

infants film, r_s = .69, p = .000046, but there was no significant correlation between

perceived warmth and the number of Duchenne smiles during the neutral film, r_s =

.23, *ns*.

Discussion

The objective of this study was to establish whether the differences in

nonverbal behaviour I observed in Study 1 influenced males' perceptions of females'

warmth and, consequently, their desirability as romantic partners. The results showed

that the females were perceived as more attractive, as warmer and as more desirable

in the attractive confederate condition, independently of the film type. This is contrary

to my prediction that judgments of females' own attractiveness would not differ

significantly as a function confederate attractiveness; it is also contrary to the

predictions that females would be rated as having warmer personalities and as being

more desirable in the attractive condition but only during the infants film.

The observed difference in female attractiveness is likely to have been

responsible for the other confederate attractiveness effects. After all, it is unsurprising

that beautiful women would be rated as more desirable short-term and long-term

partners. It is also not unreasonable to assume that more attractive women, perhaps by

virtue of a halo effect, would be rated as warmer, too. The presence of this powerful confound makes the lack of the predicted interaction effects difficult to interpret, because there is no way of assessing whether it is females' own attractiveness or perceived confederate attractiveness that is responsible for the effects (or lack thereof). Thus, the results of this study do not provide conclusive evidence either for or against the predictions set out in the introduction to this study.

One reason to believe that there was an effect on warmth to be found is the fact that females' slight smiles were related to the perceptions of their warmth, which at the very least suggests that females' own attractiveness was not the sole factor in determining male perceptions of their warmth.

Confederate Attractiveness in Study 1

Females who judged the confederate to be attractive in Study 1 were rated by the males in Study 2 as more attractive, as more desirable romantic partners (both short-term and long-term), and as having warmer personalities. These results suggest that in Study 1 females who perceived the confederate to be attractive were themselves more attractive than females who perceived the confederate to be unattractive, and that therefore females' own attractiveness could have been an influential factor in Study 1. This interpretation is strengthened by the fact that when we collapsed the dataset of Study 2 across males and combined it with the dataset of Study 1, females' own attractiveness was associated with their judgments of confederate attractiveness, significantly for the neutral film and marginally for the infants film.

Thus, the results of this study established that there was indeed a powerful variable (females' own physical attractiveness) that was associated with the measured predictor variable (confederate attractiveness) we used in Study 1. This fact makes the

lack of significant effect of confederate attractiveness on frowning inconsequential for Hypothesis 2, because the confounding variable could have been responsible, first, for the lack of effect, and second, for the trend in the data that contradicts Hypothesis 2.

Regarding Hypothesis 1, I argued in the discussion of Study 1 that given that females in both confederate attractiveness conditions displayed slight smiles at the same rate during the neutral film, 'females who perceive the confederate as attractive are more likely to display more warmth; however, they are more likely to do so only in particular situations, i.e. when there is an appropriate stimulus in their immediate environment' (p. 39). This interpretation needs to be revised in light of the present findings. The most likely explanation of the results of Study 1 is that the attractiveness of our female participants affected their perceptions of confederate attractiveness, as well as their expressions of warmth towards infants. This interpretation would imply that attractive females are more likely to display warmth towards children. Whether this is done to appear more attractive to the opposite gender is not clear, because all projections of warmth were performed in the presence of a member of the opposite sex, so we cannot offer an evidence-based argument about how these women would have behaved if there was no male audience.

It is worth noting that in neither the original dataset nor the sub-sample dataset was there an effect of confederate attractiveness on how happy and amused the females were while viewing the two films. This suggests that the smiling that attractive females engaged in during the infants film was not related to their internal feelings, which implies that it may have been strategic.

Although in itself interesting, the tendency of attractive females to express warmth towards children is not the effect we set out to demonstrate. In order to test whether emotional reactions towards children are strategically altered in romantic

contexts, we ran Study 3, where we used more effective manipulations than those used in Study 1.

Study 3: Female attenuation of negative reactions towards infants

As in Study 1, in Study 3 I wanted to establish whether females modify their emotional reactions towards children in romantic contexts and whether they do so by expressing more affection (Hypothesis 1) or attenuating negative reactions (Hypothesis 2) towards infants. The failure to manipulate romantic context successfully in Study 1 led me to adopt a different approach in the present study. Instead of manipulating the psychological presence of a male confederate, I primed participants with romance by asking them to read scenarios that were either designed to be romantic or neutral in nature. This approach has been successfully used in the literature to manipulate participants' mindsets (Griskevicius et al., 2006; Griskevicius et al., 2007).

Method[3]

Participants

Eighty female psychology students from Cardiff University took part in this experiment. Of these, 71 were retained for analysis (see Results for the exclusion criteria). The average age of the retained sample was 18.61 years (SD = 0.89); 96% of the sample identified themselves as British, and 4% as Other European. Forty-seven per cent reported being single. None of the participants had any children.

Measures of Nonverbal Behaviour

Three Action Units (AUs) or combinations of Actions Units were coded: AU4 (frowning), AU12 (at intensities A & B, slight smiles), and AU6+12 (Duchenne smiles). A certified FACS coder acted as the second-coded 15% of the video data. He

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[3] The data for this study were collected together with the data for Study 5 reported in Chapter 2.

was blind to the hypothesis and unaware of the contents of the videos participants watched. The inter-rater reliability was 76%.

Measures of Emotional Experiences

After each film, participants were asked about their emotional experiences during the films. In particular they were asked *'While watching this movie, to what extent did you experience …?'* Emotions measured were affection, amusement, anger, sadness, and surprise; the scale ranged from *1* – not even the slightest bit of emotion, to *8* – the most I have ever felt in reaction to a movie. Participants were also asked to indicate how pleasant the films were (valence); the scale here ranged from *1* – unpleasant, to *5* – neutral, to *9* – pleasant.

Materials

Emotional stimuli. The same two films as those used in Study 1 were used as emotional stimuli.

Priming stimuli. To prime long-term romance, I used Griskevicius et al.'s (2006) materials. In the romance condition, participants read a story in which they imagined meeting a highly desirable person; the story depicts the progress of the romance that develops into a passionate, committed relationship. In the control condition, participants read a story in which they imagined losing and searching for a wallet; the story describes the initial anxiety over the inability to find the wallet, but ends with the protagonist finding it and leaving the house feeling elated.

Procedure

Participants arrived at the laboratory and signed an informed consent form. They were then asked to read a story that primed either a romantic or a control mindset. Participants next watched two stimulus films while their facial behaviour was videotaped. Finally, participants were fully debriefed.

Design

The design was a 2 (Motive type: romantic mindset vs. control mindset) x 2 (Film type: infants vs. neutral) mixed factorial design. Motive type was a between participants factor, while film type was a within participants factor.

Results

Exclusion Criteria

Of the 80 participants who took part in this study, five were excluded from the analysis for the following reasons: (i) reporting being lesbian or gay male, or failure to indicate sexual orientation (2); (ii) poor video quality (4); (iii) scoring more than 3SD above the mean for anger during the neutral movie (2); and (iv) not being affected by the romantic scenario (as revealed by the manipulation checks, 1).

Manipulation Checks

Film manipulation. Paired-sample t-tests revealed that participants felt more affectionate, $t(70) = 11.64$, $p < .0000005$, $d = 2.78$, and more amused, $t(70) = 3.15$, $p = .002$, $d = 0.75$, while watching the infants film. The valence of their emotional reaction in general was also more positive, $t(60) = 4.32$, $p = .00006$, $d = 1.12$, during the infants film ($M = 7.36$, SD $= 1.61$) than during the neutral film ($M = 6.34$, SD $= 1.82$). Thus, this manipulation was considered to be successful.

Motive manipulation. There was a significant effect of motive type on the degree of romantic arousal, $t(62.44) = 14.75$, $p < 0.0000005$, $d = 3.73$, happiness, $t(42.78) = 3.70$, $p = .001$, $d = 1.13$, and excitement, $t(47.19) = 3.37$, $p = .002$, $d = 0.98$, that participants felt after reading the priming scenarios. Even though the levels of happiness and excitement were affected by the motive manipulation, in addition to the level of romantic arousal, I considered the manipulation to be successful because

the effect size for the romantic arousal was much greater than the effect sizes for

happiness and excitement.

Smiling

There was no significant effect of motive type on smiling (Duchenne smiles

and slight smiles) during either film. A Wilcoxon signed rank test revealed that the

simple effect of film type was significant for Duchenne smiles at both levels of

motive type, but that it was significant for slight smiles only at the level of control

mindset (see Table 3).

	Romantic mindset			Control mindset		
Film type	Mean Rank	*z*	*P*	Mean Rank	*z*	*p*
			Slight smiles			
Infants	14.16	-0.54	*Ns*	13.95	-3.14	.002
Neutral	14.96			9.20		
			Duchenne smiles			
Infants	7.62	-2.92	.003	7.00	-2.20	.028
Neutral	6.00			7.00		

Table 3. The simple effects of film type on smiling at the two levels of motive type**.**

Frowning

There was a significant effect of motive type on the amount of frowning while

watching the infants film, $z = -2.20$, $p = .028$, $r = .26$, such that participants in the

romantic motive condition (Mean Rank = 25.73) frowned less than participants in the

control condition (Mean Rank = 35.60). The comparable effect was not significant for

the neutral film, $z = -1.57$, *ns* (see Figure 4).

However, a Wilcoxon Signed Ranks test revealed that the simple effect of film

type was not significant either in the romantic mindset, $z = -0.59$, *ns,* or in the control

mindset, $z = -0.18$, *ns*.
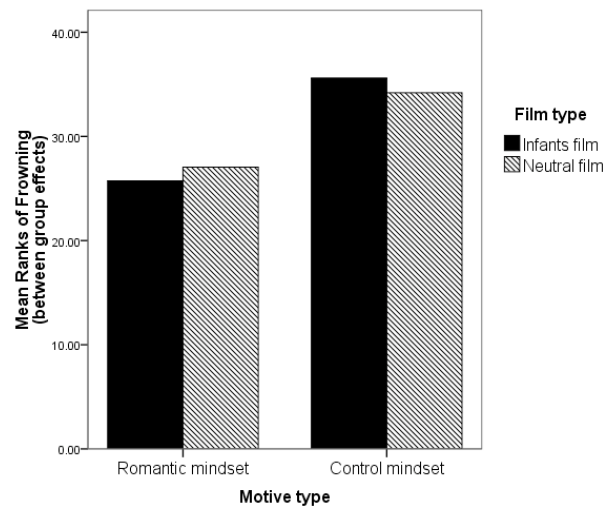
Figure 4. The effects of motive type and film type on the amount of frowning.

Reported Emotions

There were no significant effects of motive type on the levels of affection, amusement, sadness, or surprise experienced by participants during either the infants or the neutral film. There was also no significant effect of motive type on the valence of affect experienced by participants during the two films.

Discussion

The results of this study provide support for Hypothesis 2 but not for Hypothesis 1. I found that the motive type manipulation did not affect the amount of smiling (either Duchenne or slight smiles), but that it did affect the amount of frowning during the infants film, such that females primed with long-term romance frowned less than females primed with a control mindset. In accord with the logic of Hypothesis 2, this effect did not hold when participants viewed the neutral film. In contrast to our predictions, however, females primed with romance frowned equally frequently when viewing the two films.

Alternative Explanations

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Main effect of the confederate type. Inspection of Figure 4 suggests an interpretation of the results in terms of a main effect of motive type on the amount of frowning. What the figure appears to show is that females frowned less when they were in the romantic mindset than when they were in the control mindset, and that it did not matter what the object of the emotional reaction was. I have several reasons for thinking that this was not the case. First, in Chapter 3 we will see that in a romantic context, females tend to indicate that they would express *negative* emotions towards a female known to be unfaithful, which at the very least suggests that there is no generalised tendency to express less negative emotions in the context of romance. Second, if motive type really influenced frowning in general, rather than attenuating frowning in those specific situations where less frowning would be advantageous to females, we should have been more likely to observe a significant effect of motive type on the amount of frowning during the neutral film, as well as the infants film. However, we did not observe this effect. In accord with my prediction, the effect of motive type on frowning was significant only during the infants film.

Happiness/Excitement effect. It is possible that the effect of motive type on the amount of frowning during the infants film was due to the fact that participants felt happier and/or more excited after reading the romantic scenario than after reading the neutral scenario. Although this is a possibility that cannot be ruled out completely, there are reasons to believe that the difference in the facial behaviour was not due to the differences in how happy and/or excited the participants felt. For happiness, the first reason is that the facial action most closely associated with happiness is smiling, rather than frowning, so if happiness were the factor affecting facial behaviour in this study, we would expect to see an effect of confederate type on slight smiles, on Duchenne smiles, or both. The second reason is that not only did the amount of

smiling not vary consistently with motive type manipulation, but in three out of four cases (slight and Duchenne smiles during infants and neutral films) the effect of motive type on smiling produced a tendency in the direction opposite from the one we would have expected to see if the greater happiness in the romantic mindset condition had had an influence on facial behaviour in this study. The third reason is the null effect of motive type on frowning during the neutral film. The final reason is the absence of effects of motive type on measured emotions, including affection, amusement and sadness, or on the overall valence of the emotional reaction to the two films. For excitement, the main reason to believe that it did not produce the effects in question is that if excitement had been responsible for the effect of motive type on frowning, the pattern of results would have been opposite to what it was, i.e., participants in the romantic mindset condition would have frowned more rather than less, because excitement is associated with heightened levels of activation (Russell, 1980).

General Discussion

I conducted three studies to investigate whether females change their emotional reactions towards infants in order to appear more desirable to persons of the opposite sex. Two alternative hypotheses were considered. Hypothesis 1 stated that females would express more affection towards infants in the psychological presence of an attractive male more than in the psychological presence of an unattractive male. Hypothesis 2 stated that females would instead attenuate negative reactions towards infants in the psychological presence of an attractive male. The unsuccessful manipulation of confederate type in Study 1 led the use of the measured 'confederate attractiveness' variable as a factor. This approach produced results that were interesting but inconclusive with respect to the two hypotheses. The fact that

males in Study 2 judged females in the attractive confederate condition to be much more attractive than females in the unattractive condition suggested that female attractiveness may have been a confounding factor in the design of Study 1, such that attractive females were more likely to rate the confederate as attractive than unattractive females. Overall, the data from the two studies led me to conclude that attractive females are more likely to express warmth towards infants than unattractive females, and that they do *not* do so because of any change in their emotional experiences while observing infants. Whether these expressions of warmth have anything to do with romance remains unclear. This conclusion did not directly speak to my hypotheses, so I improved the manipulation and ran a further study. The results of Study 3 were consistent with the hypothesis that when in a romantic context females attenuate negative reactions to infants (Hypothesis 2).

Chapter 3: Female reactions to unfaithfulness[4]

Monogamous pair-bonding equalises maternal and paternal investment in offspring and makes the two genders equally demanding when it comes to selecting long-term mates (Campbell, 2004; Geary, 1998). Thus, we can expect that in humans, a species with high levels of paternal care, both males and females will be motivated to advertise their qualities as mates in order to attract desirable partners (Griscevicius, Cialdini, & Kenrick, 2006). Consistent with this logic, Tooke and Camire (1991) found that females attempt to enhance their physical appearance when they are trying to impress a potential mate. Likewise, research has shown that when in a long-term mating mindset, females are motivated to advertise their pro-social orientation and genetic quality by becoming more helpful (Griscevicius et al., 2007) and more creative (Griscevicius et al., 2006).

In this chapter I argue that in the context of long-term-mate attraction one of the qualities that males desire and that females advertise is faithfulness. Males desire faithfulness because paternal investment is associated with risks as well as benefits (Symons, 1979; Trivers, 1972). Although by taking care of their offspring males can ensure that their offspring survive to adulthood and reproduce themselves, they risk wasting time and resources by investing in another male's child (Buss, Larsen, Westen, & Semmelroth, 1992). In species with internal fertilisation, a male can rarely be certain that he has successfully impregnated his mate and, consequently, he can rarely be certain that he is the father of her offspring (Gross & Shine, 1981). The uncertainty of paternity is an adaptive problem (Trivers, 1972) that creates a selection pressure on males to care about their long-term partner's fidelity (Buss et al., 1992; Cann, Mangum, & Wells, 2001; Symons, 1979).

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[4] This chapter is partly based on Dosmukhambetova and Manstead (in press).

One consequence of the pressure posed by paternity uncertainty is male sexual jealousy, which is thought to be an evolved mechanism of mate-guarding designed to protect against female infidelity (Daly, Wilson, & Weghorst, 1982; Greiling & Buss, 2000). Although both genders experience sexual jealousy, males experience it more often and more strongly. For example, Buss et al. (1992) found that males more than females report that they would be more upset by sexual infidelity, and that females more than males report that they would be more upset by emotional infidelity. Buss et al. (1992) also showed that imagining sexual and emotional infidelities has differential effects on the male and female physiological reactions, such as electrodermal activation, pulse rate and the activity of *corrugator supercilli* (the muscles that produce an appearance of frowning). Males showed stronger reactions when imagining sexual infidelity, while females tended to show the reverse pattern.

Although male concern about a partner's sexual fidelity is powerful (Daly et al., 1982), it is not indiscriminate. Evolutionary theory predicts that its activation will be linked to expected paternal investment in offspring (Trivers, 1972; Whittingham, Taylor, & Robertson, 1992). If a male does not intend to invest in the first place, there is no need for him to be concerned about wasting resources on another male's offspring. In Masai culture, the only known culture where males openly tolerate spousal infidelity (Daly et al., 1982), inheritance is avuncular, such that males care for their sisters' offspring more than they do for their own. Such an arrangement is a clear indication of evolutionary forces at work. Males 'do not care' about their wives' sexual relationships with other males because (a) they do not expect to invest in her children, and (b) they have another way to ensure the propagation of their genes into the next generation, i.e. caring for the offspring of a woman who is closely related to them.

Male sexual jealousy would not have evolved if it had not been successful at ensuring that females stay faithful; however, the existence of male sexual jealousy suggests that at least some females in evolutionary history reaped the benefits of pursuing a polymorphic strategy whereby they secured the investment of one male and discreetly engaged in extra-pair copulations with another, high quality male (Greiling & Buss, 2000). If there are differences between females in the likelihood of being unfaithful (Bailey, Kirk, Zhu, Dunne & Martin, 2000), then males would benefit if they preferred to invest in females who are likely to stay faithful in the first place. Consistent with this logic, Buss and Schmitt (1993) showed that males name faithfulness as one of the desired characteristics in their long-term romance partners.

If males prefer to assort themselves selectively with females who are more likely to remain faithful, females should be motivated to present themselves to potential long-term partners in a way that suggests that they do not condone unfaithfulness. There are good theoretical reasons to believe that females are concerned enough about their sexual reputation (Campbell, 2004) to be motivated to manage impressions in this way. For example, teenage females avoid associating with other females known to be 'tarts' (Lees, 1993) because they fear acquiring a similar reputation by association. Females are also sometimes willing to engage in physical violence in order to protect their sexual reputation (Campbell, 2004). Statistical data on female juvenile offenders obtained from various governmental agencies, including the FBI in the US and the Home Office in the UK, show that when female-female aggression occurs it is usually in poorer areas between women of approximately the same age (O'Brien, 1988) and that the most important causes of fights are attacks on a female's or her friend's personal integrity, which include accusations of promiscuity (Campbell, 1986).

If faithfulness is something that males desire in their long-term mates and sexual integrity is something that females are concerned about, females who seek long-term partners should be motivated to communicate to prospective partners that they do not condone unfaithfulness. I therefore hypothesized that *when in a long-term relationship mindset, females will distance themselves from a female known to have been unfaithful.*

This pattern is predicted only for heterosexual, pre-menopausal females. This is due to the fact that faithfulness is important primarily because of the risk of adulterous conception. This risk is clearly minimal for post-menopausal females and there is no reason that males should not be 'aware' of this fact. If males care less about the sexual faithfulness of their post-menopausal partners than they care about the sexual faithfulness of their younger and more fertile partners, it would be less important for post-menopausal females to actively self-present themselves as faithful, which means that they should be less motivated to engage in such self-presentational behaviour. The age at which females reach menopause varies widely (Phillips, 2004), so any cut-off age will necessarily be arbitrary. The average age of reaching menopause is 51 years, with 2 to 8 years of peri-menopausal period when a woman's hormonal profile undergoes substantial changes. I therefore operationalized 'pre-menopausal' as being under the age of 50.

I conducted four studies to test the hypothesis regarding female self-presentational behaviour. In Study 1, I presented an animation depicting a dinner party to participants who were primed either with long-term romance or a control mindset[5]. At this dinner party, there was a female who either (i) acted in a highly flirtatious manner with a man other than her partner or (ii) acted in a gregarious but

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[5] Throughout the thesis I use the terms 'to prime' and 'mindset' in relation to the motive type manipulations. 'Mindset' always refers to a level of motive type manipulation, e.g. romantic mindset; whereas 'to prime' refers to the induction of the mindsets.

non-flirtatious manner. The task of participants was to rank the guests in the party in the order of their desirability as partners in a game of cards that was to take place at the end of the party. In Study 2, I extended the manipulation of motive type by including a prime of short-term romance mindset. I also changed the stimuli from an animation to a verbal depiction of a woman who was (i) unfaithful and promiscuous (cheater), (ii) promiscuous but faithful (player), or (iii) a control. Participants were asked to indicate their reactions to the target female, including judging how likely they were to agree to go to a concert with her, indicating how much they would like to be her friend, and judging how similar they were to her.

In Studies 3 and 4 I investigated nonverbal expressions of social distancing. In Study 3 I examined how males and females said they would react to a same-sex acquaintance who strongly implied that he or she was acting unfaithfully in one of three social contexts: (i) when the participant was accompanied by his or her date, (ii) when the participant was accompanied by an opposite-sex acquaintance, or (iii) when the participant was accompanied by a same-sex friend. In Study 4 I investigated participants' actual nonverbal behaviour, by getting them to watch a film depicting an unfaithful woman after they had been primed either with long-term romance or with a control mindset.

Study 1: Female social distancing from an unfaithful other (animation)

Method

Participants

A total of 160 female participants were recruited through personal contacts. Undergraduate students enrolled in a Level 2 Social Psychology Practical collected the data. The average age of participants was 23.42 (SD = 9.26). In terms of ethnic

background, 94% reported being White, 3% Asian, and the rest either Black or Other. Ninety-six per cent of participants reported being residents of the UK. Eighty-one percent were students, while 11% reported working full-time. Forty-eight per cent were single, 20% were either married or in a serious committed relationship, and the rest reported being in casual or steady dating or sexual relationships. Only two participants reported being either lesbian, gay male, or bisexual.

Materials

To prime long-term romance, I used Griskevicius, et al.'s (2006) materials. In the committed long-term romance condition, participants read a story in which they meet a highly desirable person; the story depicts the progress of the romance that develops into a passionate, committed relationship. In the control condition, participants read a story in which they go to a much-anticipated concert with a friend; the story describes the protagonist being worried because of her inability to find the tickets but ends with her finding them and leaving the house feeling excited and happy.

Several PowerPoint animations were prepared in advance. All animations involved a schematic depiction of a dinner party; males and females in the animation were represented by squares and triangles, respectively, and the relationship status of the males and females was represented by partners sharing colours. In the cheater animation, a female (represented by one of the triangles) 'made a move' on the hostess' partner behind her own partner's back; in the control animations the female behaved in a gregarious but a non-flirtatious manner. The participants themselves (represented by a separate triangle) were also at the party; they were either with a same-sex friend or with their partner. Thus there were four animations representing the following combinations of independent variables: 2 (female type: cheater vs.

control female) * 2 (relationship status of the participant: attached vs. unattached).

Every animation ended with the host suggesting a game of cards, for which guests had

to choose a partner; the host started the process by choosing the participant's

companion (partner or same-sex friend) as his card partner. Participants were

instructed to choose a card partner of their own at this point; in order to aid this

process, all the triangles and squares floated into a grid that assigned letters to them

(from A to I).

Procedure

After signing the informed consent form, participants were given instructions

that led them to believe that the researchers were interested in establishing baseline

levels of 'transportation' for stimuli that vary in the level of abstraction.

Transportation, they were told, is the degree of emotional responsiveness to imagined,

visual, and/or verbally depicted stimuli.

After completing a background information questionnaire, participants read a

scenario that primed them with either a long-term romance or a control mindset;

participants were then given the manipulation check questionnaire. Next, participants

were shown one of the four PowerPoint animations, and were asked to rank-order the

guests based on their desirability as card partners using the following scale: *1* – most

desirable, *7* – least desirable. They were asked to make sure that they ranked *all*

persons, except the host and their own partner/same-sex friend.

Participants then completed a questionnaire containing items probing their

comprehension of the animations (e.g., "Who did you come to this party with?",

"How were the figures of the same colour related?"), as well as the questionnaire

containing a number of behavioural, affective and attitudinal measures concerning the

target female (see Appendix 2). Finally, participants were fully debriefed.

Design

The design of the study was a 2 (Motive type: romantic mindset vs. control mindset) * 2 (Female type: cheater vs. control female) * 2 (Relationship status of the participant in the animation: attached vs. unattached) fully between-participants design.

Results

Exclusion Criteria

Eleven variables that probed participants' comprehension of the animations were combined into an aggregate score ranging from 5 to 11 ($M = 9.52$, SD = 1.30). Participants who scored more than 3 standard deviations less than the mean together with participants who failed to answer any of the comprehension questions were excluded from further analyses. I excluded non-heterosexual participants as well as participants who were 50 years of age or older. I also excluded one participant who failed to report her age. Thus, 142 participants were retained for further analysis.

Manipulation Checks

Motive type. There was a significant effect of motive type on romantic arousal, $t(94.65) = 12.76$, $p < .0000005$, $d = 2.62$, such that participants in the romantic mindset condition ($M = 3.83$, SD = 1.57) were significantly more romantically aroused than participants in the control mindset condition ($M = 1.29$, SD = 0.64). There was no significant effect of motive type on participants' ability to visualise the animations, $t(140) = 0.85$, *ns*, on participants' levels of happiness, $t(140) = -1.02$, *ns*, or excitement, $t(140) = 1.69$, *ns*.

Female type. There was also a significant effect of female type on the perception that a girl tried to seduce a man in the animation, $t(122.78) = 4.48$, $p = .000017$, $d = 0.81$, such that participants in the promiscuous animation condition were

more likely to think it was true ($M = 1.13$, SD = 0.34) than participants in the control

animation condition ($M = 1.45$, SD = 0.50).

Card Partner

One of the ways I measured social distancing was by asking participants to

rate the desirability of the target female as a partner in the game of cards. The scores

varied from 1 (most desirable) to 7 (least desirable). The Shapiro-Wilk test was highly

significant for this variable, $W(139) = 0.83$, $p < .0000005$, and the standardised values

of skewness and kurtosis were higher than the value recommended as acceptable

(1.96) by Field (2000). Transformations for severely positively skewed data (see

Figure 5) recommended by Tabachnick and Fidell (2007) failed to produce a normal

distribution, and the standardised value of kurtosis was greater than 1.96.
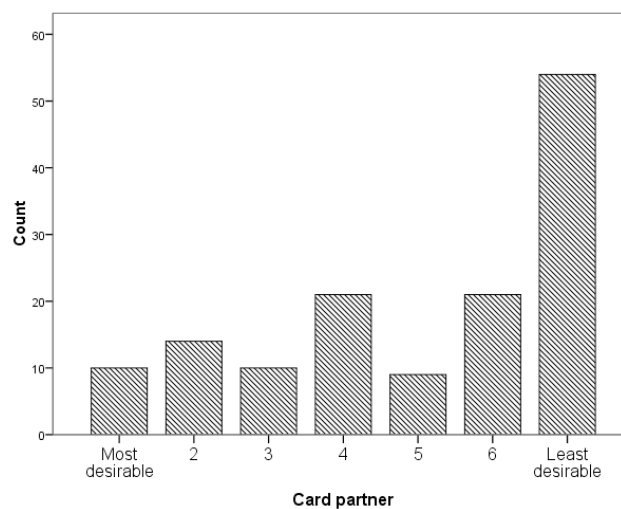
Figure 5. Card partner distribution

Thus, in order to perform a 2*2*2 ANOVA on this variable, I recoded it into a

dichotomous variable using a median split. The 3-way interaction between motive

type, female type and relationship status was significant, $F(1, 131) = 4.56$, $p = .035$,

$\eta^2 = .034$. There was also a main effect of female type on this variable, $F(1, 131) =$

18.51, $p = 0.000033$, $\eta^2 = .124$, such that the cheater ($M = 1.72$; SD $= 0.45$) was rated as a much less desirable card partner than the control female ($M = 1.38$, SD $= 0.49$).

In order to interpret the 3-way interaction, I examined the 2-way interactions at each level of the motive manipulation. In the romantic mindset condition the 2-way interaction between relationship status of participants in the animation and female type was significant for card-partner desirability, $F(1, 68) = 4.67$, $p = .034$, $\eta^2 = .064$, such that (i) unattached participants' ratings were unaffected by female type, but (ii) attached participants' ratings were affected by female type (see Figure 6). Attached persons in the romantic mindset condition rated the promiscuous female ($M = 1.78$, SD $= 0.43$) as a much less desirable card partner than the female in the control animation ($M = 1.33$, SD $= 0.49$), $p = .008$, $\eta^2 = .100$.
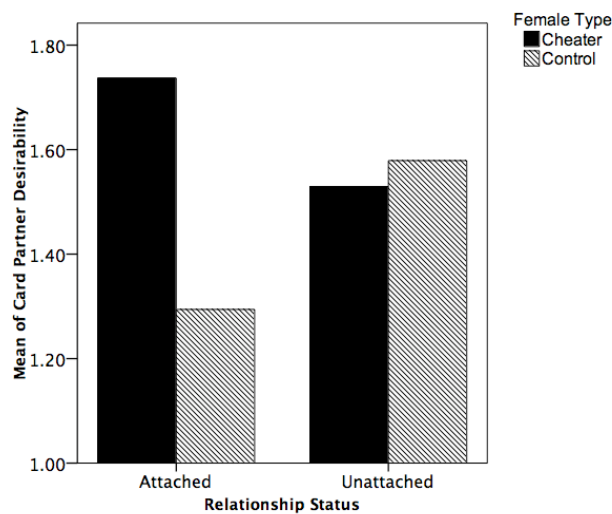
Figure 6. Effect of the relationship status of participants in the animation and female type on card partner desirability in the romantic mindset condition. Note that greater values denote less desirability.

The 2-way interaction between relationship status and female type was not significant in the control mindset condition, $F(1, 63) = 0.71$, *ns*, $\eta^2 = .01$.

Other Measures of Social Distancing

There were three other measures of social distancing: participants' willingness to go to a concert with the target female; their willingness to be her friend; and the degree to which participants judged they were similar to the female. The 3-way interaction between motive type, female type and attachment was not significant for any of these variables (smallest p = .206). However, in all three cases there were significant main effects of female type (see Table 4).

	Female type	Mean	SD	t	df	p	d
If she invited you to go to a concert with her, how likely would you be to say yes?	Cheater	2.67	1.48	4.32	136	.000029	0.74
	Control	3.74	1.48				
How much would you like her to be your friend?	Cheater	1.84	0.85	7.24	110	>.0000005	1.41
	Control	3.33	1.49				
How similar do you think you are?	Cheater	2.06	1.04	4.70	128	.000007	0.83
	Control	3.01	1.33				
Admiration	Cheater	1.46	1.06	3.06	126	.003	0.55
	Control	2.13	1.49				
Disgust	Cheater	4.59	2.11	-7.63	133	>.0000005	1.32
	Control	2.11	1.71				
Embarrassment	Cheater	3.17	1.79	-5.02	129	.000002	0.88
	Control	1.83	1.35				
How likeable is she?	Cheater	2.35	1.21	5.69	137	>.0000005	0.97
	Control	3.56	1.29				
How pretty do you think she is?	Cheater	4.54	1.15	-2.05	136	.043	0.35
	Control	4.12	1.27				
How threatening is she?	Cheater	4.70	1.76	-4.53	136	0.000013	0.78
	Control	3.33	1.77				

Table 4. Effects of female type on impressions of the female target.

Other Measures

The 3-way interaction was not significant for any other dependent measures. However, there was a significant effect of female type on a number of dependent variables. A summary of these results can be seen in Table 4.

Discussion

There was a 3-way interaction between motive type, female type and relationship status of participants in the animation on the target female's desirability as a card partner. Within the long-term romance motive type, there was a significant 2-way interaction between relationship status and female type on participants' ratings of the target female's desirability as a card partner, such that the target female was rated as a much less desirable card partner when participants' romantic partner was present at the party. Thus, the presence of a romantic partner in itself did not affect female behaviour vis-à-vis the cheater, which might be reflective of the fact that the presence of a potential mate is not in itself sufficient reason to engage in self-presentational behaviours, and that in order to evoke self-presentational efforts, the presence of a potential mate has to be coupled with a motivation to attract him as a *long-term* mate. This pattern is consistent with the finding of Griscevicius et al. (2006) that females show an upsurge in creativity only why primed with a committed long-term romance mindset but not short-term romance or control mindsets.

A weakness of this study was that the female type manipulation was too strong, in that the cheater was perceived much more negatively than the control female. In particular, the cheater evoked more disgust, more embarrassment and less admiration; she was perceived as less likeable, as prettier, and as more threatening. Participants also reported that she was more dissimilar to the participants themselves, and that they would be less likely to go to a concert with her and less willing to be her friend. This pattern is consistent with previous research showing that promiscuous

females tend to be judged harshly (Marsh & Paton, 1986; Sprecher, McKinney, & Orbuch, 1987); however, it makes the lack of significant interaction effects difficult to interpret, because the strength of the main effect of the female type may have overshadowed any two way-interactions between female type and either motive type or relationship status. The predicted interaction would involve females in the control mindset *not* distancing themselves from the cheater.

It is important to note that I did not predict significant interactions for all dependent variables; in particular, no interaction effect was expected for perceived threat and for judgments of cheater's prettiness. I aimed to show that the differential distancing behaviour of participants in different motive type conditions vis-à-vis the cheater was not driven by their perceptions of her attractiveness or by the threat she posed. On the other hand, I did predict an interaction for the three additional measures of social distancing (willingness to go to a concert with her, willingness to be her friend, and ratings of target-female/self similarity).

Study 2: Female social distancing from an unfaithful other (Yvette)

In this study I modified the strength of the female type manipulation by including more positive information about the females in all conditions. To make this possible, I changed from animations of the characters and their behaviours to verbal depictions. The reason is that although it is relatively easy to make a female seem promiscuous by soundlessly animating abstract shapes, it is much more difficult to convey other kinds of information about her.

I also excluded the explicit manipulation of relationship status from this experiment, so that only one manipulation of romance, motive type, was left. This was deemed to be sufficient for two reasons. First, the strength of the female type manipulation was diminished, and second, research has shown that people are capable

of engaging in self-presentational behaviours even in the absence of the relevant

audience (Baldwin, Carrell, & Lopez, 1990; Griscevicius et al., 2006, 2007).

In addition to changing the materials, in Study 2 I also extended the

manipulation of motive type and female type by adding another condition to each of

the two factors. This was done in order to rule out possible alternative explanations of

the predicted results. Thus, the design of the study became a 3(Motive type: long-term

romance mindset vs. short-term romance mindset vs. control mindset) * 3(Female

type: cheater vs. player vs. traveller control) fully between-participants design.

The short-term romance condition was included in the motive type factor in

order to enable me to argue that it is not just romantic mindset, but rather *long-term

romance* mindset that evokes social distancing from unfaithful others. I predicted, in

effect, that participants in the short-term romance condition would behave similarly to

participants in the control mindset condition. I also changed the control mindset

scenario from one in which the protagonist goes to a concert to a scenario where she

loses a wallet (Griscevicius et al., 2006). The reason for this change was that one of

the main measures of social distancing is willingness to go to a concert with the target

female, so I wanted to avoid priming concert-going and thereby artefactually inflating

control participants' responses to this measure.

For the female type factor, I included the player condition as a second control

in order to rule out two different alternative explanations. The first has to do with the

threat to a stable relationship posed by a promiscuous female. Such a threat could

potentially be a reason enough for a mated female to distance herself from the cheater,

so in the absence of a control for promiscuity (i.e., the player condition) the pattern of

results I predict could be explained in terms of this threat. The second alternative

explanation I sought to rule out was a negative social labelling explanation, whereby

females primed with long-term romance distance themselves from promiscuity on the grounds that it is a negative label for females, rather than infidelity per se[6]. Here, females would distance themselves from the cheater in order to avoid being labelled in a socially undesirable way (i.e., as 'promiscuous') by an audience they care about most (long-term partner, as opposed to a short-term partner and non-social control). For this factor, too, I predicted that participants in the player condition would behave similarly to participants in the control condition.

<center>Method</center>

Participants

Participants were recruited through the internet. They were given a chance to enter a lottery at the end of the study to win an Amazon voucher of £40, £20 or £10. The study was advertised on the Facebook and on websites that host links to online psychological studies, such as http://psych.hanover.edu, www.in-mind.org, and www.socialpsychology.org. Of the 237 participants who participated in the study, 171 were retained for analysis (see Results for exclusion criteria). The average age of the sample was 24.23 (SD = 7.27). Their ethnic background was as follows: 88% White, 6% Asian, 2% Latino/Hispanic, and the rest were Black or Other. Forty-two per cent of the sample reported being single; 38% were either married or 'in a serious committed relationship,' while the rest were in casual or steady dating relationships. Fifteen per cent of respondents reported having at least one child. Seventy-eight per cent had at least some college education and another 8% attended graduate school. Finally, 64% of the sample came from the UK, 32% came from the US, 1% from Canada, while the rest were either continental European or Australian.

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[6] Until now I've been using the words 'unfaithful' and 'promiscuous' interchangeably; now, however, I adopt the distinction proposed here.

Materials

For the motive type manipulation I used Griskevicius et al.'s (2006) materials. The committed long-term romance condition was the same as in Study 1. In the short-term romance condition, participants read a story in which they imagined meeting a highly desirable member of the opposite sex while on a vacation on a tropical island. The meeting occurred on the very last day of the vacation, and the story depicts a romantic day ending in a passionate kiss. Throughout the story, participants are reminded that they will never see this person again. In the control condition, participants read a story in which they imagined losing and looking for a wallet; the story describes the initial anxiety over the inability to find the wallet, but ends with the protagonist finding it and leaving the house feeling elated.

Three scenarios describing different females were prepared in advance (see Appendix 3. In the first scenario (cheater) a female named Yvette was described as an adventurous woman who likes variety and frequently changes her dating partners; in order to depict her unfaithfulness it was stated that 'she particularly enjoys the thrill of dating two men at the same time without them realising it'. In the second scenario (player) Yvette is described in the similar way, but it is stated that even though she changes her partners frequently, she does not date more than one person at any given time. In the third scenario (traveller control) Yvette is similarly described as adventurous, but in this condition she is described as moving frequently from city to city, rather than changing her dating partners frequently.

Measures

All key dependent variables were measured on a 23-point visual analog scale (1 – not at all, 12 – moderately, 23 - extremely). The scales were realised as sliders on the computer screen; the cursor always appeared in the centre of the slider, directly

above a point labelled 'moderately'. The only dependent measure that was accompanied by a different set of instructions was 'How similar do you think you are?' (i.e., to Yvette). For this item, participants were provided with a diagram that helped them to visualise what 'similar' means in this context (see Appendix 4).

I also included a 4-item scale measuring the quality of participation ($\alpha = .74$, see Appendix 5). The questions were designed to probe how much effort participants invested in completing the questionnaire, and how much their answers reflected their true opinions.

Procedure

After reading the informed consent form and agreeing to take part in the experiment, participants answered questions about age, ethnic background, sexual orientation and other demographic variables. They were then randomly allocated to one of the three motive type conditions (long-term romance, short-term romance, or control) and were led to believe that the scenarios they were going to read were given to them because the experimenters were interested in 'whether the atmosphere of imagined events affects later recall'.

After reading the motive type materials, participants completed the manipulation check questions. In particular, they were asked to indicate the extent to which they were able to visualise what was happening in the scenario, the extent to which they were excited and happy, and the extent to which they experienced romantic arousal (the order of these items was counter-balanced). Participants then were randomly allocated to one of the female type conditions (cheater, player, or control) and read the corresponding scenario about Yvette. Next, participants answered a number of questions about their perceptions of Yvette; responses to these

questions were the key dependent variables (see Appendix 4). Finally, they completed

the participation quality questionnaire and were fully debriefed.

Design

The design of this study was a 3 (Motive type: long-term romance vs. short-

term romance vs. control mindset) * 3 (Female type: cheater vs. player vs. traveller

control) fully between-group design.

<div align="center">Results</div>

Exclusion Criteria

I excluded a total of 66 participants for the following reasons: failure to

indicate sexual orientation or indicating being bi- or lesbian or gay male (24

participants); being 50 years of age or above (11 participants); proceeding through

pages of the study more than 2.5 times faster than the average participant (17 cases);

scoring more than 1.96 SD less than the mean on the participation quality

questionnaire (6 cases); not being fluent in English (5 cases); and answering 1 (not at

all) or 2 on the 7-point scale that probed whether participants were successful in

visualising the scenarios (3 cases).

Attrition Rates

One concern with internet studies is that participant attrition rates might differ

between conditions. This may happen because participants might find some

conditions more interesting than others and thus they might be more likely to drop out

of 'boring' control conditions. Such selective attrition might introduce a systematic

bias in self-selection to different conditions and confound the results.

Examination of attrition rates in this study revealed that, even though

participants did tend to stay in the treatment conditions more than in the control

conditions, the differences were not very large. More specifically, for the motive type

manipulation attrition rates from the three conditions varied from 24% to 28%, while

for the female type manipulation attrition rates varied from 23 to 30%.

Manipulation Checks

The effect of motive type on romantic arousal was significant, $F(2, 168) =$

101.57, $p < .0000005$, $\eta^2 = 0.55$, such that participants in the long-term romance

condition ($M = 4.57$, SD =1.49) and the short-term romance condition ($M = 4.69$, SD

= 1.57) were more romantically aroused than participants in the control condition (M

= 1.48, SD = 1.10). However, participants in the three conditions did not differ with

respect to how happy the scenarios made them, $F(2, 168) = 2.34$, *ns*. There was also

no effect of motive type on how well participants were able to visualise the scenarios,

$F(2, 168) = 1.84$, *ns*.

There was, however, a significant effect of motive type on how excited

participants felt, $F(2, 168) = 6.12$, $p = .003$, $\eta^2 = 0.068$, such that participants in the

short-term romance condition experienced the highest levels of excitement ($M = 4.94$,

SD = 1.61), followed by participant in the long-term romance condition ($M = 4.82$,

SD = 1.50), followed by participant in the control mindset condition ($M = 3.95$, SD =

1.84). Post-hoc tests revealed that there was no difference between the long-term and

short-term romance conditions, but both long-term romance ($p = .005$) and short-term

romance ($p = .002$) were significantly different from the control condition. I control

for level of excitement in all subsequent analyses.

To establish whether participants understood the difference between the long-

term and short-term romance scenarios, I analyzed the effect of these two conditions

on the item 'How likely were you to see him again?' An independent-samples t-test

revealed that participants in the long-term romance condition were significantly more

likely than participants in the short-term romance condition to choose the option 'very likely' as opposed to 'not likely at all', $t(77.91) = 9.64$, $p < .0000005$, $d = 2.18$.

Contrast Analysis

In order to test the specific prediction in which I am interested I recoded the two 3-level factors (motive type and female type) into a single 9-level factor with the following conditions: (1) long-term romance and cheater; (2) long-term romance and player; (3) long-term romance and traveller control; (4) short-term romance and cheater; (5) short-term romance and player; (6) short-term romance and traveller control; (7) control mindset and cheater; (8) control mindset and player; (9) control mindset and traveller control.

I then constructed contrasts to test the hypothesis that participants distance themselves from the cheater more than from the player and traveller control, but only when they are in the long-term romance mindset, or – in other words – that (i) participants would exhibit more distancing behaviours in the long-term romance condition (vs. short-term romance and control mindset) *and* (ii) participants would exhibit more distancing behaviours when faced with the cheater (vs. player and traveller control). This contrast will, in effect, compare a single cell (the long-term romance/cheater condition) to all other cells[7].

Thus, the contrast for the motive type manipulation was (2, 2, 2, -1, -1, -1, -1, -1, -1), because the motive type manipulation was represented in the following way: long-term romance mindset (conditions 1, 2, and 3), short-term romance mindset (conditions 4, 5, and 6), and control mindset (conditions 7, 8, and 9). On the other hand, the contrast for the female type condition was (2, -1, -1, 2, -1, -1, 2, -1, -1),

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[7] Note that, for statistical reasons (Rosenthal & Rosnow, 1985), it would not be correct to use a more intuitively appealing contrast (-8, 1, 1, 1, 1, 1, 1, 1, 1).

because the female type manipulation was represented thus: cheater (conditions 1, 4, and 7), player (conditions 2, 5, and 8) and traveller control (conditions 3, 6, and 9).

The first contrast (motive type) compares the three long-term romance conditions to the remaining six conditions, while the second contrast (female type) compares the three cheater conditions to the remaining six conditions. What I am interested in, however, is the interaction of these contrasts, which is obtained by multiplying the two. The interaction contrast of (2, 2, 2, -1, -1, -1, -1, -1, -1) and (2, -1, -1, 2, -1, -1, 2, -1, -1) is (4, -2, -2, -2, 1, 1, -2, 1, 1); and this is the contrast I used in the analysis.

A significant interaction contrast would indicate that the difference between the cheater and the player/traveller control conditions depends on whether the motive type is long-term romance or short-term romance/control. More specifically, it would indicate that participants distance themselves from the cheater more than from the player and traveller control, but only when they are in the long-term romance mindset.

Willingness to Go to a Concert with Yvette

The item 'go to a concert', was significantly non-normal, $D(171) = 0.11$, $p = .000038$, and negatively skewed. I therefore transformed this variable using the recommended 'reflect and square root' function (Tabachnik & Fidell, 2007). The values of outliers were also changed (the next highest value plus 0.01 or the next lowest value minus 0.01, as appropriate). These procedures produced a normally distributed variable, $D(171) = 0.065$, *ns,* with no outliers.

The predicted contrast effect was significant, $F(1, 161) = 4.78$, $p = .03$, $\eta^2 = 0.029$ (see Figure 7). The main effect of female type was also significant, $F(2, 161) = 5.87$, $p = .003$, $\eta^2 = 0.068$, such that participants were much less likely to say 'yes' to

going to a concert with the cheater ($M = 3.03$, SD = 0.85) than the player ($M = 2.66$,

SD = 0. 76) or the traveller control ($M = 2.49$, SD = 0.78).
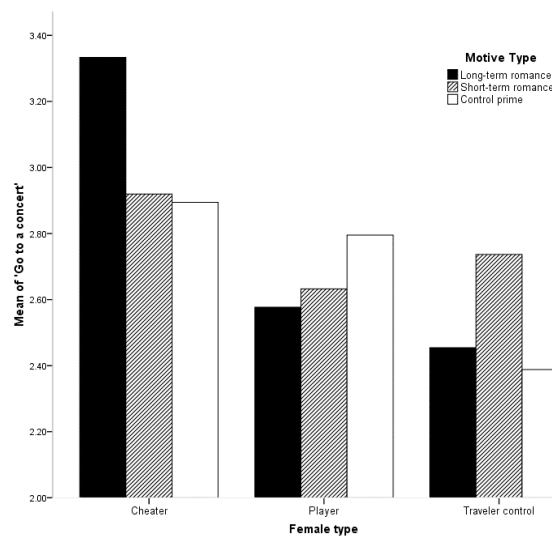
Figure 7. Interaction effect of motive type and female type on the likelihood of saying
'yes' to going to a concert with Yvette. Note that lower values represent *stronger*
desire to go to a concert with Yvette.

Perception of Own Similarity to Yvette

The item 'how similar are you' was significantly non-normal, $D(171) = 0.12$,

$p = .000002$, and positively skewed. I therefore transformed this variable using the

recommended square-root function (Tabachnik & Fidell, 2007). The values of outliers

were also changed (the next highest value plus 0.01 or the next lowest value minus

0.01, as appropriate). Although the transformed variable was still non-normal, $D(171)$

$= 0.11$, $p = .000009$, it had no outliers and the standardised values of skewness and

kurtosis were less than 1.96. I proceeded with the analysis, because ANOVAs are

robust against moderate violations of normality (Glass, Peckham & Sanders, 1972).

The predicted contrast was significant, $F(1, 161) = 4.74$, $p = .03$, $\eta^2 = 0.029$

(see Figure 8). The main effect of female type was also significant, $F(2, 161) = 10.44$,

$p = .000054$, $\eta^2 = 0.115$, such that participants indicated that they were less similar to

the cheater ($M = 2.34$, SD $= 0.94$) than the player ($M = 2.96$, SD $= 0.78$) or the

traveller control ($M = 2.81$, SD $= 0.55$).
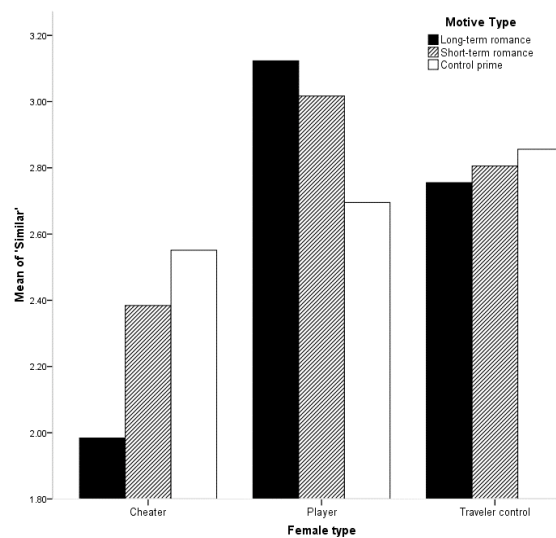
Figure 8. Interaction effect of motive type and female type on participants' ratings of their similarity to Yvette.

Willingness to be Friends with Yvette

The item 'how much would you like her to be your friend' was significantly

non-normal, $D(171) = 0.15$, $p < .0000005$, and negatively skewed. I therefore

transformed this variable using the recommended 'reflect and square root' function

(Tabachnik & Fidell, 2007). The values of outliers were also changed (the next

highest value plus 0.01 or the next lowest value minus 0.01, as appropriate). Although

the transformed variable was still non-normal, $D(171) = 0.11$, $p < .000019$, it had no

outliers and the standardised values of skewness and kurtosis were less than 1.96.

The predicted contrast was significant, $F(1, 161) = 4.25$, $p = .04$, $\eta^2 = 0.026$

(see Figure 9). The main effect of female type was also significant, $F(2, 161) = 19.35$,

$p < .0000005$, $\eta^2 = 0.19$, such that participants were less willing to be a friend of the

cheater ($M = 3.69$, SD $= 0.59$) than the player ($M = 3.07$, SD $= 0.54$) or the traveller

control ($M = 3.25$, SD $= 0.52$).
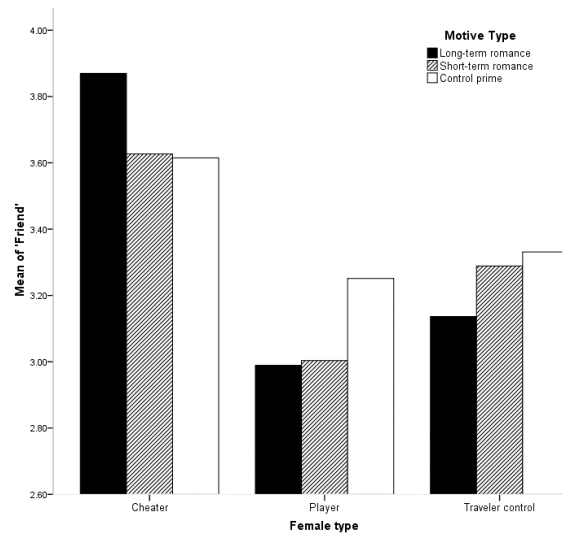
Figure 9. Interaction effect of motive type and female type on the willingness of participants to be Yvette's friend. Note that lower values represent *stronger* desire to go to a concert with Yvette.

Perceptions of Yvette's Attractiveness and Overall Likeability

In the analysis of ratings of how pretty Yvette was judged to be, there was only a significant main effect of female type, $F(2, 161) = 3.76$, $p = .025$, $\eta^2 = 0.045$, such that participants judged the cheater ($M = 14.16$, SD $= 3.4$) to be less pretty than either the player ($M = 15.79$, SD $= 3.36$) or the traveller control ($M = 15.16$, SD $= 2.55$). The contrast used in other analyses was not significant. There were also no other significant main or interaction effects in a factorial ANOVA.

The analysis of ratings of Yvette's overall likeability also revealed only a main effect of female type, $F(2, 161) = 21.47$, $p < .0000005$, $\eta^2 = 0.21$, such that the cheater was perceived to be less likeable ($M = 10.93$, SD $= 3.7$) than either the player ($M = 14.85$, SD $= 3.97$) or the traveller control ($M = 14.76$, SD $= 3.61$). There were no other significant main or interaction effects in a factorial ANOVA.

Perceived Threat Posed by Yvette

The item 'threatening' was significantly non-normal, $D(171) = 0.11$, $p = .000035$, and there was significant negative kurtosis (-2.1). Negative kurtosis

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produces underestimates of variance (Tabachnik & Fidell, 2007), a problem that cannot be dealt with by transforming the data. Following the recommendations of Tabachnik and Fidell (2007), I dichotomised this variable. In the analysis of these dichotomised ratings there was only a significant main effect of female type, $F(2, 161) = 7.1$, $p = .001$, $\eta^2 = 0.081$, such that the traveller control was perceived to be less threatening ($M = 1.31$, SD = 0.47) than either the player ($M = 1.53$, SD = 0.53) or the cheater ($M = 1.67$, SD = 0.49). The contrast used in other analyses was not significant. There were also no other significant main or interaction effects in a factorial ANOVA.

Discussion

The predicted contrast effect was significant for all three measures of social distancing. Females in a long-term romance (vs. short-term romance and control mindset) condition were more reluctant (i) to go to a concert with the cheater, (ii) to be the cheater's friend, and (iii) to regard herself as similar to the cheater. These three motive type groups did not differ from each other in their desire to go to a concert with a player or a traveller control.

As in Study 1, there was a persistent main effect of female type on the dependent measures. In a way, it is inevitable that female type manipulation will be stronger than motive type manipulation, because when using only verbal stimuli it is easier to lead participants to form strong judgments about other people than to evoke a potent romantic mindset. Verbal depiction is a common source of judgments about others but not of romantic feelings. However, even though female type manipulation was strong, I succeeded in diminishing its strength relative to what it was in Study 1, so that it no longer overshadowed the interactions of interest.

The obtained pattern of results enables us to rule out the alternative explanations mentioned above. First, the fact that females in the control mindset condition behaved similarly to females in the short-term romance condition allows me to conclude that it is not merely the romantic nature of the long-term romance mindset that led females in this condition to distance themselves from the cheater. Had I not included the short-term condition, it would have been possible to argue that females in a romantic mindset distanced themselves from the cheater, because – by being unfaithful – the cheater betrayed the contract implicit in a romantic partnership. The most parsimonious explanation for the demonstrated effect would then be social as opposed to evolutionary in nature. This is not, however, what my results show.

The other two alternative explanations that I am able to rule out are the threat and the negative labelling explanations. First, the fact that the significant contrast effects on our measures of social distancing were not accompanied by a similar effect on the measure of threat suggests that an explanation in terms of threat is at the very least unlikely to be the whole story. Moreover, if the threat explanation were correct, I should have found that females in the long-term romance mindset also distance themselves from the player, because theoretically the player poses as much of a threat to the relationship as the cheater. Second, the fact that females in the long-term romance condition did not distance themselves from the player suggests that the distancing that occurred in the cheater condition was not due to the fact that females were simply afraid of being negatively labelled (i.e., as promiscuous) by association.

Study 3: Female expressive distancing from an unfaithful other
(reported nonverbal behaviour)

One alternative explanation that still needs to be ruled out is the possibility that the effect may be gender-neutral. It is possible that when pursuing a potential

long-term partner, both males and females seek to distance themselves from a same-sex person who behaves in a way that casts doubt on his/her integrity. If this were the case, the effect might simply be a generalised strategy that consists of wanting to appear to have a 'wholesome' personality to people who matter, rather than having its basis in paternity uncertainty. To rule out this gender-neutral explanation, in Study 3 I also collected data from males.

I also used a different method of eliciting self-presentational concerns. Rather than the *motive type* manipulation used in Studies 1 and 2, I manipulated *audience type* by asking participants to imagine being in the presence of a person in whom they were romantically interested, a person of the opposite gender for whom they had no particular feelings, or a person of the same gender whom they wanted to befriend. The choice of controls for the audience type manipulation was dictated by the necessity to control for (i) the gender of the audience in the experimental condition and (ii) the implicit self-presentational concerns of the experimental condition.

I also sought to present participants with a situation that called for active self-presentation. Not going to a concert with the cheater or not wanting to be her friend are ways of distancing oneself from her that do not actively communicate to the intended audience the sentiments underlying such decisions. In Study 3 I presented participants with a scenario in which they were faced with a person of the same gender who revealed her/his tendency to be unfaithful and asked participants how they would feel and what they would express on their face regarding the unfaithful other to their romantic interest other, opposite-sex acquaintance or same-sex friend.

<div align="center">Method</div>

Participants

Participants were recruited through the internet. They were given a chance to enter a lottery at the end of the study to win an Amazon voucher of £10, £20 or £40. The study was advertised on the Facebook and on websites that host links to online psychological studies, such as http://psych.hanover.edu and http://www.onlinepsychresearch.co.uk. Of the 176 participants who completed the study, 125 were retained for analysis (60% female; see Results section for exclusion criteria). The average age of the retained sample was 25.73 years (SD = 8.54); 81% identified themselves as White, 8% as Asian, 6% as Black, 3% as Latino or Hispanic, and 1% as Other. Fifty-three per cent reported that they were single; 33% were either married or 'in a serious committed relationship,' while the rest were in either casual dating or steady dating relationships. Nineteen per cent of respondents reported having at least one child. Seventy per cent had at least some college education and another 8% attended graduate school. Finally, 63% of the sample came from the US, 24% came from the UK, 4% from Canada, and 4% from continental Europe, while the rest were from Australia, China, Israel, Japan, and Philippines.

Materials

The scenario concerned a participant's same-sex flatmate who jokingly revealed that he/she is being unfaithful to his/her partner (see Appendix 6) to the participant and the participant's companion (audience type manipulation).

To assess nonverbal behaviour I prepared a set of pictures from which participants could choose the expression that best resembled the one that they themselves would make in response to the events in the scenario. Each expression corresponded to a specific emotion: neutrality, distress, anger, disgust, embarrassment, and joy (see Appendix 6). Except for the 'embarrassment' expression, which was taken from Keltner, Young, and Buswell (1997), all other pictures were

taken from the FACS Manual (Ekman et al., 2002). Pictures were cropped to include

only the facial area and blurred slightly in order to make irrelevant characteristics,

like gender, age, and physical attractiveness, less salient.

Procedure

After reading the informed consent form and agreeing to take part in the

experiment, participants answered several demographic questions (same as those in

Study 2). They were then randomly allocated to one of three audience type conditions

(see Appendix 7). They were asked to imagine a particular person of the opposite

gender with whom they (i) wanted a romantic relationship or (ii) did not want a

romantic relationship; or to imagine a particular person of the same gender with

whom they (iii) wanted to be friends. Participants were instructed that in the scenario

that they would read, they should imagine being in the presence of this person.

Participants were then presented with the scenario. After reading it, participants rated

the extent to which they would experience certain emotions (see Appendix 6) and

chose from the set of six different facial expressions the expression that they would be

most likely to make to their audience regarding the unfaithfulness of their flatmate.

Finally, all participants were fully debriefed.

Design

The study had a 2 (Participant gender: male vs. female) * 3 (Audience type:

date vs. opposite-sex control vs. same-sex friend) fully between-participants factorial

design.

<div align="center">Results</div>

Exclusion Criteria

Of the total sample that completed the study, I excluded cases (i) where

participants proceeded through the web pages more than 2.5 times faster than the

average participant (16 cases), (ii) where participants reported being younger than 18

years of age (2 cases); (iii) where participants reported being lesbian, gay male, or

bisexual (8 cases); and (iv) where participants reported being 50 years of age or over

(25 cases).

Attrition Rates

As in the previous study, participant attrition rates from different conditions

did not differ across audience type: Attrition varied from 24% to 31% in this study.

Manipulation Checks

In a 1-way ANOVA I examined the effect of audience type (date vs. opposite-

sex control vs. same-sex friend) on ratings of physical attractiveness of the imagined

person. This was highly significant both for the 'objective' (*How attractive do other*

people find this person?, $F(2, 122) = 4.93$, $p = .009$, $\eta^2 = .075$) and 'subjective' (*How*

attractive was that person to you?, $F(2, 122) = 17.52$, $p < .0000005$, $\eta^2 = .225$)

measures. Planned contrasts revealed that dates were rated as more attractive than

opposite-sex controls on both measures (objective, $p = .002$; subjective, $p = .000001$).

Although there was a non-significant tendency for friends and controls to be rated

differently on the objective measure of attractiveness, $p = .094$, such that same-sex

friends ($M = 4.68$, SD = 1.33) were rated as more attractive than opposite-sex controls

($M = 3.16$, SD = 1.52), this was not considered to be a problem because the difference

was marginal and because friends and controls were not rated significantly differently

on the subjective measure of attractiveness.

Further analysis revealed that compared to opposite-sex controls ($M = 3.18$,

SD = 1.92), dates ($M = 5.45$, SD = 1.64) were rated as more desirable long-term

romantic partners, $t(83) = 5.87$, $p < .0000005$, $d = 1.29$. Participants reported that they

would have liked the imagined person to be their friend significantly more in the

same-sex friend condition ($M = 5.13$, SD = 1.42) than in the opposite-sex control

condition ($M = 4.37$, SD = 1.6), $t(76) = -2.12$, $p = .03$, $d = 0.49$. The audience

manipulation was therefore considered to be successful.

Reported Emotions

Although the interaction between audience and gender was not significant for

any of the reported emotions (affection, amusement, disgust, or embarrassment), the

main effect of audience on experienced embarrassment was significant, $F(2, 119) =$

14.52, $p = .023$, $\eta^2 = .061$. Participants were more embarrassed in front of a date ($M =$

4.02, SD = 1.83) than in front of a control ($M = 2.95$, SD = 1.9) or a friend ($M = 3.0$,

SD = 2.05).

Facial Expressions

To examine the effect of audience on this variable I recoded it into a

dichotomous variable, dividing expressions into 'accepting' or 'rejecting.' The

accepting expression was a smile, while rejecting expressions were anger, disgust,

neutrality and sadness.

A neutral expression was deemed to be rejecting for two reasons. First,

participants were choosing how to react to a comment that was clearly meant to be

amusing, so there was a certain amount of pressure to react 'appropriately', i.e. by

smiling. Second, neutral expressions are often perceived as negative (Lee, Kang,

Park, Kim, & An, 2008), to the extent that some researchers who study facial

expressions alter neutral expressions to be 25% happy (e.g., Phillips et al., 1997), so

that they are perceived as neutral by participants. The neutral expression I used was

taken from the FACS manual (Ekman et al., 2002), and had not been modified in this

way.

Embarrassment was excluded from the analysis, because the data suggested that participants often mistook this expression for a positive one. Thus, expressing embarrassment was positively correlated with the experience of amusement, r_s = .279, p = .002, and uncorrelated with the experience of embarrassment, r_s = -.015, *ns*. With the benefit of hindsight, this pattern of results is not surprising because the embarrassment expression I used depicted a person smiling while looking down and touching his face (see Expression 5 in Appendix 6). The emotion that it portrayed could be experienced in reaction to, for example, being praised in public – an event that can certainly be embarrassing, but is not unpleasant. I reasoned that including this expression in the analysis would make the interpretation of the results difficult[8]. Together, the remaining expressions (anger, disgust, happiness, neutrality, and sadness) comprised 82% of all chosen expressions for both genders.

A Kruskal-Wallis test of the effect of audience on female displays of accepting and rejecting emotions was significant, χ^2 = 9.51, p = .009 (see Figure 10), such that females expressed rejection (anger, disgust, neutrality and sadness) more often than acceptance emotions in the date condition. The comparable test was not significant for males, χ^2 = 0.50, *ns* (see Figure 11).

Conscious Desire to Impress

I measured conscious desire to impress by asking participants whether, in choosing what they would express, they were motivated to impress the person they were asked to imagine. Participants indicated their answers on a scale ranging from 1 (not at all) to 4 (moderately) to 7(extremely). There was no significant interaction effect of audience type and gender on this measure, $F(2, 104)$ = 0.50, *ns*, η^2 = .01. The average score was 3.25 (SD = 1.90).

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[8] It is worth noting that the pattern of results remains the same if we include embarrassment as a 'rejecting' expression.
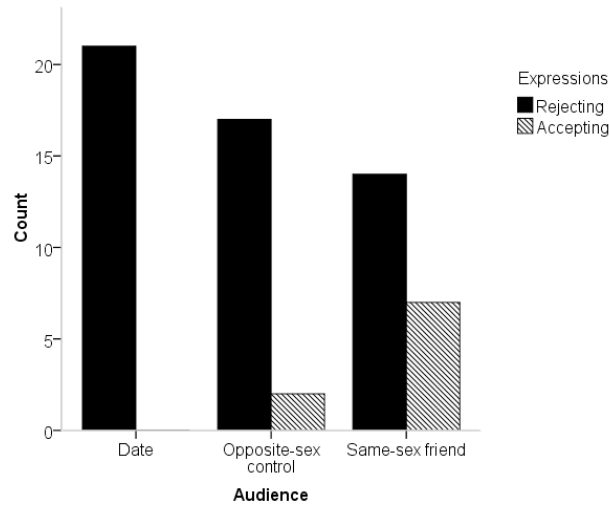
Figure 10. Effect of audience type on females' expressions of rejecting and accepting expressions.
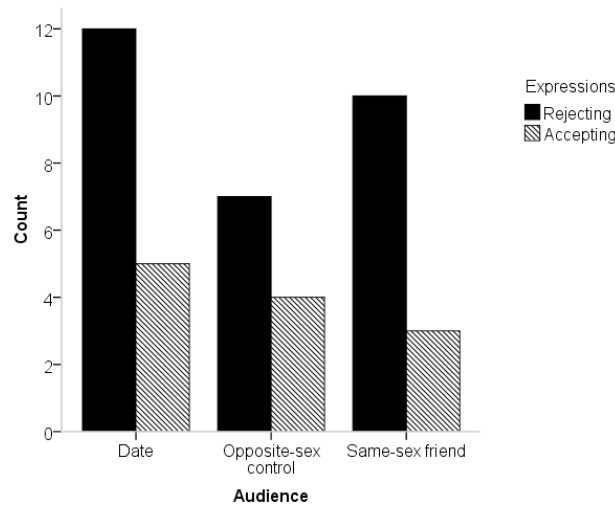
Figure 11. Effect of audience type on males' expressions of rejecting and accepting expressions.

Discussion

I found a significant effect of audience type on females' expressions of rejecting and accepting emotions regarding an unfaithful acquaintance. Females were more likely to express negative emotions to a date than to an opposite-sex control or to a same-sex friend. This pattern was reversed for accepting expressions, such that

females were most likely to express positive emotion regarding the unfaithful acquaintance to a same-sex friend.

Like females, males were more likely to express rejecting emotions than accepting emotions; however, the likelihood that they would express a certain type of emotion (rejecting or accepting) did not vary as a function of audience type. Thus, the effect is not gender-neutral. As predicted, only females modulated their emotional expressions regarding an unfaithful acquaintance as a function of audience type.

Study 4: Female expressive distancing from an unfaithful other (nonverbal behaviour)

In Study 4, I sought to show that females motivated to attract a long-term partner use facial expressions in order to distance themselves from unfaithful others. In this study I used the paradigm I had developed for investigating the effect of the psychological presence of a desirable male on female reactions towards infants (see Chapter 2). Thus, romance was primed using Griscevicius et al.'s (2006) materials, and participants were then videotaped while they watched a neutral film as well as a film depicting an unfaithful female protagonist.

There are notable differences between Studies 3 and 4 that need to be considered before hypotheses about the nature of the effect of motive type on nonverbal behaviour can be advanced. Most importantly, in Study 3 the expressions of emotion are directed at the intended audience (i.e., the date), because the unfaithful flatmate is no longer in the room when the expression is called for (see Appendix 6). In Study 4, however, the expressions of emotion are directed at the unfaithful female portrayed in the infidelity film.

At first glance, it seems odd to claim that an emotion would be expressed towards a female *in the video*, because participants, like any other viewers, are fully

aware of the fact that individuals appearing on screen are not in any sense responsive to their immediate behaviour. However, there are good theoretical reasons to believe that individuals would not be completely unmoved by people on the screen: Only in the last 100 years of approximately 2 million years of human evolution have people started being exposed to images of moving individuals with whom they could not meaningfully interact. It therefore seems likely that humans are hard-wired to treat every visually available person as a potential interaction partner (Reeves & Nass, 1998).

There is a growing body of research that suggests as much. In a striking demonstration of how people can be affected by virtual agents whom they know to be non-sentient, Pertaub, Slater, and Barker (2002) showed that participants who gave a speech in front of a disapproving virtual audience were less confident and more anxious than participants who gave their speeches to approving or neutral virtual audiences. Also it has been shown that people perceive TV not just as a box but as a place where events take place: Reeves, Lombard and Melwani (1992) showed that when people moved closer to the screen they felt as if they were closer to the people displayed on the screen. Lombard (1995) also showed that when people watched TV in a closer proximity to the screen, they made more extreme evaluations of the characters portrayed, just as they do in real life when interpersonal distance is low.

This evidence suggests that people *are able to* express emotions towards characters they see on TV; however, the question still remains whether participants in the present study would express their emotions towards the female in the film rather then the romantic partner who is implicitly present in the situation. Behaviour is often influenced by people who are not physically present (Baldwin, Carrell, & Lopez, 1990; Fridlund, 1992, Griskevicius et al., 2006) and in the past researchers have used

this fact to study self-presentational behaviour (e.g., Roney, 2003; Wilson & Daly, 2004). However, does the success of these studies imply that the self-presentational behaviour will necessarily *be directed at* the psychologically salient audience? Having an audience in mind under whose 'supervision' we choose to behave in our daily lives may be a familiar experience for most people. Freud (1920) recognized that this dynamic plays an important role in our enculturation into adult society when he proposed that *super-ego,* a mental representation of one's parents' views, is an integral part of the human psyche. If this dynamic of performing for psychologically salient audiences is a feature of the human psyche, there is no reason why this mechanism should not be sensitive to the fact that behaving towards Person A in the psychological presence of Person B is different from behaving towards Person B when Person A is being talked about. If my mom tells me to be nice to an aunt whom I don't really like, I can smile at the aunt when my mom is present only in my mind, but I can roll my eyes at my mom when she mentions the aunt.

The point is that the behaviour will somehow reflect all accessible and relevant persons, but it is probable that the target of behaviour (i.e., the person to whom an emotion is expressed) will be the person who has the most salient physical presence. In the paradigm used in the present study, it was the unfaithful female who satisfied this criterion. It is for these reasons that I maintain that the expressions of emotion will be directed at the unfaithful female portrayed in the infidelity film.

The argument in Study 3 was that in the physical absence of the unfaithful flatmate females would distance themselves from her by expressing rejecting emotions regarding her to their audience. The question that arises concerning the effects to be expected in Study 4 is whether females would distance themselves from the unfaithful other by expressing rejecting emotions towards *her*. This is not the only

option. Individuals might also distance themselves from an undesirable other by expressing less emotion of any kind towards her: There is a body of research supporting this claim. First, people who chronically suppress their expressions tend to damage their social relationships (Gross & John, 2003), which is the main objective of social distancing. Second, in marital relationships suppression of expressions, otherwise known as 'stonewalling,' on the part of one of the partners is associated with lower relationship satisfaction (Gottman, 1998). Finally, acute expressive suppression during social interactions disrupts these interactions and makes the suppressor less liked by their interaction partner (Butler et al., 2003). It is therefore possible that expressive suppression, or showing less of any kind of emotion, would be used to create social distance between self and an undesirable other.

Thus, there are two competing hypotheses regarding the form the distancing in Study 4 would take. Hypothesis 1 is that *females motivated to attract a long-term partner would show less positive emotion and more negative emotion towards a female known to be unfaithful*, while Hypothesis 2 is that *females motivated to attract a long-term partner would show less positive and less negative emotion towards a female known to be unfaithful.*

<div align="center">Method</div>

Participants

Eighty female psychology students from Cardiff University took part in this experiment. Of these, 71 were retained for analysis (see Results for the exclusion criteria). The average age of the retained sample was 18.61 years (SD = 0.89); 96% of the sample identified themselves as British, and 4% as Other European. Forty-seven per cent reported that they were single. None of the participants had any children.

Measures of Nonverbal Behaviour

As before (see Chapter 2) FACS (Ekman et al., 2002) was used to code the facial behaviour of participants. Three Action Units (AUs) or combinations of Actions Units were coded: AU4 (frowning), AU12 (at intensities A & B, slight smiles), and AU6+12 (Duchenne smiles).

A certified FACS coder acted as the second-coded 15% of the video data. He was blind to the hypothesis and unaware of the contents of the videos participants watched. The inter-rater reliability was 76%.

Measures of Emotional Experiences

After each film, participants were asked about their emotional experiences during the films. In particular they were asked *'While watching this movie, to what extent did you experience …?'* Emotions measured were affection, amusement, anger, sadness, and surprise; the scale ranged from *1* – not even the slightest bit of emotion, to *8* – the most I have ever felt in reaction to a movie. Participants were also asked to indicate how pleasant the films were (valence); the scale here ranged from *1* – unpleasant, to *5* – neutral, to *9* – pleasant.

Materials

As in Studies 1 and 2, I used Griskevicius et al.'s (2006) materials to manipulate motive type. In this study I used the committed long-term romance scenario and the non-social scenario, in which the protagonist loses her wallet.

Two short films were prepared in advance. Film 1 (infidelity film) was an edited version of the trailer for the film *Unfaithful*. It was 1 minute and 28 seconds long; however, only the video data corresponding to the last 55 seconds were coded. This was because the unfaithfulness of the main protagonist only became evident during the last 55 seconds of the trailer. Film 2 (neutral film) was designed to be

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emotionally neutral: It was a recording of Amazonian rainforest with a peaceful

classical music piece playing in the background. This film was 1 minute long.

Procedure

Participants arrived at the laboratory and signed an informed consent form.

They were then asked to read a story that primed either a romantic or a control

mindset. Participants next watched two stimulus films while their facial behaviour

was videotaped. Finally, participants were fully debriefed.

Design

The design was a 2 (Motive type: romantic mindset vs. control mindset) x 2

(Film type: infidelity vs. neutral) mixed factorial design. Motive type was a between

participants factor, while film type was a within participants factor.

Results

Exclusion Criteria

Of the 80 participants who took part in this study, nine were excluded from the

analysis for the following reasons: (i) reporting being lesbian or gay male or failure to

indicate sexual orientation (2); (ii) poor video quality (4); (iii) scoring more than 3SD

above the mean for anger during the neutral movie (2); and (iv) not being affected by

the romantic scenario (as revealed by the manipulation checks, 1).

Manipulation Checks

There was a significant effect of motive type on the degree of romantic

arousal, $t(62.44) = 14.75$, $p < 0.0000005$, $d = 3.73$, happiness, $t(42.78) = 3.70$, $p =$

.001, $d = 1.13$, and excitement, $t(47.19) = 3.37$, $p = .002$, $d = 0.98$, that participants

felt after reading the priming scenarios. Although the levels of happiness and

excitement were affected by the motive type manipulation, in addition to level of

romantic arousal, I considered the manipulation to be successful because the effect

size for the romantic arousal was much greater than the effect sizes for happiness and

excitement. In addition, the results that I found (see below) cannot be readily

explained in terms of differences in happiness and excitement.

Reported Emotions

There were no significant effects of motive type on levels of affection,

amusement, anger, or sadness experienced by participants during either the infidelity

or the neutral film. There was also no significant effect of motive type on the valence

of affect experienced by participants during the two films. There was, however, a

significant effect of motive type on the level of surprise reported during the infidelity

film, $t(69) = -2.27$, $p = .026$, $d = 0.55$, such that participants in the romantic mindset

condition ($M = 3.53$, SD $= 1.97$) reported less surprise than did participants in the

control mindset condition ($M = 4.61$, SD $= 2.03$). The effect was absent for the neutral

film, $p = .44$.

There was also a significant effect of motive type on the level of anger during

the neutral film, $t(45.31) = 2.25$, $p = .03$, $d = 0.67$, such that participants in the

romantic mindset ($M = 1.55$, SD $= 0.89$) experienced more anger than participants in

the control mindset ($M = 1.14$, SD $= 0.45$). This effect was not significant for the

infidelity film.

Frowning

For the infidelity film, there was a marginal effect of motive type on the

amounts of frowning, $z = -1.76$, $p = .079$ (two-tailed), $r = .21$, such that participants in

the romantic mindset condition tended to frown less (Mean Rank $= 26.80$) than

participants in the control mindset condition (Mean Rank $= 34.73$). There was no

effect of the motive type on frowning for the neutral film, $z = -1.57$, *ns* (see Figure

12).
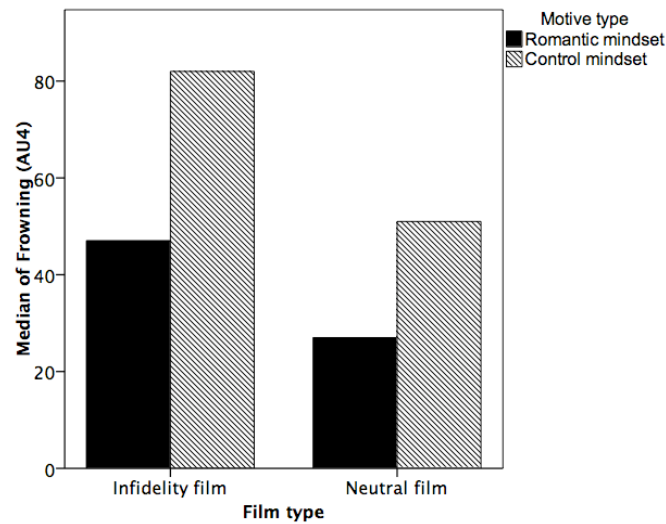
Figure 12. The effect of motive type and film type on the amount of frowning

Smiling

There was a significant effect of motive type on the amount of slight smiles, z = -2.00, p = .046 (two-tailed), r = .24, again such that participants in the romantic mindset condition tended to smile less (Mean Rank = 26.55) than participants in the control condition (Mean Rank = 35.60). However, there was no effect of the motive type on slight smiles for the neutral film, z = -1.14, *ns* (see Figure 13).
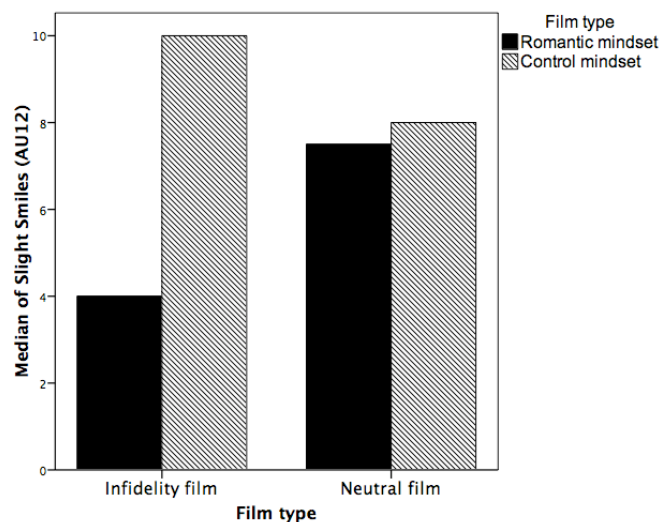
Figure 13. The effect of motive type and film type on the amount of slight smiles.

For Duchenne smiles, there was no effect of motive type either for the infidelity film, $z = -0.72$, *ns*, or for the neutral film, $z = -1.31$, *ns*.

Discussion

In this study I showed that when females were in a romantic mindset, they smiled less and, to a lesser degree, frowned less while watching a film depicting a female who is being unfaithful. The comparable effects were not significant for the neutral film. This pattern of results is consistent with Hypothesis 2, which states that the social distancing from an unfaithful other will occur through expressing less emotion of any kind, rather than through showing fewer positive and more negative reactions (Hypothesis 1).

As mentioned above, the effect of motive type on frowning was only marginal. Although this pattern is not fully consistent with Hypothesis 2, which states that females will express less of any type of emotion, it is perhaps not surprising that when social distancing is the goal individuals would tend to show less positive affect to a greater degree.

There was no effect of motive type on Duchenne smiles, which does not seem to be consistent with the hypothesis either. However, the absolute numbers of Duchenne smiles during the two movies were so small (the 75th percentiles during the two movies were equal to zero) that this expression was probably subject to the floor effect.

The manipulation checks revealed that participants in the romantic mindset experienced more happiness and more excitement in addition to being more romantically aroused. I did not regard this as a problem because the effect size for romantic arousal was orders of magnitude greater than the effect sizes for happiness and romantic arousal. The results of the study provide a further reason to believe that

happiness and romantic arousal did not play a role in producing the effects I found.
Greater happiness in the romantic mindset condition cannot explain the reduction of
slight smiles by participants in the romantic mindset, while greater excitement fails to
explain both the reduction of frowning and the reduction smiling by these
participants; after all, greater excitement is supposed to be associated with more rather
than less activity.

Emotional Experiences

There was a significant effect of motive type on surprise during the infidelity
film, such that females reported being less surprised when they were in the romantic
mindset than in the control mindset. It is perhaps unsurprising that females in a
romantic mindset were less surprised when they saw another female fall in love.

The effect that is much more difficult to explain is the significant difference in
the amount of anger participants experienced during the neutral film: Participants in
the romantic mindset experienced more anger than participants in the control mindset.
During verbal debriefing, some participants reported thinking about deforestation and
other threats to natural beauty while watching the neutral film, which was a footage of
an Amazonian Rainforest, so it is possible – although there is no way of ascertaining
this suggestion – that females in the romantic mindset were either more likely to think
about deforestation and therefore get angry or more likely to get angry once they
thought of deforestation. This would be loosely in line with previous research by
Griskevicius et al. (2007) showing the females become more helpful when they are in
a romantic mindset.

General Discussion

Across four studies I showed that females in a long-term romance mindset or
in the presence of a date distance themselves from females known to be unfaithful. In

Study 1 I showed that participants in a long-term romance mindset whose partner was present at a party ranked a female who behaved unfaithfully at that party as a much less desirable card-partner than did participants in other conditions. However, in this study our manipulation of female type was strong relative to the manipulation of long-term romance, and possibly as a consequence of this strength there was no interaction effect on subtler measures of social distancing, like participants' willingness to go to a concert with the target female.

In Study 2 I improved on the manipulations and showed that females in a long-term romance condition indicated that they would be less likely to say 'yes' to going to a concert with the unfaithful woman, that they would be less willing to be her friend, and that they were less similar to her (by comparison with control conditions). This pattern was not observed for females in a short-term romance mindset or a control mindset. In Study 2 I also ruled out several alternative explanations for my findings, including a threat explanation and a negative labelling explanation.

In Study 3, I showed that females (but not males) expressed more rejecting emotions regarding an unfaithful other to their date (vs. opposite-sex control and same-sex friend). Thus, the distancing from an unfaithful same-sex other is specific to females and is reflected in expressive behaviour as well as in more passive forms of distancing. Furthermore, the tendency for females to engage in this self-presentational behaviour does not appear to be consciously motivated; females did not report trying to impress their dates any more than they reported trying to impress opposite-sex controls or same-sex friends. This pattern is consistent with the findings of Roney (2003), who showed that males who were exposed to young females reported placing higher importance on social status and described themselves as more ambitious, but

did not think consciously about mate-attraction and were not aware that their answers had been influenced by the manipulation.

In Study 4 I used a paradigm first described in Chapter 2. Because of the differences in the structure of the situation between Studies 3 and 4, the prediction regarding nonverbal behaviour in Study 4 was slightly different from the one in Study 3. In particular, I advanced two competing hypotheses about the shape that the social distancing would take. Hypothesis 1 was that female participants would distance themselves from the unfaithful other by showing less positive and more negative emotions. Hypothesis 2 was that female participants would distance themselves from the unfaithful other by expressing less emotion of any kind towards her. The results supported Hypothesis 2 more than Hypothesis 1. Participants in the romantic mindset condition showed a reduction in slight smiles and, to a lesser extent, a reduction in frowning while watching a film depicting an unfaithful female protagonist.

Thus, using different manipulations, stimulus materials, and dependent measures, I have shown that, when in a long-term romance mindset or in the presence of a romantic date, females tend to distance themselves from another female who is known to be unfaithful, and that they do not do this as part of a conscious strategy of impression management.

Theoretical Significance

The results of the four studies provide support for the role of paternity uncertainty in female self-presentational efforts in the context of attracting long-term mates. Males have evolved to be vigilant about their existing long-term partners' fidelity (Buss et al., 1992; Daly et al., 1982; Trivers, 1972) and they name faithfulness as one of the desirable characteristics in their potential long-term mates (Buss & Schmitt, 1993). This concern about female fidelity, I argue, has made it advantageous

for women who are motivated to start a long-term relationship to advertise that they do not condone unfaithful behaviour. This lack of condonement is expressed in measures of behavioural choice, perceptions of self-other similarity, and expressive behaviour.

Future Directions

Reproductive behaviour is sensitive to cues that are germane to its success (Gangestad & Simpson, 2000). One such cue is one's own desirability as a partner (Kenrick, Groth, Trost & Sadalla, 1993). Thus attractive females prefer more masculine and symmetric men as long-term partners (Penton-Voak et al., 2003; Little, Burt, & Perrett, 2006). Furthermore these females are generally very desirable as mates (e.g., Li, Balley, Kenrick, & Linsenmeier, 2002) and tend to be perceived (as are attractive males) as more popular and less socially anxious (Feingold, 1992). However, Singh (2004) showed that beautiful women also tend to be perceived as more unfaithful. This is not surprising, since attractiveness is correlated with the number of sexual encounters and sexual variety, which are in turn correlated with the number of extra-pair copulations (Hughes & Gallup, 2003). Thus, if beautiful women are more 'at risk' for being unfaithful, they should be particularly motivated to advertise their faithfulness to desirable long-term mates. Self-rated attractiveness should therefore moderate the effect of long-term romance mindset on distancing behaviour observed in the present research, and this is a prediction that could be examined in future research.

Chapter 4: Male expressions fear and affection[9]

The minimum that a female has to do to produce offspring is much greater than the minimum that a male has to do to achieve the same result. The major consequence of this asymmetry is that the two genders have differential cost-benefit analysis when it comes to reproductive behaviour (Trivers, 1972). The result is that females, who are more invested in the offspring from the very beginning, have evolved a preference for males who can be depended on to help raise her children (Gangestad & Simpson, 2000; Trivers, 1972). Another result is that females, who are likely to be in a physically vulnerable state while carrying or taking care of an infant, have evolved a preference for males who can protect both them and their offspring during and beyond this vulnerable stage (Trivers, 1972; see also Grieling & Buss, 2000).

Evolutionary theory therefore predicts that the desirability of a male as a romantic partner will be at least partly a function of his perceived willingness to invest in his children, and his perceived ability to physically protect both his female partner and her offspring. This latter point is consistent with findings in the social psychological literature, where there is evidence that females prefer males who do not exhibit fear in the face of a fear-arousing stimulus. For example, Zillmann, Weaver, Mundorf, and Aust (1986) found that women preferred males who displayed mastery rather than fear while watching a horror film.

If these are the traits that females prefer in males, they are the traits that males should advertise in the context of romance. When in the psychological presence of an attractive female, males should therefore be motivated to show fewer expressions that would be indicative of their inability to provide such protection; they should also be

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[9] This chapter is based on Dosmukhambetova and Manstead (under review, a).

motivated to augment expressions that show that they are likely to be good fathers.

However, there are known individual differences in how people approach romance

(Gangestad & Simpson, 2000; Simpson & Gangestad, 1991, 1992), so these

hypotheses need to be further qualified.

Sociosexual Orientation

Previous research (e.g., Griskevicius et al., 2007) shows that impression

management efforts in a romantic context are moderated by sociosexual orientation.

The Sociosexual Orientation Inventory (SOI; Simpson & Gangestad, 1991) measures

the predisposition to engage in sexual relations without commitment and intimacy.

Lower scores on this scale indicate that people are 'restricted', meaning that they need

to be emotionally attached to and comfortable with individuals with whom they have

sexual intercourse; higher scores on this scale indicate that people are 'unrestricted',

meaning that they do not require emotional involvement prior to sexual intercourse,

and that they are comfortable with having multiple casual sexual relationships.

Consistent with this distinction, SOI has been shown to be associated with a

number of sociosexual behavioural tendencies. For example, unrestricted individuals

are more likely to cheat on their partners (Seal, Agostinelli, & Hannett, 1994); they

also desire (and end up with) partners who score high on attractiveness and social

visibility, whereas restricted individuals desire (and end up with) partners who

possess good personal and parenting qualities (Simpson & Ganagestad, 1992).

Interestingly, even though sociosexual orientation in males has been shown to

predict their preference for physically attractive partners (Simpson & Gangestad,

1992), sociosexual orientation does not correlate with males' own attractiveness

(Boothroyd, Jones, Burt, DeBruine, Perrett, 2008); it does, however, correlate with

the perceived masculinity of males' faces, such that unrestricted males are perceived to have more masculine faces.

In a series of studies, Griskevicius and colleagues found that, when in a romantic context, unrestricted males tend to impression manage more than restricted males (Griskevicius et al., 2007; Sundie, Kenrick, Griskevicius, and Tybur, 2007, as cited in Griskevicius et al., 2007). Griskevicius et al. (2007) showed that in romantic contexts unrestricted males become more financially generous and are more likely to engage in heroic helping. The researchers argued that this behaviour reflects unrestricted males' inclination to pursue multiple romantic partners.

In the present study I aimed to show that in the context of romantic attraction males show less fear to a horror film and augment their reactions of affection towards infants. In addition, I predicted that the romantic context would have a greater effect on the unrestricted males' (vs. restricted males') expression of fear. This is because such a pattern would be in line with unrestricted males' greater likelihood to be more masculine and, therefore, more dominant, as well as unrestricted males' penchant to exhibit 'heroism' when in a romantic context (Griskevicius et al., 2007).

I did not have a corresponding prediction concerning the way in which SOI would moderate the impact of romantic context on males' expressions towards infants (also depicted in a film), because while unrestricted males are, by definition, more strongly motivated to attract a new mate, they do not value good parenting qualities as highly as restricted males do (Simpson & Gangestad, 1992).

Social Appraisals

Even though my argument is that participants will engage in strategic emotional communication and the strategic nature of behaviour is most convincingly demonstrated when participants' thought process can be shown to involve strategic

concerns, I do not measure participants' social appraisals. As explained in Chapter 1,

the main reason for this is that there are methodological difficulties associated with

measuring processes that take place outside of conscious awareness.

<div align="center">Method</div>

Participants

Of the sixty-seven males who took part in this study, sixty-two were retained

for analysis (see Results for the exclusion criteria). Some were students at Cardiff

University, who participated for credit, and others were members of the wider

community, who participated in exchange for £4. The average age of the retained

sample was 22.37 years (SD = 4.52); 90% of the sample identified themselves as

British, 2% as other European, and 8% as 'other'. Forty-seven per cent reported being

single.

Measures of Nonverbal Behaviour

The Facial Action Coding System (FACS; Ekman et al., 2002) was used to

code the facial behaviour of participants during the films. Four Action Units (AUs) or

combinations of AUs were coded: AU1+AU4 (inner brow raiser and brow lowerer),

AU4 (brow lowerer), AU5 (upper lid raiser) and AU12 (lip corner puller). AU4 was

not coded as 'AU4' when it occurred in combination with AU1, but it was coded in

all other configurations. AU1+4, AU4 and AU5 were selected because of their

connection to the expression of fear (Smith & Scott, 1997), while AU12 (lip corner

puller, with or without AU6 – cheek raiser and lid compressor) was selected because

it has been used as a measure of parental warmth and affection (Carton & Carton,

1998).

A second coder, blind to the hypotheses of the experiment, coded a sample of

the video-recordings. Both coders are FACS certified. The inter-coder reliability was

calculated by multiplying the number of AUs for which the two coders agreed by 2 and dividing it by the total number of events coded by the two coders (Ekman et al., 2002). The inter-coder reliability was 79%.

Measures of Emotional Experiences

All self-reported emotions were measured on a 9-point scale, ranging from 0 (*did not feel the emotion in the slightest*) to 8 (*the most I have ever felt in reaction to a movie*). Emotions measured were affection, amusement, anger, fear, sadness, and surprise.

Materials

Stimuli used. Three short films were prepared in advance of the study. Film 1 (horror film) was a 2-min-20-sec-long extract from the commercial movie *1408*. The extract depicts a male trying to escape from an 'evil' room; at the end of the clip he hallucinates an attacker who tries to stab him. This film was selected from a number of horror movie clips that had been pre-tested for evoking fear (Appendix 8). Film 2 (neutral film) was the *Sticks* movie devised by Rottenberg, Ray, & Gross (2007) to be emotionally neutral. It was also 2 min 20 sec long. Film 3 (infants film) was an edited version of the Pampers *Peace on Earth* commercial; it depicts sleeping infants with *Silent Night* playing over it; this film was 1 minute long.

Audience. I pre-tested six photos of females (3 had been pre-selected to be attractive and 3 to be unattractive) for physical attractiveness on a population of males ($n = 19$). The 11-point response scale ranged from 1 (*the least attractive woman I have ever seen*) to 11 (*the most attractive woman I have ever seen*). The two photographs that evoked the most dissimilar ratings, $t(18) = 10.13$, $p < .0000005$, $d = 4.78$, were used in this study. The attractive image received a mean rating of 7.37 (SD = 1.57), while the unattractive image received the mean rating of 2.47 (SD = 1.12).

Sociosexual orientation. A median split procedure was used on the SOI score

($\alpha = .70$) because restrictedness and unrestrictedness are explicitly defined by

Simpson and Gangestad (1991) in terms of the median split.

Procedure

Before participants arrived at the laboratory, the experimenter put on make-up

and clothes to make herself appear unattractive. This was necessary in order to

remove the possibility that participants would regard the experimenter as attractive,

because this might have interfered with the manipulation of the attractiveness of the

research assistant. After welcoming participants and sitting them down in front of a

computer and a video-camera, the experimenter matter-of-factly mentioned that she

had to leave in a few minutes and that her research assistant would be able to monitor

their progress through the experiment via a camera and would debrief them at the end

of the study. The experimenter also mentioned that participants were free to ask the

research assistant questions, if they had any, during the experiment. Participants were

then left alone to read the informed consent and start the experiment.

The manipulation of research assistant's physical attractiveness was

incorporated into the informed consent. After reading standard information about

tasks and procedures of the experiment, participants continued to a page that provided

information about the research assistant, who would ostensibly also have access to

their data (see Appendix 9). The attractiveness of the research assistant was

manipulated by a photo that was included on this page. The cover story that provided

the rationale for including the picture was that the research assistant was a fellow

student and that "studies have shown that participants are reluctant to have their data

be analysed by people they might know". Participants were then asked if they would

like to continue with the experiment. All but one said that they would.

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After agreeing to participate, participants watched three films (horror film, infants film and neutral film) and answered questions about their experiences with each one. At the end participants filled out the manipulation check questionnaire and Sociosexual Orientation Inventory (Simpson & Gangestad, 1992) and were fully debriefed.

Design

The design of the study was a 2 (Confederate type: attractive vs. unattractive; between-subjects) * 3 (Film type: horror vs. neutral vs. infants; within-subjects) factorial.

<div align="center">Results</div>

Exclusion Criteria

Of the 67 participants who took part in the study, five were excluded. Two reported being lesbian or gay male; one reported having seen the *1408* film many times; the videorecording quality was very poor in another case; the final excluded participant stated during debriefing that he had not believed there was a research assistant who would observe him via the camera.

Manipulation Checks

Film manipulations. The dominant emotion reported by participants while watching the horror film was fear. They reported feeling more fear ($M = 4.71$, SD = 1.96) than anger ($M = 2.48$, SD = 1.78), $t(61) = 8.54$, $p < 0.0000005$, $d = 2.17$, or sadness ($M = 2.63$, SD = 1.70), $t(61) = 9.22$, $p < 0.0000005$, $d = 2.36$. Confederate type did not affect the experience of any emotion (fear, $t(60) = 0.81$, *ns*; anger, $t(60) = 0.47$, *ns*; sadness, $t(60) = - 0.002$, *ns*).

The dominant emotion reported by participants while watching the infants film was affection. Participants reported experiencing more affection ($M = 5.21$, SD =

2.01) than amusement ($M = 2.48$, SD $= 1.79$), $t(61) = 10.23$, $p < 0.0000005$, $d = 2.62$, while watching the infants film, but there was no effect of confederate type on reported experience of affection, $t(60) = 0.72$, *ns*, or amusement, $t(60) = 1.45$, *ns*. Thus, I regarded the film manipulations to be successful.

Confederate manipulation. There was a significant effect of confederate type on perceptions of the confederate's attractiveness, $t(38.26) = 18.24$, $p < .0000005$, $d = 5.90$, such that participants viewed the attractive confederate as much more attractive ($M = 8.11$, SD $= 0.68$) than the unattractive confederate ($M = 3.37$, SD $= 1.21$). However, there was no effect of confederate type on reported intention to impress the confederate, $t(60) = 0.76$, *ns*; on how much they thought about the fact that their video-recording would be coded by the confederate, $t(34) = 1.18$, *ns*; or on how much they were aware of the fact that the confederate was watching them during the experiment, $t(34) = -0.86$, *ns*.

Nonverbal Behaviour

For all measured AUs, the standardized skewness and kurtosis measures were greater than the recommended 1.95 value (Field, 2005) and the Shapiro-Wilk test of the normality of distribution was highly significant (smallest $p = .000028$). All nonverbal data were therefore analysed using non-parametric tests.

Horror Film

There was a significant effect of confederate type on the amount of frowning (AU4) participants engaged in, $z = -2.15$, $p = .032$, $r = .28$, such that males in the attractive confederate condition frowned less (Mean Rank $= 25.74$) than did males in the unattractive confederate condition (Mean Rank $= 35.40$).

In contrast, the amount of frowning (AU4) was not significantly affected by confederate type when participants were watching the neutral film, $z = -1.90$, $p =$

.057, *r* = .25, although here, too, males in the attractive confederate condition (Mean Rank = 25.19) tended to frown less than did males in the unattractive confederate condition (Mean Rank = 33.54) (see Figure 14).
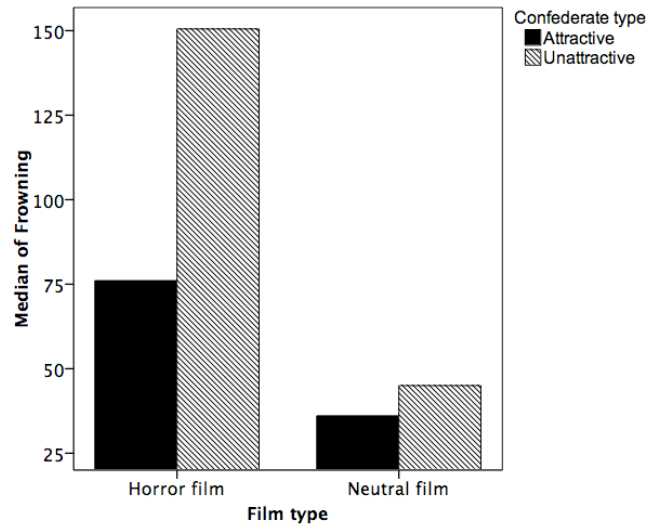
Figure 14. The effect of confederate type and film type on frowning during the horror film.

As predicted, when the sociosexual orientation of respondents was taken into consideration, the effect of the confederate type on the amount of frowning was significant only for the horror film and only for the unrestricted males (see Table 5). While watching the horror film, unrestricted males frowned less when observed by an attractive confederate than when observed by an unattractive confederate.

Confederate type	Horror film				Neutral film			
	Mean Rank	*z*	*p*	*R*	Mean Rank	*z*	*p*	*r*
			Restricted males					
Attractive	11.92	-0.76	*ns*	.10	10.21	-1.59	*ns*	.21
Unattractive	14.17				14.79			
			Unrestricted males					
Attractive	9.97	-2.27	.023	.30	11.63	-0.79	*ns*	.10
Unattractive	16.72				13.94			

Table 5. The effect of confederate type on frowning by sociosexual orientation and film type.

Infants Film

There was a significant effect of confederate type on participants' nonverbal behaviour, such that participants in the attractive confederate condition smiled more (Mean Rank = 33.44) than did participants in the unattractive confederate condition (Mean Rank = 25.63), z = -2.00, p = .046, r = .26 (see Figure 15). The effect of confederate type on the amount of smiling when participants watched the neutral film was not significant, z = -1.13, *ns*, r = .15, such that participants in the attractive confederate condition (Mean Rank = 31.39) did not smile more than participants in the unattractive confederate condition (Mean Rank = 27.17). Sociosexual orientation did not moderate these effects.

There were no other significant effects of confederate type on facial behaviour for any of the films.
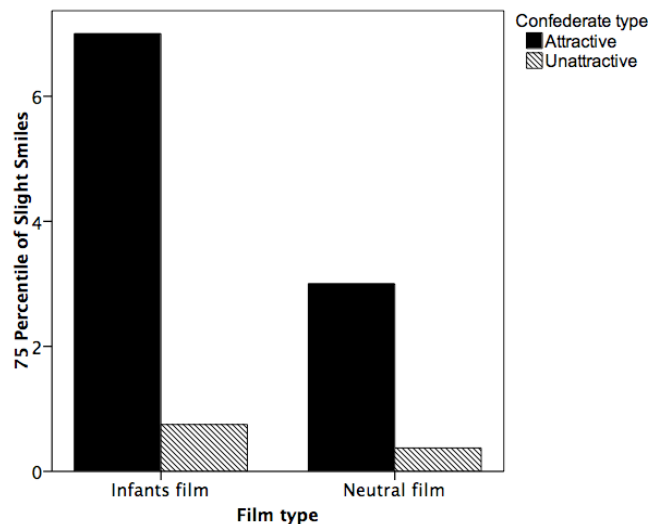
Figure 15. The effects of confederate type and film type on smiling during the infants film.

Discussion

I found that the emotional expressions shown by males varied systematically as a function of the attractiveness of a female observer. First, I showed that the presence of an attractive female observer led males to frown less while they watched a horror film. As predicted, this effect was most evident among males with an unrestricted sociosexual orientation (Simpson & Gangestad, 1991), i.e., males who are more strongly motivated to pursue multiple, uncommitted romantic relationships. Unrestricted males behave in such a fashion because the sexual strategy they adopt is correlated with many other behavioural tendencies, including a propensity to act in a 'heroic' manner (Griskevicius et al., 2007). Second, I showed that the presence of an attractive female observer led males to smile more while they watched a film depicting cute infants. The comparable effects were not significant for the neutral film. Third, I showed that the effects I observed cannot be attributed to differences in the psychological salience of the attractive confederate, because participants in the attractive confederate condition did not report greater awareness of the confederate

than participants in the unattractive confederate condition. I interpret these results as showing that males attenuated expressions of fear towards a fear stimulus and augmented expressions of affection towards infants in order to appear to be more desirable romantic partners to the attractive female who was ostensibly observing them.

One question to consider is whether the expressions that were apparently strategically attenuated and augmented by the participants were in fact expressions of fear and affection, respectively; after all, particular facial actions can be associated with a number of different emotions (Smith & Scott, 1997). There are reasons to believe that they were. During the horror film, of the three measured emotions that could evoke frowning, fear was the strongest in terms of reported experience; it was experienced much more strongly than either anger or sadness (the smallest Cohen's d of the differences between experiencing fear and other negative emotions was 2.17). Likewise, during the infants film, of the two emotions that could be implicated in evoking AU12 (affection and amusement), affection was the dominant one (Cohen's $d = 2.62$). Although it is true that the emotion we experience is not necessarily the emotion we express, Rosenberg and Ekman (1997) showed that as the intensity of the emotional experience increases the coherence between emotional experiences and emotional expressions increases, too. For both dominant emotions (fear and affection), the mean intensity at which they were felt was greater than the midpoint, which at the very least suggests that the action units we investigated were likely to be expressions of fear and affection (as appropriate) rather than expressions of other negative or positive emotions (respectively). It is also worth noting that Scherer and Ellgring (2007) found that AU4 was most strongly associated with actors' expressions of fear.

Another and, perhaps, safer way to interpret our results is in terms of the association between Action Units and appraisals. AU4 (frowning), for example, has been associated with an appraisal of goal obstruction (Scherer, 1984). More specifically, Wehrle and Kaiser (2000) argued that "frowning often occurs when somebody does some hard thinking while concentrated *attending to a problem*, or *when a difficulty is encountered* in a task." (p. 51, italics added). In our experiment males frowned less in reaction to a horror film when they thought a beautiful woman was observing them, i.e., males in the experimental condition communicated that they did not view the situation as being as 'difficult' or as 'problematic' as males in the control condition. AU12 (lip corner puller), on the other hand, has been associated with intrinsic pleasantness (Kaiser & Wehrle, 2001). Males in our experiment smiled more at infants in the experimental condition, which can be interpreted as an attempt to communicate to the attractive female that they like infants more compared to the males in the control condition. This interpretation agrees well with an interpretation in terms of emotional states.

Another question that arises with respect to our interpretation is whether males attenuated fear and augmented affection *in order to* seem more desirable as a romantic partner to the attractive female observer, i.e., in order to manipulate the impression they make on the observer. Our data show that even if males attempted to manipulate their social image in such a way, they did not do so consciously: Males did not report wanting to impress the attractive confederate any more than they wanted to impress the unattractive confederate. However, the absence of conscious strategizing on the part of the males does not imply that their behaviour was *not* driven by strategic concerns. Not only is self-presentation often subconscious (e.g., Dosmukhambetova & Manstead, in press; Karremans & Verwijmeren, 2008; Roney,

2003); it is also more likely to be successful when the self-presenter deceives without being aware of doing so (Jones, 1964; Trivers, 2000).

A further reason for thinking that the observed behaviours were strategic is the close correspondence between my theoretical predictions and the effects I observed. Evolutionary theory predicts that females should prefer males who do not cower at the first sign of danger (Trivers, 1972; see also Grieling & Buss, 2000) and who exhibit the potential to be a good parent (Gangestad & Simpson, 2000). Evolutionary theory also predicts that unrestricted males will in general be more likely to try to impress females and that they will be more likely to do so (than restricted males) when it comes to fearlessness, but not when it comes to parenting potential. The results conform closely to these predictions.

Limitations

A limitation of the present research is that I only collected data from male participants. This was for two reasons. First, I wanted to manipulate the presence of an observer directly rather than by using priming techniques (e.g., Griskevicius et al., 2006), and second, research shows that females do not respond to mere exposure to attractive males (Roney, 2003; Wilson & Daly, 2004; also see Study 1, Chapter 2) so the absence of corresponding effects in females would have been difficult to interpret.

Chapter 5: Discussion

The main objective of this thesis was to demonstrate that individuals strategically change their facial expressions and other emotional behaviour in order to enhance their image in the eyes of a potential romantic partner. In three empirical chapters I reported eight studies examining four different effects. The first two of these effects concerned female self-presentational behaviour (Chapters 2 and 3), while the second two concerned male self-presentational behaviour (Chapter 4).

More specifically, in Chapter 2 I provided evidence for the hypothesis that when in a romantic mindset, females show less negative emotion to infants. In Chapter 3, I demonstrated that females motivated to attract a long-term partner present themselves in ways that suggest that they are likely to be faithful. Finally, in Chapter 4, I showed that in the presence of an attractive female, males present themselves as fearless in reaction to a horror film and as affectionate towards children. I argued that positive reactions to infants, propensity to be faithful and fearlessness are advertised because they are desired by the opposite sex for various evolutionary reasons.

The data I presented also showed that – with one exception – the presence of a potential romantic partner did not affect participants' emotional experiences despite affecting their emotional expressions. Thus, for example, when males augmented their expression of affection towards infants, their feelings towards the infants did not change. This pattern of results makes sense, because if strategic modulations of expressions were shaped by sexual selection, modulation of emotional expressions would be more pronounced than modulations of emotional experiences. This is because selection tends to work with phenomena that are most closely linked to the

outcome, which in this case is *expression* of emotion. Emotional experience would be altered only inasmuch as it aided convincing production of the relevant behaviours.

Overall, the work described in this thesis adds to the growing body of research showing that individuals engage in self-presentation in romantic contexts using various social and non-social behaviours (Mori et al., 1987; Griskevicius et al., 2006), by showing that they engage in self-presentation using nonverbal behaviour associated with emotional states.

Strategic Nature of Behavioural Differences

In this thesis I have consistently argued that the effects I observed are strategic in nature. Earlier, I have also explained that (i) researchers often maintain that the most convincing way to show that behaviour is indeed strategic is to obtain participants' reports about their attempts to behave strategically, and that (ii) I did not measure participants' thought processes, because the behavioural effects I observed were not enacted consciously by participants. Nevertheless, I still maintain that the effects I report are very likely to reflect strategic behaviour. There are three main reasons for this belief.

First, even though some of my manipulations involved confounds (e.g., in some studies motive type manipulation affected happiness as well as the levels of romantic arousal), the patterns of results I obtained could not be easily explained in terms of the effect of these confounds. As I mentioned before, I do recognize that alternative explanations cannot be ruled out with complete certainty; however, these explanations often involve far-fetched arguments, whereby, for example, (i) happiness leads to less frowning but does not lead to more smiling, and (ii) happiness affects frowning during the treatment videos but not during the neutral video. It is also worth noting that, consistently, the effect sizes were much larger for the effect of motive

type on romantic arousal than the effect of motive type on happiness/excitement in these studies. Thus, not only are the explanations in terms of romantic arousal more straightforward, they are also more likely.

Second, as I mentioned earlier, there is a large body of literature suggesting that people do indeed respond to primed audiences by engaging in self-presentational behaviours (Baldwin et al., 1990; Fitzsimons & Bargh, 2003; Fridlund, 1991; Griskevicius et al., 2006; Roney, 2003). These explanations are consistent with the arguments set out in this thesis.

Finally, a careful look at what self-reports do and do not show can leave one unconvinced about whether self-reports of engaging in self-presentational behaviour are a necessary *or* a sufficient reason to conclude that a certain behaviour is indeed self-presentational. People are notoriously poor at knowing reasons for their own behaviour (Nisbett & Wilson, 1977). Thus, a priori predictions coupled with implicit audience manipulations and positive results are as a good a method as any to show that behaviours are indeed self-presentational.

<div align="center">Particularities of Methods and Analyses</div>

There are several features of methods and analyses that are worthy of further discussion. I address these below.

Manipulations of the Mere Presence of an Attractive Stranger

In Chapter 4, I manipulated romantic context by presenting male participants by means of a photograph of an attractive female who was ostensibly observing them through the camera during the experiment. This manipulation worked well, with males rating the attractiveness of the attractive confederate as much higher than the attractiveness of the unattractive confederate ($d = 5.90$). This is in sharp contrast to the manipulation I used in Study 1 of Chapter 2. In that study, I attempted to

manipulate romantic context for females by showing them a pre-recorded videotape

of either an attractive or an unattractive male who, participants believed, was their

interaction partner. Even though the confederates in the videotapes were pre-tested

and selected specifically to produce dissimilar ratings of attractiveness, the

manipulation was not successful: Females did not rate the attractive confederate as

more attractive than the unattractive confederate.

With the benefit of hindsight, it is clear that there are several reasons why the

manipulation of the mere presence of a physically attractive stranger of the opposite

sex worked for male participants but not for female participants. First, although the

pre-tests of the two sets of materials (photographs for males and videos for females)

yielded significant differences in the ratings of the attractiveness of the chosen

confederates, the effect sizes were different. The difference between female

confederates' attractiveness in the pre-tests was very large ($d = 4.78$), whereas the

difference between male confederates' attractiveness in the pre-tests was simply large

($d = 0.96$). This is partly due to the fact that the images of females were obtained from

the internet (where a broader range of options is available), whereas the videotapes of

males were made by myself, which means that male confederates were chosen from a

more restricted opportunity sample.

Second, even if the difference in attractiveness between the two male

confederates had been as great as the difference between the two female confederates,

females might not have been affected by the manipulation, because female

attractiveness is much more important to males than is male attractiveness to females

(Feingold, 1990).

Finally, the fact that women and men differ with respect to minimal obligatory

parental investments (see Chapter 1) means that males profit more than females from

casual sexual encounters, with the result that they are more likely to benefit from being 'swept off their feet' by a beautiful female stranger. Becoming excited by the mere presence of an attractive male stranger and succumbing to this excitement would not have benefitted females to the same degree, because female reproductive success is not limited by sexual access to males; rather, it is limited by the number of offspring she can raise to maturity, so for females the goal is to secure investment rather than sexual access (Duncan et al., 2007).

Within-Group Analyses

In four out eight studies reported in this thesis (Studies 1 & 3 reported in Chapter 2, Study 4 reported in Chapter 3, and the study reported in Chapter 4) I employed a paradigm in which participants viewed two or more films in either a romantic or a control mindset. In the data analyses I focused on the effect of motive/audience type (romance vs. control) on the expressions of emotion during the films. Only in Chapter 2 did I consistently perform within-group analyses of the effects of film type at the two levels of motive/audience type. This was for two main reasons.

First, I did not have strong predictions concerning which way the effects (if any) would go for every possible within-group analysis for studies in other chapters. This is because there is no sense in which expressions during a neutral film needed to be at the same level (or not) as expressions during the emotional films in the two motive/audience type conditions. For example, in Study 4 of Chapter 3, within-group analysis revealed that there were significant effects of film type on the amount of frowning during the two motive type conditions (see Figure 12, Chapter 3), such that in both conditions participants frowned more during the infidelity film than during the neutral film. This is unsurprising because the infidelity film featured a woman who

behaved in a potentially objectionable manner. The neutral movie, on the other hand, was simply footage of an Amazonian rainforest, with soft classical music playing in the background – not much to frown about.

On the other hand, the effect of film type on *slight smiles* in this study was significant for the romantic mindset but not for the control mindset. As Figure 13 in Chapter 3 shows, the effects were in different directions: Participants smiled *more* during the neutral film than the infidelity film in the romantic mindset condition but they smiled *less* (albeit non-significantly so) during the neutral film in the control mindset condition. Although the pattern is different from the one described above, it also makes sense, because (i) the neutral film was designed to be somewhat pleasant, so some slight smiles were expected in response to this film in both motive type conditions, and (ii) in accord with my hypothesis, participants in the romantic mindset showed fewer slight smiles during the infidelity film than did participants in the control mindset.

The second reason I did not perform any within-group analyses is that they would not have added to the understanding of the dynamics in which I am interested. The neutral film conditions were included in the designs to show that the effect of motive/audience type was specific to the emotional films, and that the effect was not due to any generalized tendency to alter expressions in a particular way when in a romantic context.

To summarise, I did not run within-group analyses because the results of these analyses would have had no bearing on my hypotheses.

Participants' Relationship Status

In all reported studies I measured and reported participants' own relationship status; however, I did not include analyses of this variable in the results sections. The

main reason for this is that in none of the studies did the relationship status make a meaningful difference on how participants behaved or responded to questions. In most studies dividing datasets by relationship status made the effects I observed less pronounced, often pushing them into non-significance. This can easily be explained in terms of sample-size-related loss of power.

Counterbalancing

In two of the studies that use films as stimuli (Study 4 reported in Chapter 3 and the study reported in Chapter 4), film order was not fully counterbalanced. In both cases, the reason for this apparent omission was practical, and in neither case does the lack of counterbalancing affect the interpretation of the results.

Data collection for Study 4 reported in Chapter 3 (*Female expressive distancing from an unfaithful other [nonverbal behaviour]*) took place at the same time as data collection for Study 3 reported in Chapter 2 (*Female attenuation of negative reactions towards infants*). My original intention was to investigate female reactions to infants, and the infidelity film was included for piloting purposes. The infants film was, therefore, counterbalanced with the neutral film, and the infidelity film was always presented last. A similar thing happened in the study reported in Chapter 4, in which I investigated male reactions to a horror film and to infants. The horror film, which was my primary focus when designing the study, was counterbalanced with the neutral film, and the infants film was always presented last.

The reason for thinking that this feature of the designs does not threaten my interpretation of the results is that in both studies the first two films *were* counterbalanced, with the result the third film was seen right after the neutral film by

half of the samples and after the emotional film by the other half. These two

subsamples were not confounded with the between-group manipulations. So although

the third film always came last, the different reactions to the film as a function of

motive type could not be accounted for in terms of order effects.

Interaction effects

In four out of eight studies in this thesis I investigated facial nonverbal

behaviour. In all four studies, I *de facto* predicted an interaction between film type

and motive type on nonverbal behaviour, but I did not test for interactions directly.

The reason was that nonverbal data were not parametric, so the use of parametric tests

(e.g., mixed ANOVA) was not appropriate. Even though a number of non-parametric

tests for interactions have been developed over the years, I did not use them in my

analyses because (i) most of them have been associated with various problems (Leys

& Schumann, 2010), and, more importantly, (ii) none of the appropriate tests are

supported by the SPSS, the statistical package used by psychologists to analyse data.

I therefore based my conclusions on the presence of the effects of motive type

during the treatment videos and the absence thereof during the control video.

Admittedly, this is not the most ideal solution, because statistical tests (both

parametric and non-parametric) are designed to test how probable the results are

under the null hypothesis (i.e., how sure we can be that the alternative hypothesis is

true), but not how probable the results are under the alternative hypothesis (i.e., how

sure we can be that the null hypothesis is true). Thus, statistical significance is

designed to be informative only about the alternative hypothesis, which means that

the absence of effects are not very firm grounds on which to base conclusions.

Even though it is true that, statistically speaking, it is often more probable that

the null will be retained given the alternative hypothesis is true than that the

alternative hypothesis will be retained given that the null is true, I argue that failure to reject the null hypothesis is still probabilistically informative about whether the null is true or not.

First, even though there is no direct link between alpha (probability of rejecting the null when it is true) and beta (probability of retaining the null when the alternative hypothesis is true), the larger the p-value of the significance test (i.e., alpha) the smaller is the value of beta, so a non-significant alpha implies greater probability that the null is actually true than a significant alpha.

Second, I tested four different effects in this way, which concerned various self-presentational behaviours both in males and females. The specific behaviours were, of course, different, but at a higher level of abstraction I looked at very similar self-presentational effects. My hypotheses differed with respect to which way the effects would go during the treatment films (sometimes I predicted higher levels of facial activity in the romantic mindset conditions, whereas at other times I predicted lower levels of facial activity), but for the neutral film the predictions always stayed the same – that motive type would *not* produce significant results. As expected, the results for the neutral films stayed consistently non-significant across all four studies. This consistency in itself is statistically improbable, which implies that there were indeed no effects to be detected for the neutral film.

Finally, as I explain in more detail below, I do not claim that my findings constitute incontrovertible evidence that the effects I observed (and did not observe) as well as the interpretations I offer indeed reflect reality. Providing such evidence is not the purpose of this thesis. I simply argue that my results support the hypothesis I had proposed.

Theoretical Implications

Evolutionary Psychology

I derived my hypotheses about the content of inter-sexual self-presentation of

emotions from evolutionary theory. As explained in Chapter 1, the reason that I was

keen to do so was that emotion researchers do not often apply the logic of

evolutionary theory to their thinking about day-to-day workings of emotions.

This under-usage of evolutionary psychology might reflect the general reluctance of

many psychologists to use evolutionary theory in their theorising (e.g., Berwick,

1998; Lewontin, 1990). This is unfortunate, because the value of evolutionary theory

for explaining and predicting human behaviour is becoming increasingly undeniable

(Gangestad et al., 2006; Kenrick, 2006; Ketelaar & Ellis, 2000). It has been successful

in explaining various, often counter-intuitive, aspects of human design, such as

senescence (Kirkwood & Rose, 1991), infanticide (Harris, Hilton, Rice, & Eke,

2006), uxoricide (Shackelford, Buss, & Weekes-Shackelford, 2003), and mating

preferences (e.g., Buss & Schmitt, 1993), to name a few.

Although emotion researchers have not shied away from evolutionary

explanations to the same extent that other social psychologists have, the influence of

evolutionary psychology has been restricted to theorising and research on the origins

of emotions (e.g., Ekman & Friesen, 1971; Ohman & Mineka, 2001). My work shows

that evolutionary psychology, which has proved to be a rich source of new predictions

in other areas of social psychology (Kenrick, 2006), can also be put to good use by

emotion researchers studying the *unfolding* of emotional experiences and expressions.

However, it is important to be clear about what I claim my data to show and

what I *do not* claim my data to show. One implication of the fact that I used

evolutionary psychology to derive my hypotheses is that I believe that the behaviours

I observe constitute *adaptations*, evolved behavioural patterns that have been shaped by selection and that they therefore have a genetic basis. Even though I do in fact *believe* this to be the case, I do not claim that my data provide sufficient evidence to support this interpretation. It would be necessary to collect a much broader range of supporting evidence before being able to argue that a certain behavioural pattern is an adaptation. For example, Ohman and Mineka (2001) demonstrated that fear is an evolutionary adaptation by bringing together evidence from neuropsychology, zoology, comparative psychology, developmental psychology, and many other fields. Providing original evidence on this scale is, of course, beyond the scope of any single thesis.

What I do claim in relation to evolutionary theory is that my data provide *necessary* evidence for the hypothesis that the behavioural patterns I demonstrated constitute evolved adaptations. Tooby and Cosmides (1992) provided a set of guidelines for researchers attempting to establish that a particular design is an evolutionary adaptation. Within the framework of their so-called 'evolutionary functional analysis', there are five main questions or issues that a researcher has to deal with: (i) Why would this design be propagated in the Environment of Evolutionary Adaptedness (the environment to which the mechanism is adapted)? (ii) What were the relevant recurrent structures that necessitated evolution of this mechanism? (iii) How is the mechanism (behavioral, cognitive and neuro-physiological) organised? (iv) How does the mechanism produce output given input? (v) How well does the mechanism produce successful outcomes?

In this thesis I have addressed some of the key issues in this analysis in two ways. First, by providing an evolutionary rationale for my hypotheses, I have started to spell out the relevant recurrent structures that led to the evolution of the

behavioural tendencies I have examined. Second, by demonstrating that the

behaviours in question occur, I have started to describe the way the behavioural

mechanism is organized. Consequently, my work constitutes a necessary stepping-

stone in the process of showing that the effects I observed are indeed evolutionary

adaptations.

Theories of Emotion

The results I have reported in this thesis demonstrate that expressions of

emotion are partly determined by the social context in which the emotion is

expressed. My results, therefore, contradict some of the key assumptions of the

theories that view emotions as largely impervious to social contexts. In this section I

explain how my findings relate to the theories of emotion I described in the

introduction.

Darwin's Expressions as Vestiges. Darwin's view that expressions are mere

vestiges of previously adaptive behaviours associated with particular internal states is

not supported by my findings. If expressions had indeed been such vestiges, they

would have been ritualistic in nature and they would *not* have been responsive to

subtle social pressures in predictable ways.

Ekman's Expressions as Read-Outs. To some extent my results also contradict

Ekman's views. I say 'to some extent' because the way in which I approached my

data analysis was not specifically designed to test Ekman's notion that it is

configurations of facial movements rather than single facial movements that carry

emotional meaning. The part of Ekman's theory that my results do conflict with is the

relative ease with which emotional expressions can be influenced by social pressures.

In Ekman's view, facial displays vary under the influence of display rules (Ekman &

Friesen, 1969). These rules modify the 'true' biologically determined expressions and

tailor them to the social demands of the society in which individuals find themselves (Ekman & Friesen, 1986). In a sense, all socially-motivated changes in emotional expressions can be attributed to 'displays rules': one simply has to come up with a specific rule that would account for the observed change. However, I think that it is clear that what Ekman meant by display rules are more general rules that are of the same order of abstraction as the one that was investigated in the famous Japanese-American study (Ekman & Friesen, 1975). In this study, Japanese students were shown to express less emotion in front of an authority figure than American students, presumably because the Japanese have different 'display rules'.

Appraisal Theory of Emotion. Finally, my results contradict predictions that some appraisal researchers make concerning the expression of emotion in social contexts. Appraisal researchers who are interested in expressions (e.g., Frijda & Tcherkassof, 1997**;** Kaiser & Wehrle, 2004; Scherer, 1984**)** predict that it is the nature of the emotional trigger, rather than the social context, that determines both the nature of the experienced emotion and the resulting facial expression. Concerning emotional experiences, my findings are in accord with this prediction, because only on one occasion did I find that the emotional experience changed as a function of social context (participants in Study 3 of Chapter 3 were more embarrassed by their promiscuous flatmate's behaviour in front of their date than in front of either of the two controls). Given that in the research reported in this thesis I ran many analyses investigating the effects of motive/audience type on emotional experiences and I did not have strong predictions about how emotional experience would vary, I am inclined to attribute this one significant effect to chance. Thus, with respect to emotional experience my findings to do not contradict the predictions of appraisal researchers interested in facial expressions. However, my findings *do* contradict their

predictions when it comes to emotional *expressions*. I found that social context significantly affects individuals' expressions of emotion in predictable ways. This is in direct opposition to the prediction of the *componential view* of emotional expressions (Kaiser & Wehrle, 2004), which states that movements of the face reflect non-social appraisals made by individuals.

Fridlund's Behavioural Ecology View. Fridlund's view of emotions is one of the two perspectives that I described in Chapter 1 that recognize the influence of social goals on emotions. Fridlund argued that emotional expressions signify the most probable trajectories of the organism in the near future (Fridlund, 1992), and it is possible to recast my findings in terms of this interpretation. However, describing my results in terms of Fridlund's theory would oversimplify the story and would not provide any insight into the intra-psychic processes that are responsible for the effects. The main reason for this is that Fridlund does not explicitly distinguish between objects of emotional experiences and receivers of emotional expressions. To Fridlund emotional expressions have evolved in order to communicate motives, so emotions are always directed at a person who has triggered the emotion. This general set-up does not capture the nature of the effects that I have demonstrated in this thesis, because the objects of participants' emotions were separate from the recipients of their emotional expressions.

Social Appraisal Theory. The effects I found are fully in line with social appraisal theory (Manstead & Fischer, 2001). To see this, take male expression of affection towards infants as an example. In terms of Figure 1 (reproduced below), the following processes take place:

1. male P sees an attractive Female O (target appraisal);

2. male P sees stimulus X, which is an infant or an infant-like emotional stimulus (classic appraisal);

3. male P changes his expressions vis-à-vis X in a way that Female O is likely to find appealing (self-related social appraisal).
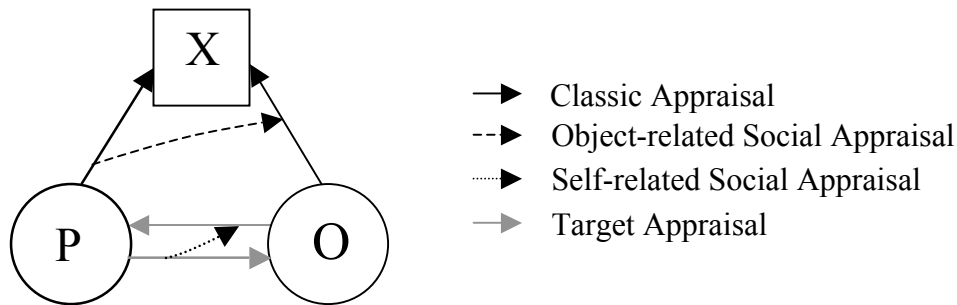
As explained in Chapter 1, because of the methodological and conceptual problems associated with trying to uncover subconscious processes, the investigation of intra-psychic processes fell outside the scope of the present work. Thus, even though my findings are in line with social appraisal theory, they do not provide direct support for it. Indeed, it is a major limitation of this work that I cannot offer an evidence-based argument concerning the intra-psychic processes responsible for the behaviours I observed. However, even though there are no data about process that would definitively distinguish between the interpretations of my findings offered by the social appraisal theory and by Fridlund's behavioural ecology view, the findings are more in line with social appraisal theory, because it captures the dynamics of self-presentational behaviours I demonstrated better than does the behavioural ecology view.

In the next section I discuss some reasons for why the behaviours I investigated were subconscious in the first place, and I offer some thoughts about a possible way to tap the underlying processes of subconsciously enacted self-presentational behaviours.

Testing Social Appraisal Theory

The reader will remember that the first (and so far, the only) researchers to show the dynamics of social appraisals while studying strategic behaviour were Evers et al. (2005). There are several reasons why the strategic behaviour they studied lent itself better to this analysis than the strategic behaviour that I described in this thesis. The most important one is that while their dependent measure was the amount of hot sauce participants gave someone who had angered them for obligatory consumption, most of my dependent measures were facial behaviours. A decision to act in a certain way (deciding how much hot sauce the other would have to consume) should be more accessible than is the 'decision' to make semi-involuntary facial movements, especially given that people are not very good at judging what their faces show (Barr & Kleck, 1995).

However, even when self-presentational behaviour is enacted unconsciously, I believe that there is a way to tap the underlying appraisals. These appraisals should in principle map onto the beliefs people hold about the effect that certain behaviours will have on the behaviours or perceptions of a target audience. In other words, people might not be aware of the fact that they are engaging in strategic behaviours, but they should be able to access information about how behaving one way rather than another would influence the target audience. Through the use of carefully worded questions and indirect measures it should be possible to assess these beliefs.

Future Research

I have shown that males and females regulate their emotional expressions in predictable ways when they find themselves in the presence of an attractive member of the opposite sex. However, these results do not necessarily imply that individuals do this because it makes them more desirable as mates. There are theoretical reasons

for believing that the behaviours I observed would increase one's desirability, but this is yet to be demonstrated empirically. In order to provide support for the assumption that the behaviours I observed make one more desirable, it would be necessary to provide independent evidence that the members of the opposite sex find these behaviours attractive. I attempted to do this for female expressions of affection towards infants in Study 2 reported in Chapter 2. In that study I presented male participants with videotapes of female participants from Study 1. These males were asked to rate the females on dimensions of physical attractiveness, warmth, and overall desirability as a long-term mate. The prediction was that displays of affection would contribute to ratings of overall desirability independently of ratings of physical attractiveness. Unfortunately, due to problems with the design of Study 1, the results of Study 2 were inconclusive with respect to my hypothesis.

Researchers seeking to investigate this issue should be aware that there are at least three different ways to establish that the behaviours in question increase agents' desirability. The first of these is the approach I adopted in the study described above. Thus, one could set up a study in which participants are videotaped while displaying target behaviours under certain conditions, and then show the resulting footage to members of the opposite sex, asking these new participants to rate individuals in the videos on various dimensions of personality characteristics and physical attractiveness, as well as their overall desirability as long-term and short-term romantic partners.

The second approach would be to investigate whether individuals show behavioural preference for certain characteristics in their partners. Admittedly, this would not constitute a direct demonstration of the fact that when these behaviours are presented they are *advertised*, but it would provide stronger support for this

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hypothesis than previous research, which showed that males and females simply *name* certain qualities as desirable (e.g., Buss & Schmitt, 1993). There are two conceptual/methodological pitfalls that researchers need to be aware of. The first was articulated by Li and Kenrick (2006); they argued that researchers studying mate preferences often conflate logically separate questions of 'whether' one would enter a relationship and 'what' qualities are desired in from a relationship partner. They showed, for example, that whereas males are universally less hesitant than females with respect to the issue of 'whether' to enter short-term romantic relationships (Clark & Hatfield, 1989), when it comes to *attributes* of a short-term mate (the 'what' question), males and females do not differ in the qualities they prefer: They both want their short-term romantic partners to be physically attractive. The second potential pitfall is a temptation to investigate how desirable a certain attribute is in an 'abstract' romantic partner. Li, Bailey, Kenrick, and Linsenmeier (2002) argued that preferences should be studied *in relation to each other* rather than one at a time. To illustrate this, take male preference for faithfulness in long-term partners. If asked whether they value faithfulness in their long-term partners, both males and females are likely to answer that they do; however, this would not be a good test of their preferences. Other things being equal, females might prefer males who are not sexually permissive. However, other things are never equal, especially since sexual permissiveness in males is positively correlated with other desirable characteristics, like physical attractiveness (Hughes & Gallup, 2003) and dominance (Gangestad et al., 2004). The point is that it is difficult to say how important a certain trait is in determining partner preference without systematically investigating how males and females weigh permissiveness (or any other trait, for that matter) in the presence of other personality characteristics.

A third approach would be to look at preferences in terms of losses rather than gains. As we have seen, simply asking participants how the presence of a certain trait would influence someone's desirability as a romantic partner would probably be a naïve approach to testing preferences. However, gains have relatively smaller subjective value than corresponding losses (Tversky & Kahneman, 1991), so effect sizes are likely to be larger and easier to detect when preferences are investigated in terms of losses. One way to do this is to investigate the costs individuals bear if the self-presentation of their potential romantic partner turns out to be deceptive. But how could this be done? How could one estimate, for example, the costs incurred by a female who married a male whom she believed to be more ambitious than he turned out to be? Haselton, Buss, Oubaid, and Angleitner (2005) argued that an evolutionary response to paying the costs of being deceived would act through the emotion system, such that people would get more upset about being deceived in matters where they have traditionally paid the highest costs. Thus, males and females should get most upset about a prospective mate's deception when it concerns the characteristics that they themselves value. This is indeed what Haselton et al. found: Males were more upset than females about deception concerning youthfulness and possibility of sexual access; whereas females were more upset than males about deception concerning resources, status, commitment and emotional fidelity. One of the ways we know that males value sexual faithfulness in long-term romantic partners more than females do is that males get more upset when they visualize sexual rather than emotional infidelity, whereas females get more upset when they visualize emotional rather than sexual infidelity (Buss et al., 1992). The other preferences I hypothesized in this thesis (e.g., female preference for males who like infants) could be investigated in a similar manner.

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Practical Applications

Individuals tend to collect information about themselves by observing their own behaviour (Bem, 1967); this principle is as true for our everyday behaviours as it is for behaviours that arise in the context of courtship.

If people are indeed inclined as a result of their genetic make-up to emphasize psychological sexual dimorphisms during courtship, then gender stereotypes will be reinforced in this most important of human endeavours, and through the process of self-perception (Bem, 1967) these stereotypes may carry over into the rest of their lives. This is troubling because, for better or for worse, evolution has shaped humans in such a way that qualities (like dominance and ambition) that tend to make individuals successful in their professional lives are the very qualities that tend to make males (but not females) romantically successful. Thus, especially in the world of business there is often a trade-off for females between being feminine and being successful.

Knowledge of when and why people are most susceptible to being nudged into gender-stereotypic roles may help women to make conscious decisions about whether to let their behaviour in the context of mate-attraction be consequential for the way they view themselves in their professional lives. Without abandoning everything associated with 'being feminine', women equipped with such knowledge may learn to recognize what constitutes courtship and constrain those behaviours to situations outside their professional lives; after all, genetic influences can be overridden by conscious choice (Barash, 1979).

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Appendix 1

Emotions Questionnaire

When watching the Silent Night clip did you experience any of the following (please tick as appropriate)?

		Not at all	A little	Moderately	Strongly	Very Strongly
1	Anger					
2	Disgust					
3	Surprise					
4	Happiness					
5	Amusement					
6	Sadness					
7	Fear					
8	Other (please specify) ………					

If you want to expand on you answers to any of the questions above or have any other comments, please use the space below:

When watching the Amazonian Rainforest clip did you experience any of the following (please tick as appropriate)?

		Not at all	A little	Moderately	Strongly	Very Strongly
1	Anger					
2	Disgust					
3	Surprise					
4	Happiness					
5	Amusement					
6	Sadness					
7	Fear					
8	Other (please specify) ………					

If you want to expand on you answers to any of the questions above or have any other comments, please use the space below:

Thank you!

Appendix 2

We are now going to ask you some questions about one of the characters in the scenario. Please answer the questions using the following scale where appropriate:

1	2	3	4	5	6	7
Not at all			Moderately			Extremely

1. Please describe in one sentence the behaviour of Ms. Green **(B)** in the scenario:

2. Please indicate to what extent Ms. Green's behaviour made you experience the following emotions

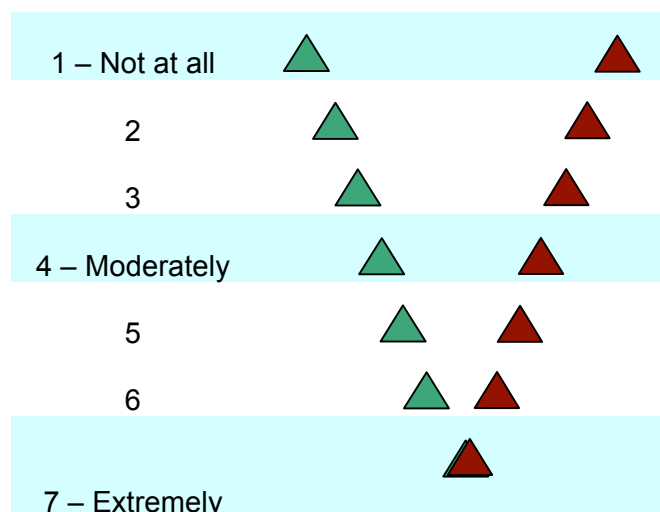|	1	2	3	4	5	6	7
Admiration							
Amusement							
Disgust							
Embarrassment							

3. How likeable is she? ☐

4. How much would you like her to be your friend? ☐

5. How pretty do you think she is? ☐

6. How threatening is she? ☐

7. If she invited you to go to a concert with her, how likely would you be to say yes? ☐

8. How similar do you think you are (use the diagram below)? ☐

1 – Not at all

2

3

4 – Moderately

5

6

7 – Extremely

Thank you!

Appendix 3

Cheater scenario

Yvette is a free spirit who does not like to be tied down by conventions. She is fun-loving and adventurous. Since she started dating at the age of 18, she's had numerous relationships. She quickly gets bored with her partners. She enjoys the variety of seeing more than one partner at any given time. She does not pursue men in relationships, but everybody knows she breaks hearts.

Player scenario

Yvette is a free spirit who does not like to be tied down by conventions. She is fun-loving and adventurous. Since she started dating at the age of 18, she's had numerous relationships. She quickly gets bored with her partners. Although she changes partners often, she is always faithful to her current partner. She does not pursue men in relationships, but everybody knows she breaks hearts.

Control scenario

Yvette is a free spirit who does not like to be tied down by conventions. She is fun-loving and adventurous. Since she left home and started living alone at the age of 18, she has lived and worked in numerous towns and cities. She gets bored with jobs and places quickly. She enjoys the variety involved in working in new jobs and getting to know new places.

Appendix 4

Please answer the following questions about Yvette. Please note that the points labelled 'Moderately' in the scales below represent the answer about an average person you don't know. If your impression of Yvette deviates (even slightly) from your perception of an average person you have no real opinion about, please move the cursor closer to one of the endpoints of the scale (as appropriate).

Not at all (1)   Moderately (12)   Extremely (23)
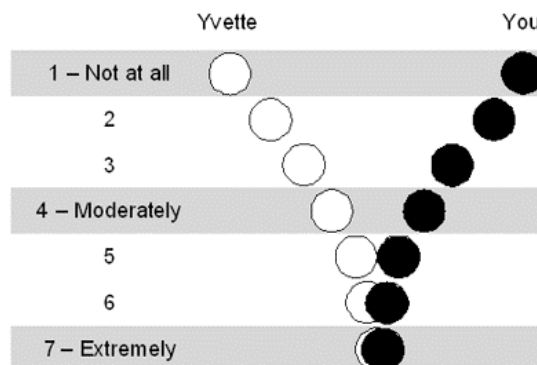
How pretty do you think she is?

How likeable is she?

If she invited you to go with her to a concert where many of your friends and acquaintances would be, how likely would you be to say yes?

How threatening is she?

How much would you like her to be your friend?

How similar do you think you are? (For this question please use the diagram below)

Appendix 5

We are very thankful that you took the time to complete our survey, but we are conscious of the fact that people take online surveys for different reasons. In this section we are interested in how you went about completing the survey, because it is very important to us to be sure that the data we analyse reflect participants´ true opinions.

Please indicate whether you agree with the following statements using the scale below:

Strongly Disagree
Disagree
Somewhat Disagree
Neither Agree Nor Disagree
Somewhat Agree
Agree
Strongly Agree

While answering the questions, I tried to follow the instructions and read the materials carefully

While answering the questions, I did not pay much attention to what I was asked to do

At least for some questions in this study I tried to answer in the way that I thought the researchers wanted me to answer

At least for some questions in this study I tried to answer contrary to the way that I thought the researchers wanted me to answer

If you have any other comments, please report them in the space provided.

Appendix 6

Imagine that you have just moved to a different city; you are renting an apartment with a girl you have never met before. Even though she seems like a nice person, you doubt whether you would hang out together if she weren't your flatmate. One evening, before going out you and your date are sitting in the living room, when your new flatmate comes in and, after exchanging greetings with the two of you, says: `Have I got a date tonight!´ You know she's been seeing a guy named Joe for a couple of weeks, so you say: `So how is Joe?´, to which she replies: `Nope, this one's name is Andrew; I am seeing Joe tomorrow! That's how we roll, right?´ She then winks at you and leaves the room.

Imagine that you have just moved to a different city; you are renting an apartment with a guy you have never met before. Even though he seems like a nice person, you doubt whether you would hang out together if he weren't your flatmate. One evening, before going out you and your date are sitting in the living room, when your new flatmate comes in and, after exchanging greetings with the two of you, says: `Have I got a date tonight!´ You know he's been seeing a girl named Jane for a couple of weeks, so you say: `So how is Jane?´, to which he replies: `Nope, this one's name is Anne; I am seeing Jane tomorrow! That's how we roll, right?´ He then winks at you and leaves the room.

Before you could react verbally or nonverbally to this situation, how would you feel right at that moment?

Not at all   Moderately   Extremely

Affectionate
Amused
Embarrassed
Disgusted
Other (please specify, if any)

Psychological research shows that our facial behaviour is often independent from our internal feelings. Thus, please imagine that you now turn to the other person; you look at his/her reaction but can't discern what s/he is thinking from his/her face. If - for some reason - you couldn't say anything at that point, what type of face do you think you would be most likely to make?

We appreciate that the expressions below might differ in the exact style of exectution or be stronger/milder than what you have in mind; however, please try to pick one anyway.

Which expression are you most likely to make?

Expression 1   Expression 2   Expression 3   Expression 4   Expression 5   Expression 6

Appendix 7

Audience type manipulation

Date

We are interested in how romantic relationships unfold in time. In this particular study we examine the dynamics of romantic relationships during the period of time after individuals become interested in one another and before they either openly admit that they do or one of them decides that it is not worth it. Thus, we would like you to think about a person to whom you were attracted most recently. If you are thinking about a current romantic interest that has not developed into a relationship yet, that is fine; but if you are currently in a relationship and/or if you are thinking about a person from the past, please choose a person with whom you very much wanted a relationship but it didn't work out. In any case, try to recall as vividly as possible how it felt to be in the presence of that person.

Opposite-sex control

We are interested in how non-romantic relationships with opposite gender unfold in time. In this particular study we examine the dynamics of relationships during the period of time after individuals become acquainted. Thus, we would like you to think about a person of the opposite gender that you have no particular feeling for. It can be an acquaintance whom you see regularly at school/work and exchange some pleasantries with. The ideal candidate would be someone of approximately your own age and who is not capable of influencing either your professional or your social life, i.e. the person is not your direct superior and you would not care if s/he threw a party and did not invite you. Try to recall as vividly as possible how it feels to be in the presence of that person.

Same-sex friend

We are interested in how same-sex friendships unfold in time. In this particular study we examine the dynamics of a potential friendship during the period of time after individuals get acquainted and before they either become friends or stay mere acquaintances. Thus, we would like you to think about a person whom you were motivated to become friends with most recently. You can also think about a good friend, and think back to the time right before you became close friends. Try to recall as vividly as possible how it felt to be in the presence of that person.

Were you able to imagine a specific person? (If not, please take a moment to recall a person that fits the description)
 Yes

Is the person you imagined male or female?
 Male Female

How physically attractive do people in general find this person?
                              Not at all   Moderately   Extremely
How physically attractive is this person to you?
How desirable is this person as a potential long-term (romantic) mate?
How desirable is this person as a potential short-term (romantic) mate?

Appendix 8

The Pre-test of Horror Films

The primary objective of this pre-test was to select a film that would be most efficient in eliciting fear.

Method

Participants

Nineteen male participants were recruited through the School of Psychology paid participant panel. They received £4 for their participation. Their average age was 23.16 (SD = 5.28). Twenty-one per cent of the sample reported being single, 26% were in a casual dating/sexual relationship, and 53% were either in serious committed relationship or were married. Sixty-four percent were undergraduates, 32% were postgraduates, while the remaining participant (5%) was not a student. Sixty-eight per cent were British, 11 % were Asian, 5% were continental European, and the rest identified themselves as 'other'.

Materials

Six movie clips were selected for this pre-test:

1. *Final Destination* (2m 25s): A young man dies in a bathtub after slipping and getting caught in the cord of the shower curtain.
2. *The Shining* (1m 20s): Recommended by Rottenberg et al. (2007), this extract depicts a young boy who is playing alone in a deserted hotel corridor; he thinks he hears his mother's voice in one of the rooms and approaches it cautiously.
3. *1408* (2m 20s): A man is trying to escape from an 'evil' room; at the end of the clip he hallucinates an attacker, who tries to stab him.
4. *The Grudge* (2m 26s): A man is attacked by a dead woman who first crawls out of a well on TV and then steps into the room and follows him as he tries to crawl away on a floor covered with broken glass.
5. *The Ring* (2m 20s): A woman is gripped with fear as she watches a dead woman crawl serpentinely down the stairs towards her.
6. *Silence of the Lambs* (3m 28s): Also recommended by Rottenberg et al. (2007), this extract depicts a female FBI agent who is pursued in a dark room by a criminal wearing night-vision goggles.

Procedure

After arriving at the laboratory, participants read and signed the informed consent. They then watched the six films in a randomized order and answered questions about their experienced with each one. At the end of the pre-test they watched an amusing video clip, designed to restore their mood.

Results

Because there is no single way to judge which film was most efficient in eliciting fear and only fear, I used three different criteria for selecting a film. Each time a film satisfied a criterion, it received a point. The film with the greatest number of points was selected for the experiment.

Criterion 1 was that the mean and the median of the experience of fear should be greater than midpoint. Because the scale for all emotions ran from 0 (Not even felt the slightest bit of the emotion) to 8 (The most I have ever felt in reaction to a movie), the midpoint was 4. Only *1408* satisfied this criterion.

	Final Destination	The Shining	1408	The Grudge	The Ring	Silence of the Lambs
Mean	3.58	3.53	4.42	3.58	4.16	3.74
SD	2.19	1.93	2.06	2.59	2.39	1.88
Median	4.00	4.00	5.00	3.00	4.00	4.00

Table 6. Averages of the experience of fear for the six films

Criterion 2 was that fear should be the primary emotion. 'Primary emotion' is the emotion that was reportedly felt with the highest intensity. For *The Grudge* and *The Ring* the primary emotion was disgust rather than fear.

Criterion 3 was that there should be no women in the film. This was important because I wanted to avoid unsuspectingly priming a 'damsel in distress' script. *The Grudge*, *The Ring* and *Silence of the Lambs* did not satisfy this criterion.

Based on these three criteria, *1408* was judged to be the most appropriate film for use in the experiment (see Table 7).

	Criterion 1	Criterion 2	Criterion 3	Total
Final Destination	0	1	1	2
The Shining	0	1	1	2
1408	1	1	1	3
The Grudge	0	0	0	0
The Ring	0	0	0	0
Silence of the Lambs	0	1	0	1

Table 7. Selection criteria for the six films

Appendix 9

In accordance with the Data Protection Act we are under the obligation to provide you with the information about a person who will analyse your videotaped data, especially when that person is a fellow student. Studies have shown that participants are reluctant to have their data be analysed by people they might know, so we try to give you an opportunity to make an informed decision about how you wish your data to be treated.

The person shown above is the Research Assistant for this project. If you do not agree to participate, please let the experimenter know now; if you do, please click the square below and continue.

By clicking the box above, I signify that I consent to participate in the study conducted by Dina Dosmukhambetova, School of Psychology, Cardiff University, with the supervision of Prof. Antony Manstead.