Error Management, The Speaker-Bias, and Lie-rarchy in the Evolution of Deception Avoidance

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Abstract

Decades of research have yet to provide a comprehensive theory explaining how, without adequate detection skills, humans circumvent costly deception. This series of studies proposed that biased perceptions of deception evolved to *avoid* costly deception without having to accurately detect it, per se. Based on evolutionary and error management models, three research studies were conducted to test the proposal that cost-benefit analyses and mental shortcuts produce biased perceptions of deception. In particular, the studies explored the role of the receiver of a message, characteristics of the speaker, and the cost associated with the message in the over- or under-perception of deception.

Study 1 explored if the receiver's characteristics (sex and relationship status), the content of the message, and priming mate value influenced perceptions of veracity. A sample of university students and individuals from the wider community (N = 104) completed a word-priming task where they reordered a series of short scrambled sentences containing words related to high or low mate value. Following priming, participants judged the veracity of messages considered to carry higher or lower reproductive costs. The findings indicated that if costs were minimal individuals maximised the frequency of Type II errors (false-negative) resulting in greater perceptions of honesty. However, the process typically producing truth-biased perceptions began to generate amplified perceptions of deception as costs increased. These findings are consistent with an error management approach, indicating that individuals maximised the number of Type I errors (false-positive) as costs increased.

Study 2 explored perceptual biases that may arise based on the characteristics of the speaker. This study proposed a speaker-bias in deception detection; specifically, that initial perceptions of truthfulness vary as a function of a speaker's sex and

attractiveness. Participants (N = 117) viewed a series of written vignettes involving an anonymous ‘speaker’ revealing biographical details to a ‘receiver’ character. After each vignette, participants were informed as to the truthfulness of the message (either truthful or a lie) and asked to indicate the anonymous speaker character from a series of photos of individuals varying in sex and facial attractiveness. As expected, participants rated female speakers as a more likely source of truthful statements and male speakers as a more likely source of potential deception. It was also found that photos of attractive individuals were selected more frequently during honest conditions.

Study 3 resulted in the construction of a hierarchy of lies based on participants' preferences to avoid different types of deception. This study also allowed participants to make choices among various forms of deception simultaneously to directly investigate the fundamental trade-offs between preferences to avoid different types of deception. Each participant was given a list of ten traits an individual might lie about to secure a new partner. Participants (N = 147) were provided with a high (30 tokens) and low (10 tokens) 'budget'. Participants allocated as many or as few of the tokens as they wished across the traits to indicate their preference not to be deceived regarding each trait. Based on theoretical notions, the ten traits were categorised into one of four tiers a priori. As expected, traits categorised into the higher tiers produced higher avoidance preferences, while traits in lower traits produced lower avoidance preferences. Further, the preference to avoid higher tier traits was most evident when greater restrictions were placed on the participant’s selection process. However, as budget restrictions were lifted, trade-offs were found to occur, indicating an increased distribution of resources to lower tiers. Taken together, the findings from the three studies conducted provide a foundation for a new cognitive model of deception avoidance that may have greater explanatory power than earlier models.

CHAPTER 1
INTRODUCTION

Evolved Mental Mechanisms

That human mental and behavioural mechanisms may be the result of natural selection is a premise that has both interested researchers and caused considerable debate for over a century. Evolutionary psychology is the most recent discipline to examine the evolutionary roots of mental processes. The evolved psychology of human courtship has been a particular focus for much of the study of evolutionary psychology (for a review see Miller, 2000; Buss, 2007). An array of different topics has been explored, including mate selection and attraction (Buss, 1989a; Singh, 1993), and mate retention and poaching (Fisher, 1992; Schmitt & Buss, 2001). Another major area of research focus of the discipline concerns the detection of cheaters and the violation of social contracts (Barkow, Cosmides, & Tooby, 1992). Of particular relevance to the current research is the human ability to circumvent deception. A series of three studies was undertaken to investigate the interface of these two research areas by examining the role of deception detection within the context of human mate selection.

Natural Selection as the Primary Mechanism of Evolutionary Change

Darwin (1859) observed that in a natural setting, survival is not without competition. Darwin declared competition to be the driving force behind evolutionary change. Darwin recognised all environments can only sustain a limited number of individuals; thus, not all individuals will survive. The struggle to obtain limited resources crucial to survival results in competition between individuals. Darwin also noted that some individuals, as a consequence of the variation within species, have an elevated chance of survival. He proposed that over evolutionary time, those who were

better adapted would flourish, while the others would decrease in numbers. Darwin referred to this phenomenon as ‘natural selection’.

Darwin (1859), and more recently Mayr (2001), describe natural selection as having two vital elements. The first component is the *production of variation*. Genetic recombination via sexual reproduction produces variations in traits (e.g., great variety in the number of different phenotypes expressed) upon which natural selection acts. Every offspring produced via sexual reproduction contains a slightly different set of genes. This wide variety in traits provides a species with an enhanced probability of survival should the environment undergo changes, as a result, decreasing the likelihood of mass extinction (Mayr, 2001). The second crucial factor in natural selection is that survival and reproduction are *non-random events*. The phenotypes providing some individuals with superior adaptation to their environment are not randomly selected. Phenotypic variation in traits, such as advanced camouflage, provides some individuals with an increased chance for survival. Over an extended timeline, those individuals containing the genetic material for traits that assist in survival will increase in frequency within a population.

Some traits leading to a greater survival rate are heritable so that offspring are born with the same advantages as their parents (Miller, 2000). A distinction is made between a trait being “inherited” and a trait being “heritable”. Within sexual reproducing species, all traits that are dictated by genes are inherited. However, traits that have phenotypic variation between individuals in a population are heritable. For example, traits that do not vary genetically or are constant in all humans (e.g., having two eyes or two legs) are considered inherited, but they have zero heritability (Miller, 2000). Only traits with heritability greater than zero can be subject to natural selection.

Sexual Selection

Darwin (1859) detailed the process of natural selection to assist in the explanation of how organisms change over time. However, he later documented interesting observations of significant differences existing between the male and female members of a species. He noted that although males and females (within the same species) are well adapted to their environment, the process of natural selection alone could not explain differentiation of their traits. He observed that in species that reproduce sexually, males typically had more sexual ornamentation than females. Darwin suggested that the divergence of traits based on an individual's sex was the product of a separate type of selection, he called 'sexual selection'.

Sexual selection describes how individuals not only compete to survive, but also to reproduce. Darwin (1871) reported sexual selection as "the advantage which certain individuals have over others of the same sex and species solely in respect of reproduction" (p. 243). Characteristics arising exclusively from the advantages they provide though their capability to attract members of the opposite sex are called secondary sexual characteristics (Darwin, 1859). Darwin (1859) argued that the presence of secondary sexual characteristics is evidence for sexual selection, yet he failed to clarify why specific traits were more likely to be preferred.

Indicators of Genetic or Inclusive Fitness

At the present time, fitness refers to an individual's ability to successfully pass on copies of their genes to the next generation. Hamilton (1964) defined *inclusive fitness* as the sum of direct (genes passed on through offspring) and indirect (genes passed on through genetic relatives) fitness. Individuals replicating their own genes (via sexual reproduction) and/or aiding relatives high in genetic relatedness may achieve higher levels of inclusive fitness. Fisher (1915) suggested that secondary sexual

characteristics are indicators of genetic fitness, which he referred to as ‘fitness indicators’. Traits signifying greater genetic fitness should be preferred by females during the process of selecting a mate. The overt expression of fitness indictors in males demonstrates a low level of genetic mutations (few errors in genetic copying), high ability to fight off parasites and pathogens and the ability to accrue sufficient resources to maintain the trait (Fisher, 1915). These selected traits will gradually become more exaggerated as they consistently and directly convey the genetic and/or general health of the male. Females who prefer these traits will produce offspring having the best chance of surviving into the next generation and who have the same mating preferences. As a result, these offspring will subsequently have a greater probability of producing offspring of their own.

Parental Investment Theory

Fisher (1915) described why males with specific traits are more likely to be selected by potential mates. However, Trivers (1972) clarified why females tend to be the selectors, and thus, why it is ‘female mate choice’ not ‘male mate choice’ that drives sexual selection. Trivers explained that the sex that provides the greater degree of parental investment (predominantly females) is typically the choosier sex. Parental investment is defined as “any investment by the parent in an individual offspring that increases the offspring’s chance of surviving, and hence reproducing, at the cost of the parent’s ability to invest in other offspring” (Trivers, 1972, p. 139). At a minimum, human female investment includes a nine-month gestation period, and a period of lactation followed by years of dependent care. In humans, however, copulation is the minimal parental investment a male may provide. Compared to the investment by females in sexually reproducing species, this represents considerably less time, energy, and resources. Males can supply as little investment as a single episode of

insemination; therefore, a male has the ability to withdraw from a relationship to pursue additional mates. Trivers argues that because females make the greater minimal investment they should be more selective than males in relation to mate choice. Males (the lower investing sex) have the ability to mate with a higher frequency of mates than do females (the higher investing sex), and thus, have the capacity to produce more offspring (Bateman, 1948). Subsequently, a male's overall reproductive success is linked to the number of copulations resulting in offspring. In contrast, the reproductive success of females is not derived from the quantity of mates she acquires, but the quality of the mates she selects. As a consequence of this disparity in parental investment, more males than females will end their lives without successfully reproducing. Therefore, males will engage in intra-sexual competition as a means of displaying their genetic worth (fitness indicators) to females.

Mental Traits as Fitness Indicators

While numerous physical traits are considered indicators of fitness, mental traits may also serve this function. The human brain is a rather intricate organ, for which many genes are required to ensure optimal development and performance (Miller, 2000). According to Miller (2000), mental fitness indicators reveal the complexity of a person's brain. Those individuals who have a large number of deleterious genetic mutations are less likely to express sexually attractive mental abilities. Miller argues that genetic mutations represent one of the greatest reasons for variation in fitness. The brain is exceptionally susceptible to mutations, and is dictated by numerous genes. Therefore, it serves as a valuable fitness indicator for members of the opposite sex.

Because personality traits, such as loyalty, empathy, forgiveness, kindness and honesty, are all especially beneficial in a successful human sexual relationship, sexual selection has defined many moral values as sexually attractive (Miller, 2007). Traits

that correlate with an individual's parental or genetic quality (or combination of both) have an increased propensity of being sexually selected (Kokko, Brooks, McNamara, & Houston, 2002). If a man has a plethora of mutations, he will fail to consistently perform the diversity of mental activities women desire. As previously stated, higher genetic quality indicates that an individual is lower than average in deleterious genetic mutations (Miller, 2000; Ridley, 2001). Genetic mutations resulting in social anxiety, language or speech impairments, schizophrenia, autism and mental retardation (Baron-Cohen, 2002; Keller & Miller, 2006; Shaner, Miller, & Mintz, 2004) impair the formation and functioning of an advanced theory of mind. Theory of mind (for a review see Baron-Cohen, 1995) involves the capability to 'read other's minds' and is an imperative ability in order to successfully navigate human social exchanges and acquire mates.

Conversely, indicators of being a good parent are marked by phenotypic traits that favour the survival of offspring including activities such as feeding, mediating sibling rivalries, grooming, predator protection, and safely teaching life skills to offspring (Kokko, 1998). Good parent indicators, such as conscientiousness and patience, differ from those indicating good genes. Good parent indicators signal that an individual is prepared and likely to collaborate in a mutually advantageous relationship strategy that will extend across the repeated interactions involved in cooperatively raising offspring.

Mating Strategies and Moral Mental Fitness Indicators

Men and women employ a number of different mating strategies, including long-term and short-term strategies (Buss, 2007). These strategies are commonly referred to as quality versus quantity strategies, respectively (Hirsch & Paul, 1996). According to Hirsch and Paul (1996), those employing a long-term (quality) strategy

should display a different set of moral codes than those who are engaging in short-term (quantity) strategies. Long-term relationships necessitate continuing repeated reciprocity and persistent investment in offspring by both parties. Due to the nature of long-term relationships, those individuals engaging in this strategy are often perceived as more honest and moral. Women who select long-term mating prefer men with mental fitness indicators, such as kindness, empathy, niceness, and honesty (Urbaniak & Kilmann, 2003). These traits promote successful long-term strategies and are difficult to misrepresent over an extended period, and thus, are desired in potential partners.

In contrast, short-term (quantity) strategies potentially involve minimal parental investment from the male. For women engaging in short-term mating strategies, mental fitness indicators such as riskiness and prosocial heroism (voluntary behaviors intended to benefit another) are perceived as attractive (Urbaniak & Kilmann, 2003). Zahavi (1975) explained that beyond the obvious motivation to bluff and falsify, costly traits (e.g. riskiness and prosocial heroism) are difficult to counterfeit. The honest display of costly traits indicates to potential mates that the signaller's genetics are of high quality and can endure 'handicapping' activities that less competent individuals would fail to perform. In turn, individuals displaying these traits are selected as they indicate 'good genes' that will be passed on to offspring.

Not all individuals possess the traits desired by the opposite sex. Thus, some individuals elect to utilise deceptive tactics to compensate for their less than satisfactory characteristics. DePaulo and Kashy (1998) found that more people lie when engaging in short-term relationships when compared to long-term committed relationships. Such individuals deceptively alter their perceived attractiveness to the opposite sex in order to gain a strategic advantage (Miller, 2007). This tactic may

especially apply to short-term mating strategies due to the decreased time available for the detection of the lie. As relationships extend over time, opportunities to discover any deception employed increase. However, regardless of the duration of the relationship, those who could deceive others will be more successful than equivalent individuals who do not (Linton & Wiener, 2001; Miller, 2000).

Social status, age, health, and fertility are all characteristics that would be advantageous to enhance for gaining an amplified individual advantage in mating. Deception may be used to draw more potential reproductive partners or gain access to a high quantity and quality of parental investment (Zahavi & Zahavi, 1997). Many benefits result from the successful execution of deception in the mating market. Consequently, men and women have evolved to be rather competent in their capacity to manipulate and deceive others (DePaulo et al., 2003).

The Evolution of Deception

"To get the better of by trickery; to beguile or betray into mischief or sin; to mislead" are all included in the definition of the English word "deceive" (*Oxford English Dictionary*, 1989). Richard Dawkins (1989) explained the evolution of manipulation and deceit the following way: "If there is just one selfish rebel, prepared to exploit the altruism of the rest, then he, by definition, is more likely than they to survive and have children. Each of these children will tend to inherit his selfish traits and after several generations of this natural selection, the 'altruistic group' will be over-run by selfish individuals" (p. 7–8). Dawkins and Krebs (1970) suggested that individuals may manipulate the behaviour or exploit another's mental apparatus and behavioural machinery for their own benefit. Individuals proficiently employing deceptive and manipulative tactics would potentially increase their ability to survive and reproduce, therefore, having an evolutionary advantage over those who did not.

Many benefits may be acquired through manipulation and deception, not only in acquiring survival resources (e.g., food and shelter) but also reproductive resources (e.g., mates and parental care). Males may especially engage in deceit for the purposes of increasing their advantage in mating. For example, if a male was consciously or unconsciously aware that females find male fitness indicators, such as social status and resource acquisition, attractive (see, Buss, 1994, for a review) then he could misrepresent himself in any of these qualities. Ultimately, a number of the initial false behaviours that were designed to trick others could become internalised into some people's everyday strategies of mating and become an integral part of their personality (McHoskey, 2001).

Deceptive and Manipulative Personality Traits

The renaissance political writer Niccolò Machiavelli, author of *The Prince* (1998, originally published in 1532), detailed manipulative and deceptive personality traits. Machiavelli, as a manipulator himself, believed the ends justified the means and any tactic to achieve one's goals was a method worth utilising. Those individuals who are highly likely to manipulate and deceive have been found to be distinctly different in a number of ways from those who are less likely. Machiavellians are often more dominant and non-nurturing individuals who tend to have low scores on measures of empathy and agreeableness (Barnett & Thompson, 1985; Wastell & Booth, 2003; Watson, Biderman, & Sawrie, 1994), but high scores on measures of conscientiousness (Jakobwitz & Egan, 2006; Lee & Ashton, 2005; Paulhus & Williams, 2002). Mudrack (1990) argued that manipulative individuals have an external locus of control. Such views of the world result in decreased motivation for intrinsic goals, such as community building and the welfare of others, and instead focus on more on self-interested external incentives, such as personal success (McHoskey, 1999).

Machiavellians are very cunning and influential in their tactics. They employ scheming communication strategies that incorporate both emotional appeal and deceit (Grams & Rogers, 1990). Additionally, manipulation of others includes not only deceiving others to perform desired behaviours, but suppressing counterproductive negative actions as well. When attempting to manipulate, charm is the most frequent tactic used, while coercion and the silent treatment are used habitually to terminate unwanted behaviour within an interaction (Buss et al., 1987). Deceptive machiavellians are described as highly flexible in both communication and personality. Machiavellians are highly adaptive to various situations and opportunistic when engaged in those situations (Martin, Anderson, & Thweatt, 1998). Wood (1989) concluded that machiavellians are mentally malleable, but theorised that they operate under a moderately concrete cognitive apparatus that consistently drives them to achieve personal gratification safely, but by any means required. Machiavellians also have few internal conflicts or ethical dilemmas in regards to the deception of others in order to benefit themselves (Paulhus & Martin, 1987). Machiavellians have been found to disassociate their internal self-value from their selfish behaviour (Bogart et al., 1970).

Flexible moral frameworks and deceptive behaviours do not exclusively occur in adult humans. Braginsky (1970) observed that even children can be manipulative. Children enacting deceptive behaviours have better control over the impressions they make on others when compared to other children. Further, non-human primate behaviours have been observed to parallel the actions of manipulative humans (Humphrey, 1976). Non-human primates have also evolved the brain capacity to become aware of other's awareness. Primates have the ability to recognise that other individuals have goals, aims, and desires that may conflict or compete with their own and use this awareness to their advantage (Humphrey, 1976).

Environments Conducive for the Employment of Deception

Numerous environmental circumstances influence the probability of successful deception (Geis & Christie, 1970). One major factor that increases the success of deceivers is the degree of improvisation available, which is associated with the nature of social structure in the environment. Machiavellians thrive in unstructured environments that have low corresponding social rules and few norms restricting particular behaviours (Schultz, 1993; Sparks, 1994). Further, Geis and Christie (1970) observed that an additional factor that prompts success for machiavellians is face-to-face interactions. These situations allow individuals to copiously scrutinise and gauge faint nonverbal cues of the listener, allowing for increasingly precise behaviour calibration.

While some individuals may become morally and emotionally involved in some situations, machiavellians have the ability to restrict their overt display of those behaviours. Manipulative individuals are able to express a composed moral detachment during deceptive situations. This disconnection with emotions allows for additional time and ability to analyse and plan their next manoeuvre. Yet, during all these tactics and disassociations, they manage to remain visually covert in their attempts to deceive. Manipulative behaviours would ultimately fail should they become too obvious. While often finding success at being discrete, machiavellians are frequently reported as both persuasive and charming (Geis & Christie, 1970).

Peterson (1995) suggested there are six different categories of lies. *Omission* involves individuals remaining silent about things that would otherwise incriminate them. *Distorted lies* are those when people change some of the facts in their story. *Half-truths* occur when people leave out half of the problematic details. *Blatant lies* involve an individual fabricating an entire story. *White lies* are when an individual tells a minor

lie to another in an attempt to make them feel better. Finally, *failed lies* arise when someone tells a lie that later becomes a truth, coincidentally.

While there are only six ways to tell a lie, there are many different things an individual could lie about in order to appear more desirable or increase similarity with a prospective date. When attempting to secure a date with a member of the opposite sex, people have been known to lie about various features including course grades, career skills (Rowatt, Cunningham, & Druen, 1999), cheating on their partner (Saxe, 1991; Stebleton & Rothenberger, 1993), number of previous partners (Cochran & Mays, 1990; Desiderato & Crawford, 1995), condom-use history (Desiderato & Crawford, 1995), financial status, attractiveness and commitment (Benz, Anderson, & Miller, 2005). These are just a few of the possible types of lies people can engage in to increase desirability. However, like variations in a potential partner's mate value, not all these lies pose the same level of reproductive and survival costs if a missed detection occurs. An individual's mate value is defined as his or her ability to appeal to the opposite sex (see Surbey & Brice, 2007). Males varying in mate value pose differing levels of reproductive costs. Additionally, the implementation of different types of lies may also inflict different reproductive costs if the females are successfully deceived in the mating interaction.

Manipulators in the Mating Context

Several fundamental differences have been observed between manipulators and non-manipulators in relation to acquiring a mate. It has been found that men are more likely to be machiavellian compared to women, largely engaging in deceptive acts that promote self-interest (Christie & Geis, 1970). Machiavellians tend to lie more often than other individuals (Znakov, 1995). Further, machiavellians will engage in risky

behaviour with others if they perceive their accomplices are resourceful and capable (Bogart et al., 1970).

Men employ different mating strategies depending on whether the goal of their relationship is long or short-term (Buss, 2007). A successful strategy of men is to mate with as many females as possible, and deceit is one potentially successful tactic to lure extra mates. McHoskey (2001) observed machiavellians had more sexual partners in the previous year than other individuals. Additionally, manipulative men reported a higher likelihood of employing force (coercive sexual deceit) to gain sex if they were assured they could get away with it or that there would be no penalty (Boeringer, 1996).

The Expectation-Discordance Model of relationship deception (Druen, Cunningham, Barbee, & Yankeelov, 1998) suggests that when an individual is intermingling with another and deems it difficult or unfeasible to meet the standards and expectations of the other by means of honest communication, they may resort to acts of deception. Forty-six per cent of men and 36% of women reported that they had lied at least once to prompt a date with an attractive member of the opposite sex (Rowatt et al., 1999). These individuals lied to attract a date when they believed other more honest methods would lead them to failure (Druen et al., 1998). When engaged in success-oriented self-enhancing lies, people tend to use lies that make them appear more similar to an attractive potential mate than they actually are. Attractive and unattractive individuals are told different types of lies (DePaulo, Tang, & Stone, 1987). Due to this, people who are more attractive are more efficient at avoiding lies told to attractive people and others who are less attractive are more capable in avoiding lies told to unattractive persons.

In summary, machiavellians are more often men, they tend to have relatively more sexual partners, they are self-promoting, and they lie often. If mating with a deceptive machiavellian reduced an individual's fitness, then those individuals possessing mechanisms to circumvent deception would gain a distinctive advantage. Individuals who failed to avoid deception from machiavellians in this context would suffer reproductive costs, such as raising children alone, loss of resources, or producing offspring of inferior genetic quality (Johnson et al., 2004).

Solving the Adaptive Problem of Deception

The Pleistocene is referred to as the environment of evolutionary adaptedness (EEA) for early humans (Tooby & Cosmides, 1990). The EEA is defined as the historical era in which persistent selection pressures shaped particular adaptations. The EEA also encompasses those physical and social environmental circumstances that were crucial for optimal functioning and development of the adaptation. The Pleistocene extended from approximately 1.8 million to 11,000 years ago, during which time virtually all of human's multifaceted, multi-gene adaptations were shaped. During this period, all individuals were confronted with adaptive problems. Adaptive problems refer to the continuous tribulations over an organism's evolutionary history that required an adaptive solution to successfully survive and reproduce. Conceptually, deception itself may have evolved as an adaptive solution to the problem of increasing genetic fitness. Nonetheless, as frequencies of deception increased, this previous adaptive solution now serves as an adaptive problem for others. During the Pleistocene epoch, deception simultaneously existed as both a problem and solution.

For our ancestors who were victimised by deception, methods of detection should have been favoured. However, researchers have found that overall human accuracy in deceit detection is just slightly above chance (Bond & DePaulo, 2006;

Kraut, 1980). Such findings do not strongly support the existence of an evolved mechanism that consistently and successfully detects deceit. On the contrary, deception detection may only be triggered under specific conditions.

People appear to utilise many physical cues when they are judging whether they are being deceived (Malone, DePaulo, Adams, & Cooper, 2000). However, behavioural indications of deception are seldom exclusively expressed in the presence of a lie. Instead appropriate behavioural cues are appraised by the likelihood of occurrence when an individual is lying, compared to when an individual is telling the truth (Zuckerman et al., 1981). Cues to deception include shifts in posture, avoidance of eye contact and fidgeting (DePaulo et al., 2003). Vrij, Edward, and Bull (2001) reported that deceivers had extended pauses when answering questions when compared to non-deceivers. Deceivers have also been reported to express a higher frequency of hesitations during speech in general. Those individuals who shift their focus to nonverbal factors more than verbal cues experience greater success at detecting deception (Ekman, O'Sullivan, Friesen, & Scherer, 1991). Additionally, individuals who achieve successful detection in one situation are also more likely to detect deception in other contexts (Ekman & O'Sullivan, 1991; Frank & Ekman, 1997). This body of research supports the view that individuals may intrinsically vary in terms of their capability to accurately detect deception, however, still fail to achieve reasonably high levels of accuracy.

Malone and colleagues (2000) observed that the majority of their participants had similar ideas about what cues to look for when assessing deception. While the knowledge of what cues to attend did not change among the participants, their accuracy in detecting deception still varied greatly. Therefore, conscious knowledge of which cues correlate with deceptive behaviours cannot be the keystone in deception detection

accuracy. Forrest, Feldman, and Tyler (2004) proposed that while awareness of accurate detection cues is important to success, additional factors are required. These researchers proposed the existence of a mechanism that, following activation, can attain increased levels of detection accuracy. Since methodologies failed to activate this deceit-detection mechanism in many studies, the participants were virtually left guessing and, consequently, scored around chance (Bond & DePaulo, 2006; Kraut, 1980). Forrest and colleagues (2004) theorised that humans naturally operate with this detection mechanism switched off and only correctly identify selfish deceit by others when the specific mechanism is activated. It was concluded that this mechanism can be switched on by providing external cues of possible deception. Based on this perspective, the current series of studies examined if external cues indicating deception with heavy potential reproductive costs served to amend an individual's perceptions of honesty and increase one's ability to circumvent deception.

Perceptions of Deception and Status

Dominance theory refers to the idea that social dominance hierarchies operate by a set of implicit social norms that govern both behaviour and rights to resources, given one’s rank. Social hierarchies are highly tied to males’ reproductive success and the loss of social dominance can be very costly to a male’s survival and reproductive success. Cummins (1996) expanded dominance theory by hypothesising that male deception detection would be a function of social dominance within the group. Due to continuous competition, higher ranking (or dominant) individuals are required to avoid deceit from competitors if they wish to maintain access to their resources. At the same time, it would be beneficial for low-ranking individuals to become deceitful and manipulate their way to the top to gain access to sexual assets (such as mating rights and parental care). Reproductive success refers to the number of offspring produced by

an individual. In many species, reproductive success is positively correlated with the level of social dominance. Those high on the social hierarchy are less likely to be victims of predation and starvation (Cheney & Seyfarth, 1990). In addition, increasing both the level of social dominance and time spent in that role are positively related with greater reproductive success. Low-ranking individuals have much to gain in reproductive success by violating social norms and cheating behind the back of a high-ranking male. In some primates, males will move a potential mate away from the dominant male and silence her calls to him in order to avoid detection, while copulating with her (de Waal, 1998). Therefore, for high-ranking individuals, it is advantageous to be able to avoid such acts of deception, in order to maintain access to sexual resources.

Cummins (1999) found that status has a significant effect on the probability of an individual detecting deceit. However, when it came to detecting truth, status did not seem to matter. When human participants were placed in high-ranking positions, they were three times more likely to detect deceit than those placed in low-ranking situations (Cummins, 1999). In order to prime participants for deceit detection, researchers manipulated the mental state of being of higher status by placing participants in a high status group (dormitory resident assistant checking on students). Cummins observed that after participants were placed in the high-ranking groups and later switched to a low-ranking group (dormitory student checking on resident assistants), they still maintained increased detections of deception, as if they were still in the high-ranking group. Low-status groups only correctly identified deception after first being primed in the high status group in the first phase of the study.

In summary, Cummins' (1999) findings provide insight into the process of avoiding lies, rather than detecting truth. When it came to measures of truth finding, participants were all equally low in accuracy. Individuals in positions of higher status

may sustain more costs if tricked than someone of a lower position who fails to detect the same lie. When asymmetries arise between the costs of failing to identify a deceitful act and falsely identifying a deceitful act, then evolved decision-making adaptations may make systematic errors. This process is referred to as error management (Haselton & Buss, 2000). The proposed studies employ an error management approach and are based on the proposition that systematic errors are produced following a cost-benefit analysis of deception. In cases of potentially costly deception, individuals are expected to over-perceive deception to assist in avoiding deceitful acts.

Error Management Theory

When individuals are potentially being lied to, but they do not have the means to prove a statement's veracity, they are left in a situation of uncertainty in which they must make a decision. Additionally, evaluations of communications may provide cues to deception and cues to honesty simultaneously, producing a situation of ambiguity. During these situations, an individual is left with the option of producing one of two types of errors: false positives (false alarms, Type I errors), assuming someone is lying when they are telling the truth, and false negatives (missed detections, Type II errors), assuming someone is telling the truth when they are actually lying (Green & Swets, 1966). When this dichotomous decision of errors is made, as the probability of one error decreases, it unavoidably increases the probability of the other error occurring. While these two errors cannot be simultaneously avoided, they rarely carry the same level of costs. We might expect that under these conditions, human judgement and decision-making apparatuses would have evolved a bias towards the less costly error, even if this results in more errors overall.

Error management theory has been applied to two common errors in cross-sex mind reading: men over-perceiving the sexual intent of women and women under-

emphasising commitment from men (Haselton & Buss, 2000). Abbey (1982) found that men consistently think women are more interested in having a sexual relationship than do women. Over evolutionary history, one of the greatest restrictions on a male's ability to replicate was his ability to acquire a fertile mate (Symons, 1979). Men who err on the side of falsely perceiving sexual intent in females (False positive, Type I errors) paid low costs, such as lost time or energy, when compared to those who falsely perceived a lack of sexual intent from women (false negative, Type II error). The latter men would have paid a much higher cost by potentially missing a reproductive opportunity (Dawkins, 1989). Conversely, women have a commitment scepticism bias that leads them to under-emphasize a male's level of commitment. For women, failing to perceive commitment that does exist (false negative, Type II error) would be associated with a much lower cost than falsely perceiving a male's commitment when little commitment exists (false positive, Type I; Haselton & Buss, 2000).

An Error Management Theory of Deception Detection

As previously mentioned, many researchers have found that the level of accurate overall human deceit detection is just slightly above chance (DePaulo et al., 1999; Kraut, 1980). However, many studies do not fully incorporate the possibility that biased perceptions of deception may be influencing the outcome of veracity decisions. It is suggested that the costs associated with deception are likely to increase the level of deception perceived. In review, when attempting to avoid lies consistently, humans are left with two possible errors as described by error management theory: false alarms and missed detections. When reproductive costs are involved, missed detections of deception can be highly costly. Johnson and colleagues (2004) theorised that there should be a difference in reproductive costs for women who are in committed relationships compared to single females. They tested this assumption and found single

females were superior at positively identifying deception in males exaggerating biographical information that women typically find desirable in a mate. Conversely, women in committed relationships identified significantly more true biographical statements made by men. This difference is suggested to result from asymmetrical costs to single women.

DePaulo and Kashy (1998) found that people are more likely to lie in casual relationships than those with whom they share close relationships. Single women, because they are still in the mate selection phase, have higher reproductive costs if they mate or pair bond with an individual of poor quality or parenting abilities. Females in committed relationships do not suffer these costs because they are not actively seeking a mate, thus they are not expected to increase their perceptions of deception. Therefore, it is suspected that the single women in Forrest and colleagues' (2004) study were making the least costly error (Type I, false alarm) by over-emphasising possible deceit. In addition, high-ranking individuals would suffer fitness loses from any reduction in their status resulting from deception. As a result, high status individuals in Cummins's (1999) study may have also produced the least costly error and generated increased perceptions of deception compared to those who faced lower costs. The current series of studies explored if differences in reproductive costs produce different perceptions of deception and how these perceptions affect accuracy rates.

Proposed Studies: Aims and Hypotheses

The current series of studies aimed to elucidate some of the underlining factors that drive perceptions of deception. I suggest that perceptions of deception produced from internal and external factors strongly affect the outcome of a veracity judgement. The general goal of the current research program was to create a perceptual model of deception avoidance. It was expected that indications of costly deception would

stimulate amendments to the perceptual errors and biases typically guiding human behaviour. Three studies were designed to explore the perceptions of deception related to three aspects of potential deceptive communications. Study 1 examined the influence that asymmetries in reproductive costs had on a receiver's perceptions of deception. Study 2 explored the influence that a speaker's sex and level of attractiveness had on receivers' perceptions of veracity. Finally, Study 3 aimed to create a hierarchical model to explain the difference in perceptions of deception across individual traits.

CHAPTER 2
STUDY 1: DECEPTION AVOIDANCE: AN ERROR MANAGEMENT APPROACH TO THE TRUTH-BIAS

Deception-Detection in Humans

Various theories exist in relation to the human ability to detect deception accurately. Although decades of research have suggested that members of our species are capable of detecting deception, accuracy is typically low, for example, 57% in one early report (Kraut, 1980) and 54%, more recently (Bond & DePaulo, 2006; Li, 2011). Ninety per cent of published results reveal accuracy rates do not differ by more than 10% (Levine, Shaw, & Shulman, 2010b). Many studies have focused on the detection of deception cues through what Ekman and Friesen (1969) call 'leakage'. According to their theory, deception is correlated with emotional states that are leaked through nonverbal cues that cannot be completely managed by the conscious mind. For example, feelings of fear of detection, guilt and other emotions may be produced by the act of lying and may be leaked. Zuckerman, DePaulo, and Rosenthal (1981) advanced leakage theory with their four-factor theory. They proposed that emotion, arousal, cognitive effort, and over-control of behaviour are four factors that differ when individuals are telling the truth and when they are lying. However, a series of meta-analyses have cast doubt on both this theory and our ability to detect deception accurately via nonverbal cues (Aamodt & Custer, 2006; Bond & DePaulo, 2006; DePaulo et al., 2003; Frank & Feeley, 2003; Sporer & Schwandt, 2006, 2007).

Non-verbal and Cognitive Factors Associated with Deception and Detection

Although there has been little evidence to support the proposal that specific cues are consistently leaked while a lie is taking place (DePaulo et al., 2003; Sporer & Schwandt, 2006, 2007), it is still believed that leakage is due to the cognitively demanding nature of lying. Some researchers have suggested that in order to detect

deception accurately, the cognitive load during the formation or execution of the lie must be raised (DePaulo et al., 2003; Zuckerman et al., 1981). However, due to the increasing need to control behaviour and cognitive demand, liars have been found to reduce their cognitive load when lying by staring at information-poor aspects of the environment, such as floors or ceilings (Doherty-Sneddon, Bruce, Bonner, Longbotham, & Doyle, 2002; Doherty-Sneddon & Phelps, 2005; Glenberg, Schroeder, & Robertson, 1998). Liars have also been found to decrease blinking, and hand and foot movement to allow more cognition to be allotted towards behaviour maintenance during lies (Mann, Vrij, & Bull, 2002; Vrij & Mann, 2003; Sporer & Schwandt, 2007). Yet, conflicting evidence has found that movement of hands and feet tends to increase when individuals lie (Vrij, Mann, Leal, & Fisher, 2010).

While the cognitive load and nonverbal leakage model has not received consistent support, considerable evidence suggests that cognitively based lie detection is moderated by what is known as the veracity effect (Levine, Park, & McCornack, 1999). Gilbert, Krull, and Malone (1990) suggested that incoming information is, by default, perceived as truthful. Therefore, the veracity effect refers to the consistent finding that truthful messages are more accurately identified and that people persistently err more when identifying lies. The veracity effect has been demonstrated with individuals who were or were not primed to be suspicious, relational partners and strangers, and with individual's who were both familiar and unfamiliar with the content of the message (Levine et al., 1999). These findings have led researchers to conclude that the veracity of the message being judged is one of the most influential factors for accurate detection.

Previous research has also suggested that it is difficult to enhance overall accuracy past the typical rate of just above chance. For example, whether lies are

sanctioned (participants are instructed to lie) or unsanctioned (participants lied without instruction) does not meaningfully change deception detection ability (Feeley & deTurck, 1998). Confidence in accuracy was expected to correlate with actual accuracy, however, confidence (72.9%) was not revealed to be an accurate predictor of deception detection accuracy (57.2%; Depaulo, Charlton, Cooper, Lindsay, & Muhlenbruck, 1997). Due to the consistency of the veracity effect and the resulting difficulty in detecting deception, researchers have manipulated base rates of lies in order to attain elevated levels of detection accuracy. Instead of employing the standard base rate of 50% truthful messages and 50% deceitful messages, one study altered the base rate to three levels (25%, 50% and 75% truthful messages; Levine et al., 1999). Results showed that the lower the base rate of truthful messages, the higher the error rate in detecting lies. The important insight resulting from manipulating base rates is that increasing the frequency of lies encountered lowered the overall accuracy of detection.

The Effect of Continuous Scales versus Dichotomous Measures on Detection Accuracy

While most research methodologies produce similar accuracy scores, researchers have modified the way in which truths and lies are scored. Two common types of scales are dichotomous and continuous scales (Levine, Shaw, & Shulman, 2010b). Many researchers assume that deception detection is operationally defined as either right or wrong. In accordance with this assumption, the appropriate measure should be dichotomous in nature. Other studies employ continuous scales because deceptive intent, perceptions of lie severity, and judgemental certainty are suggested to vary along a continuum (Levine, 2001; Levine, Asada, & Lindsey, 2003). However, the utilisation of different scale types has been found to be somewhat arbitrary (Bond & DePaulo, 2006). Bond and DePaulo's (2006) meta-analysis found both scale types to be

comparable to each other. In addition, many researchers measure detection accuracy as an average score of correct detection of both truths and lies combined. However, when isolating the analysis to only the accuracy rate for deceptive messages, rates have been found to be below chance (Bond & DePaulo, 2006; Kraut, 1980; Li, 2011).

In review, findings have indicated that individuals can more accurately identify truthful statements as truthful, but this does little to assist individuals in evading the consequences or costs of being deceived. Deception arises in many different aspects of social interactions. People reported using deception in 14% of emails, 37% of phone calls, and 27% of face-to-face interactions (Hancock, 2007). Research has revealed that individuals lie in some way on average about twice a day (DePaulo, Kashy, Kirkendol, Wyer, & Epstein, 1996). While consistent findings exist for the frequency of lies, participants in the laboratory rarely accurately detect deception. One researcher suggested that there could be "more deeply-rooted cognitive processes" for deception detection (McCornack, 1997, p. 103). In an extension of this line of thinking, I propose that deeply-rooted cognitive processes are integrated into behaviours aimed at circumventing the consequences or costs of potential lies, as opposed to accurately detecting deception per se. The current study examined perceptions of deception in light of the costs involved in lies implemented during the mate selection phase of human courtship.

An Error Management Approach to Mating Deception

According to error management theory, errors that produce asymmetrical costs will result in a bias towards the less costly error (Haselton & Buss, 2000). Following a cost-benefit analysis, this bias often results in maximising the error that produces the most beneficial outcome. In review, men have been found to over-perceive sexual intent from women. Men who err on the side of falsely perceiving sexual intent in

females (false positive) pay low costs, such as lost time or energy, when compared to those who falsely perceive a lack of sexual intent from women (false negative). The latter men would have paid a much higher cost by potentially missing a reproductive opportunity (Dawkins, 1989). However, the cost-benefit analysis involved in error management evaluates each interaction situationally. In situations where it is no longer beneficial for men to over-perceive sexual intent, such as interactions with women who are not appropriate sexual partners (a biological sister), men have been found to correct this bias. Referred to as the 'Sister Correction', men have been found to reduce their over-perception of sexual intent when evaluating their sister (Haselton & Buss, 2000). Since a man's sister is an inappropriate sexual partner, the previously beneficial over-perception of sexual intent would now be reasonably costly. The cost-benefit analysis and the employed error type were then reversed. This amendment to the errors men typically employ reveals that a cost-benefit analysis may be a driving force behind the production of some perceptions. Adopting an error management perspective, I suggest that the asymmetries in reproductive costs from deception during courtship guide our perceptions of deception by potential mates.

Obtaining a high quality mate is an objective for virtually all humans. It is not uncommon for an individual to lie in order to increase the likelihood of acquiring or being chosen by a new romantic or sexual partner. Lying is frequent in the mate selection domain and presumably costly but, as mentioned previously, findings have suggested that human deception detection is exceptionally poor (DePaulo, Anderson, & Cooper, 1999; Kraut, 1980). When an individual is evaluating the veracity of a message, but lacks sufficient evidence to determine the statement’s veracity, he or she is forced to generate a decision in a situation of uncertainty, producing one of two types of errors. The first error is a false-positive (false alarm, Type I error), or assuming an

individual is lying when he or she is not, and the second possible error is a false-negative (missed detection, Type II error), where an individual is assumed to be telling the truth when he or she is lying (Green & Swets, 1966). A cost-benefit analysis of these errors will infrequently produce symmetrical costs. Instead, these errors are likely to be biased towards the less costly error. Similar errors in perception have been found to result from cognitive biases and heuristics (Tversky & Kahneman, 1973).

Perceptual Error Types and Cognitive Biases

Evaluations of honesty and dishonesty are frequently affected by cost-benefit analyses and cognitive biases. The most commonly reported error in perceptions of veracity is the Type II error, whereby a message is believed to be truthful when it is actually deceptive. This error appears to be a result of the well-documented truth-bias (McCornack & Parks, 1986; Zuckerman et al., 1981 and Zuckerman, Koestner, Colella, & Alton, 1984).

Whereas McCornack and Parks (1986) conceptualised the truth-bias behaviourally, Stiff and colleagues (1992) suggested the truth-bias was better operationally defined as a cognitive heuristic. Cognitive heuristics are often utilised to reduce the cognitive effort involved during the appraisal of complex stimuli. Further, Chaiken, Liberman, and Eagly (1986) suggested that cognitive heuristics, such as the truth-bias, assist in (or bias) the assessment of a stimulus or message that may be ambiguous or subject to competing interpretations. Although people have been observed to perceive others as more likely honest than deceptive, perceptions of truthfulness are not completely guaranteed. Additional information may trigger additional cognitive biases reported to affect veracity. For example, the relational truth-bias heuristic results in more intense perceptions of honesty between partners in long-term relationships compared to those not in long-term relationships (Stiff, Kim, &

Ramesh, 1992). In addition, the availability heuristic indicates that because an individual experiences more honest than dishonest communications, evaluations of honesty are more often available to that individual (O'Sullivan, Ekman, & Friesen, 1988). Correspondingly, the infrequency heuristic (Fiedler & Walka, 1993) implies that since deception is infrequently discovered and rarely expected, individuals regularly assume that others are being honest. Due to the automatic nature of perceptual processing coupled with limited or ambiguous information, the reliance on cognitive biases therefore produces many errors in judgements.

While individuals are generally truth-biased, the degree to which an individual relies on the honesty heuristic is predicted to vary as a function of cost. I suggest that the ratio of errors (Type I or Type II) generated during the evaluation of deception systematically fluctuates depending on the level of potential costs involved (cost-benefit analysis) if the deception is successful (undetected). The proposed differences in perceptions of veracity are suggested to be a result of evolved behaviours, which I refer to as avoidance behaviours. Avoidance behaviours function to reduce the likelihood of being deceived prior to overt detection. To avoid deception, individuals reduce their implicit levels of truthfulness, thus increasing the likelihood of over-perceiving deception.

From an error management perspective, individuals who face higher reproductive costs will benefit from maximising Type I errors, while those at risk of minimal reproductive costs will benefit more by maximising Type II errors. In particular, it was expected that those individuals at risk of higher reproductive costs would indicate a reduction in their reliance on the truth-bias and incorporate an increased likelihood of producing Type I errors into their judgements of the veracity of a message. Conversely, those individuals at risk of lower costs would remain truth-

biased and continue to integrate an increased frequency of Type II errors into their evaluations of veracity.

Factors Influencing Avoidance Behaviours

The present study examined perceptions of deception in light of several variables that alter potential costs following a missed detection of deception. Four factors were anticipated to produce avoidance behaviours in the form of differential perceptions of veracity based on potential reproductive costs. These variables included the sex of the receiver, the relationship status of the receiver, the priming of reproductive costs, and the content of the message being evaluated.

Men and women face asymmetrical reproductive costs and were predicted to produce different frequencies of Type I and Type II errors. As discussed earlier, due to a greater minimal investment in offspring (e.g. nine-month internal gestation period, lactation, etc.), the reproductive costs of mating with a partner as a result of undetected deception are generally elevated for women compared to men. Due to the increased potential costs inflicted on women following successful deception, women were predicted to display an increased likelihood of incorporating Type I errors in their evaluations of deception. Alternatively, while men face fewer reproductive costs from deception in the mating market, they were expected to continue to produce higher frequencies of Type II errors in their judgements of veracity. The differential pattern of errors produced between men and women was expected to result in women attributing elevated levels of deception to messages compared to their male counterparts.

The second factor predicted to alter avoidance behaviours was the relationship status of the evaluator. Johnson and colleagues (2004) theorised that that due to asymmetrical costs, single individuals, who are actively seeking a mate, may be subjected to increased reproductive costs in the mating market compared to those in

committed relationships. These researchers focused on women's ability to detect deception. While inter-sex comparisons reveal that women face greater potential risks than men in choosing a reproductive partner, Johnson and colleagues suggest that an intra-sexual difference exists in the potential reproductive costs within women. These researchers suggest that not all women suffer from the same potential reproductive costs from deception in the mating arena. Their findings indicated that single women were superior at positively identifying deception when members of the opposite sex exaggerated biographical information that women typically find desirable in a mate, compared to women in committed relationships. In contrast, women in committed relationships identified significantly more true biographical statements made by men compared to single women. While single women may possess an elevated detection skill that women in committed relationships lack, this difference in accuracy rates may actually be a product of differential error patterns generated by asymmetrical costs inflicted on committed and single women. In particular, Johnson and colleagues' findings may indicate that single women and women in committed relationships generate different levels of perceptual errors. Specifically, I propose that single women produce greater numbers of Type I errors, resulting in a greater likelihood of perceiving deception. Conversely, women in committed relationships maintain a greater assumption of honesty and continue to produce Type II errors.

Therefore, a further prediction of the current study was that reported deviations in deception accuracy may not result from an enhanced ability to detect overt cues accurately, but instead may be a consequence of altered perceptions produced from asymmetrical costs between mated and non-mated individuals. Therefore, I suggest that individuals at risk of higher costs (single women) do not have a superior accuracy in judging signals of deception compared to those with lower costs (committed women).

Instead, those at risk (single women) increase their overall perception of potential lies, flagging and labelling cases of high risk with a greater likelihood of being deceptive. Lies are thus avoided by making the least costly error (Type I, false alarm) and by over-perceiving possible deception.

The theoretical foundation for the previous two hypotheses focused on the perceptions of deception produced as a result of asymmetrical reproductive costs arising from a potentially deceptive mate. The final hypothesis adopted a more direct approach to examining the effects of reproductive costs on perceptions of deception. Those individuals deceived into mating with a partner of low value would suffer greater fitness consequences than those individuals duped into mating with a partner of high value. This asymmetry in potential reproductive costs was also expected to produce differential perceptions of deception. To stimulate these differences in perceptions of veracity, the present study incorporated a mate value-priming task, which primed participants with high and low levels of mate value. Consistent with an evolutionary perspective, mating with low mate value individuals is more costly than mating with high mate value individuals. Therefore, it was predicted that individuals primed with characteristics indicative of lower mate value would produce an increased number of Type I errors and increased perceptions of deception. Alternatively, individuals primed with desired qualities relevant to high value mates would likely continue producing similar perceptions of honesty (Type II errors) similar to other individuals at risk of lower costs.

Aims and Hypotheses of Study 1

The current study focused on the reproductive costs associated with deception in the mate selection phase of courtship. In review, reproductive costs are not equal among all individuals, therefore generating exclusively truth-biased perceptions (Type

II errors) would result in greater costs for some individuals more than others. The main aim of this study was to determine if an individual exposed to more costly deception moderated the extent to which he or she relied on the truth-bias. It was anticipated that as costs increased the reliance on the truth-bias would be reduced, resulting in an increased likelihood of producing Type I errors and greater perceptions of deception. To test the effects of costs on perceptions of veracity, participants were provided with a series of short fictitious vignettes that contained two characters: a speaker character and a receiver character. The speaker character in the vignette was responding to a question asked by the receiver character. The questions posed in the vignettes were divided into those associated with higher reproductive costs and lower reproductive costs. Answers to questions considered to inflict greater reproductive costs if deceptive were statements relevant to the individual's value as a potential mate. These biographical statements are referred to as mate value statements. Mate value statements involved topics such as financial status, attractiveness, and history of infidelity. Conversely, answers produced in response to the receiver's inquiry that were likely to inflict lower reproductive costs were statements related to neutral topics. Neutral statements included topics such as choices in colour and ice cream. Participants were then asked to evaluate the veracity of the statement produced by the speaker character on a scale of 1 (extremely likely to be truthful) to 4 (extremely likely to be deceptive).

Main effects were expected for each of the variables analysed. It was hypothesised that female participants would perceive significantly more deception occurring than male participants. Individuals not in committed relationships were predicted to indicate a significantly greater level of deception in speakers' statements than those individuals in committed relationships. Those individuals primed with high mate value were hypothesised to rate statements significantly less deceptive than

individuals primed with low mate value. However, each of the main effects was expected to be qualified by a two-way interaction with the content of the message.

The levels of deception inferred based on a participant's sex, relationship status, and priming condition were expected to differ depending on whether the individual evaluated mate value statements or neutral statements. As a result, three significant two-way interactions were predicted. A 2 (participant sex) x 2 (relationship status) x 2 (mate value prime) x 2 (message content) mixed factor ANOVA was employed to test the following hypotheses.

A significant two-way interaction was expected between a participant's sex and message content, whereby women were predicted to indicate significantly higher levels of deception than men following the evaluation of mate value statements. However, men and women were not expected to differ in the level of deception perceived in neutral statements. A series of planned comparisons were employed following the two-way interaction between participant sex and message content. Men and women (independently) were expected to infer more deception to mate value statements than neutral statements. Additionally, within the subset of responses only related to mate value statements, women were expected to perceive significantly more deception than men. Finally, no differences were expected between men's and women's judgements of neutral statements.

A second two-way interaction was predicted between an individual's relationship status and message content. In particular, single individuals were expected to assign significantly more deception to mate value statements than individuals in committed relationships. A second series of planned contrasts were employed following the predicted two-way interaction between participant relationship status and message content. Single individuals and those in committed relationships (separately)

were expected to attribute more deception to mate value statements than neutral statements. However, within the subset of responses only related to mate value statements, single individuals were expected to perceive significantly more deception than those individuals in committed relationships. Finally, no differences were expected within the judgements of neutral statements based on the participant's relationship status.

A third two-way interaction was hypothesised between the priming condition and message content. In particular, those individuals primed with low mate value were predicted to indicate greater levels of deception to mate value statements than those primed with high mate value. A third series of planned comparisons were employed following the two-way interaction between the mate value priming condition and message content. Those primed with high or low mate value were expected to perceive more deception to mate value statements than neutral statements. Additionally, within the subset of responses only related to mate value statements, those primed with low mate value were expected to perceive significantly more deception than those primed with high mate value. No differences in the judgements of neutral statements were expected between those primed with high and low mate value judgements.

Finally, to provide support for the new interpretation of Johnson and colleagues' (2004) results, an additional interaction was predicted. Specifically, it was hypothesised that single women would perceive significantly more deception than women in committed relationships, but only when statements concerned information relevant to mate value.

CHAPTER 3
STUDY 1: METHOD AND RESULTS

Study 1: Method

Participants

Participants (N = 104, 56 men and 48 women) were volunteers from James Cook University undergraduate psychology students and members of the Townsville region general community. Participants ranged in age from 18 to 37 (M = 22.5, SD = 3.13). Participant ethnicity included 37.5% Australian, 20.2% European and 28.8% North American. Additional demographic information is presented in Table 3.1.

Table 3.1
Demographic Characteristics of Study 1 Participants (N = 104)

Variable name	Level of variable	Frequency	Percentage
Relationship status	Single	61	58.7%
	Committed relationship	37	35.6%
	Missing data	6	5.8%
Participant education	Some high school	2	1.9%
	Completed high school	5	4.8%
	Some TAFE / apprenticeship	1	1.0%
	Completed TAFE / apprenticeship	6	5.8%
	Some university degree	55	52.9%
	Completed university	24	23.1%
	Some postgraduate degree	5	4.8%
	Completed postgraduate degree	5	4.8%
	Missing Data	1	1.0%
Ethnicity	Australian	39	37.5%
	Aboriginal/TSI	2	1.9%
	North American	30	28.8%
	European	21	20.2%
	South American	2	1.9%
	Asian	8	7.7%
	Other	1	1.0%
	Missing data	1	1.0%

This research project received approval from the James Cook University Human Ethics Committee (refer to Appendix A for a copy of ethical approval). Data collection was completed by utilising user-friendly online questionnaires (surveymonkey.com). The JCU Psychology research pool was implemented as a major system of recruitment. All participants who signed up via the JCU research pool were allocated credit points to

their appropriate course. All participation invitations and online recruitment postings (e.g. research pool) detailed the nature of the study, expected time commitment, age eligibility (over 18 years old), and provided contact information of both principle investigator and appropriate research supervisor (refer to Appendix B for a copy of the information sheet and Appendix C for a copy of the informed consent form).

Materials

Demographic measures. The age, gender, ethnicity, level of academic achievement, number of children desired, and relationship status of the participant were collected. The latter was used to control for the effect of relationship status, but also to compare responses of participants who are single versus those in committed relationships in order to replicate the findings of Johnson and colleagues (2004).

Word-priming task. A word-priming task was administered in which participants viewed short scrambled sentences on a computer containing words relating to someone of either high mate value (e.g. wealthy, attractive or healthy) or low mate value (e.g. poor, unattractive or unhealthy). Please refer to Appendix D for a full copy of the task. Participants were then instructed to use the random words provided to do their best to create a grammatically correct sentence and write it down in the space provided. Participants were also informed that some sentences might contain more than one right answer.

A five-word high mate value example included “is attractive an man John” from which participants were asked to reassemble the sentence “John is an attractive man”. A five-word low mate value sample item included “is unattractive an man John” which after rearranging would generate the sentence “John is an unattractive man”. Participants completed this procedure for three-, four- and five-word sentences (10 each).

Design and Procedure

Following priming, participants were given a series of statements that involved individuals (speakers) describing biographical information related to mate value or neutral information (not related to mate value) to another individual (receivers). The speaker was always of the opposite sex to the participant, but the receiver varied in sex to create both intra-sex and inter-sex dyads. As a result, female participants viewed male speakers interacting with male and female receivers, while male participants viewed female speakers also conversing with male and female speakers.

Participants were asked to indicate whether they believed the statement given by the speaker to be the truth or a lie utilizing a 4-point scale (1 = extremely likely to be truthful, 2 = more likely to be truthful than deceptive, 3 = more likely to be deceptive than truthful, 4 = extremely likely to be deceptive). Each statement could have been either the truth or a lie, hence they were designed to be ambiguous in nature. The mate value statements consisted of topics such as previous sexual relationships, financial status, health and relationship status (wording emphasized the commonly desirable aspects of each trait so that lies resulted in higher costs). Specific examples included "When a young woman asked Jacob how much he earned at his job last year, Jacob told her $80,000" and "When Erick asked Brandon if he has ever sexually cheated on a romantic partner, Brandon said never". Neutral statements included topics concerning movies, car colours and ice cream. Specific examples included "After Michael watched a movie with Ken, Michael said he liked it" and "When Daniel asked Olivia what colour her car is, Olivia said blue". Participants mean responses were employed to examine differences across conditions, with higher scores indicating higher levels of perceived deception.

Study 1: Results

General Analyses and Descriptive Statistics

A 2 x 2 x 2 x 2 mixed-factor ANOVA was employed to test the effect of the participant's relationship status (single or committed relationship), sex (man or woman), and priming condition (high mate value prime or low mate value prime), and message content (mate value statement or neutral statement) on perceptions of veracity. A standard significance level of .05 was employed on all statistical tests. The data were screened for errors in entered responses, outliers, deviations from normality, SES effects, missing data, and violations of assumptions before undertaking the inferential tests. Because such factors did not appear to play a role in the results, the analyses were undertaken without their further consideration. Table 3.2 shows the mean scores indicating perceptions of deception for both statement types as a function of the participant's sex, priming condition and relationship status.

Table 3.2
Average (M ± SD) Deception Scores for Mate Value and Neutral Statements as a Function of Participant Sex, Priming Condition, Relationship Status, and Statement Type (N = 104)

Statement type	Participant sex	Priming condition	Relationship status	*Deception score* (1–4) *M (SD)*
Mate Value	Women	Low MV	Single	2.57 (.29)
			Committed	2.42 (.25)
		High MV	Single	2.37 (.19)
			Committed	2.23 (.28)
	Men	Low MV	Single	2.17 (.32)
			Committed	1.93 (.32)
		High MV	Single	2.12 (.33)
			Committed	1.80 (.36)
Neutral	Women	Low MV	Single	1.70 (.41)
			Committed	1.62 (.25)
		High MV	Single	1.75 (.27)
			Committed	1.82 (.40)
	Men	Low MV	Single	1.79 (.35)
			Committed	1.49 (.55)
		High MV	Single	1.77 (.38)
			Committed	1.40 (.45)

Note. MV = Mate value.

The Effect of Message Content on Perceptions of Deception

A significant main effect was found for the content of the message, F (1, 88) = 256.98, $p < .0001$, $\eta_p^2 = .75$. Neutral statements (M = 1.69, SD = .39) were found to produce significantly lower perceptions of deception compared to mate value statements (M = 2.21, SD = .36). However, the content of the message was found to produce significant two-way interactions with most of the predicted variables. These interactions are described in the relevant sections.

The Effect of the Participant's Sex on Perceptions of Deception

The first set of hypotheses examined the effect of participant's sex on perceptions of potential deception in mate value statements versus neutral statements. Firstly, a significant main effect of a participant's sex on deception scores was found. The significant main effect indicated that in general women (M = 2.06, SD = .46) attributed significantly greater levels of deception to statements than men (M = 1.81, SD = .46), F (1, 88) = 14.75, $p < .0001$, $\eta_p^2 = .14$, one-tailed. However, this main effect was qualified by a significant two-way interaction. It was predicted that mate value and neutral statements would elicit different levels of perceived deception from men and women. Men and women were predicted to attribute higher levels of deception to statements related to mate value compared to neutral statements. A significant two-way interaction was found between the sex of the participant and the content of the message, indicating that the level of deception inferred by men and women was dependent on the content of the message as expected, F (1, 88) = 17.78, $p < .0001$, $\eta_p^2 = .17$.

Four planned comparisons were tested following the significant two-way interaction between participant sex and message content. Firstly, the results of a paired-sample t-test supported the hypothesis that men would attribute more deception to mate value statements (M = 2.07, SD = .35) than neutral statements (M = 1.68, SD = .41), t

(54) = 9.36, $p < .0001$, one-tailed. Support was also found for the hypothesis that women would also perceive significantly more deception to mate value statements ($M = 2.40$, $SD = .27$) than neutral statements ($M = 1.71$, $SD = .34$), t (46) = 13.64, $p < .0001$, one-tailed. However, within the subset of responses relating to mate value statements, men and women were predicted to attribute significantly different levels of deception. As predicted, the *t-test* results revealed that women ($M = 2.39$, $SD = .28$) attributed significantly more deception to mate value statements than men ($M = 2.07$, $SD = .35$), t (102) = 5.21, $p < .0001$, one-tailed. Conversely, no differences were expected between men's and women's judgements of neutral statements. The results upheld the null hypothesis and revealed there was not a significant difference between men ($M = 1.68$, $SD = .42$) and women ($M = 1.72$, $SD = .34$), t (100) = .47, *ns*, two-tailed, in the level of deception inferred with regard to neutral statements.

The Effect of the Participant's Relationship Status on Perceptions of Deception

The second set of hypotheses examined the effect of relationship status on perceptions of veracity. Specifically, it was predicted that single individuals would infer significantly more deception than those individuals in committed relationships. The results revealed a significant main effect for relationship status, indicating that single individuals ($M = 2.03$, $SD = .41$) attributed greater levels of deception to statements than those in committed relationships ($M = 1.84$, $SD = .51$), F (1, 88) = 8.44, $p < .003$, $\eta_p^2 = .09$, one-tailed. This main effect was expected to be qualified by a significant two-way interaction, but the results did not support this expectation. It was expected that the level of deception perceived between single individuals and those in committed relationships would differ based on the content of the message. Failing to support the prediction, the two-way interaction between a participant's relationship status and the content of the message was not significant, F (1, 88) = .39, *ns*.

The results of this analysis indicated that single individuals inferred greater levels of deception regardless of the message content. A *t*-test indicated that single individuals (M = 2.27, SD = .33) had greater perceptions of deception regarding the mate value statements than those in committed relationships (M = 2.11, SD = .38; t (1, 97) = 4.48, $p < .018$, one-tailed). Similarly, single individuals (M = 1.75, SD = .35) were found to attribute greater levels of deception to neutral statements than those in committed relationships (M = 1.58, SD = .43; t (1, 95) = 1.87, $p < .032$, one-tailed). Further *t*-test results revealed that single individuals rated mate value statements (M = 2.27, SD = .34) significantly more deceptive than neutral statements (M = 1.76, SD = .35; t (58) = 10.61, $p < .0001$, one-tailed). However, individuals in committed relationships also attributed significantly more deception to mate value statements (M = 2.11, SD = .38) than neutral statements (M = 1.61, SD = .43; t (36) = 9.38, $p < .0001$, one-tailed).

An additional comparison was planned to provide support for the new interpretation of Johnson and colleagues' (2004) results. The utilisation of follow up *t*-tests revealed that following the evaluations of mate value statements, single women (M = 2.46, SD = .27) perceived significantly greater levels of deception compared to women in committed relationships (M = 2.31, SD = .28; t (43) = 1.81, $p < .039$, one-tailed). Conversely, single women (M = 1.72, SD = .35) did not infer greater levels of deception than those in committed relationships (M = 1.73, SD = .35) while evaluating neutral statements, t (42) = .11, *ns*, two-tailed.

The Effect of Priming High and Low Mate Value on Perceptions of Deception

The third set of hypotheses investigated the influence priming high and low mate value had on perceptions of potential deception in mate value and neutral statements. The results did not reveal a significant main effect for the priming of mate

value across all conditions. Overall those primed with high mate value (M = 1.91, SD = .34) and low mate value (M = 1.96, SD = .36) did not significantly differ in their perceptions of deception F (1, 88) = .72, *ns*, one-tailed. However, as predicted, a significant two-way interaction between the priming condition and the content of the message was found, which indicated that the level of deception inferred in each priming condition varied depending on the content of the message, F (1, 88) = 7.04, $p < .009$, $\eta_p^2 = .07$, two-tailed. Specifically, a t-test revealed that as predicted, those individuals who received a low mate value prime (M = 2.29, SD = .35) attributed significantly greater levels of deception to mate value statements than those primed with high mate value (M = 2.15, SD = .34), t (102) = 2.13, $p < .018$, one-tailed. Conversely, those primed with low mate value (M = 1.69, SD = .38) and those primed with high mate value (M = 1.70, SD = .39) did not produce different perceptions of deception when judging neutral statements, t (100) = .21, *ns*, two-tailed.

Two paired-samples t-tests were employed to examine the final hypotheses. As expected, those primed with high mate value perceived more deception in the mate value statements (M = 2.15, SD = .34) than neutral statements (M = 1.71, SD = .39), t (51) = 9.75, $p < .0001$, one-tailed. Finally, those primed with low mate value also perceived greater levels of deception in the mate value statements (M = 2.29, SD = .35) than neutral statements (M = 1.69, SD = .38), t (49) = 11.72, $p < .0001$, one-tailed.

CHAPTER 4
STUDY 1: DISCUSSION

For many years, researchers examining the detection of deception have focused much of their efforts on the human ability to identify cues to deception accurately, with a recent meta-analysis revealing an average overall accuracy rate of 54% (Bond & DePaulo, 2006). Poor accuracy such as this indicates that deception may be successful at a reasonably high rate. However, the results of the present study indicate that a range of systematic biases and perceptual errors influence an individual's assessment of potential deception, increasing the possibility of avoiding deception. From an error management perspective, a cost-benefit analysis of the errors involved during the evaluation of deception should result in individuals producing the least costly error. The general findings of Study 1 indicated that in conditions where costs were higher heightened levels of deception were perceived, increasing the likelihood of producing Type I errors. The increased perception of deception was proposed to assist in avoiding the ramifications of costly deception without having to identify directly or accurately the deception per se. Four factors were shown to produce differential perceptions of veracity based on the potential reproductive costs involved in the interaction, including the sex of the receiver, the relationship status of the receiver, the priming of reproductive costs and the content of the message under scrutiny.

The Influence of an Individual's Sex and Relationship Status on Perceptions of Veracity

That reproductive costs are not equal across all persons, and that this asymmetry in cost would produce an asymmetry in perceptions of deception was a basic premise of this study. Reproductive costs were expected to vary depending on the receiver's sex and relationship status. The results indicated that differences in the reproductive costs

of potential deception moderated the extent to which individuals perceived the occurrence of deception. In particular, the ratio of potential Type I to Type II errors generated during the evaluation of deception was systematically higher where the level of potential costs was higher. Therefore, the expectation that those at risk of elevated reproductive cost produced greater perceptions of deception was supported. As anticipated, both men's and women's perceptions of deception were greater following the evaluation of mate value statements compared to neutral statements. This finding was expected due to the increased reproductive cost lies relating to the mate value of potential partners would inflict on both men and women.

However, because women typically provide greater parental and physiological investments to their offspring (e.g., Buss, 1989a; Trivers, 1972), undetected deception from a potential partner would likely result in greater reproductive costs for women compared to men. Statistical testing indicated that women perceived significantly greater levels of deception (potentially produced more Type I errors) in the messages overall than men. However, this finding was qualified by the two-way interaction between the participant's sex and the content of the message. Following the evaluation of neutral statements (lower cost statements), both men and women produced similar perceptions of veracity. Women's perceptions of deception deviated from men's where the costs of deception were most asymmetrical. This finding was evident during the evaluation of mate value statements (higher cost statements), whereby women perceived significantly more deception than men.

Johnson and colleagues (2004) proposed that while women were at greater risk than men, not all women face equivalent reproductive costs. Although they focused on an exclusively female sample, it was suggested that single individuals may be subjected to increased reproductive costs compared to those in committed relationships, due to

their availability in the mating market. This study aimed to advance the work of Johnson and colleagues and provide evidence for a new interpretation of their findings based on cost-benefit, and error-management perspectives. The findings indicated that all single individuals attributed significantly greater levels of deception (potential increased rate of Type I errors) to messages overall than those in committed relationships. As expected, both singles and those in committed relationships perceived greater levels of deception in mate value statements compared to neutral statements. However, single individuals as a higher risk group, in contrast to women, displayed heightened perceptions of deception than those in committed relationships during the evaluation of both mate value statements (higher cost) and neutral statements (lower cost). Following the evaluation of neutral statements, deception scores for higher risk groups were similar with single individual's (M = 1.76) producing slightly higher deception scores compared to women (M = 1.72). Deception scores for neutral statements for lower risk groups were also reasonably analogous, however, individuals in committed relationships (M = 1.61) indicated lower deception scores compared to men (M = 1.68). Therefore, the cost-benefit analysis following the evaluation of neutral statements may indicate a larger asymmetry in costs between mated and non-mated individuals than the costs between men and women.

Johnson and colleagues (2004) suggested that "females who are not in a committed romantic relationship will be superior at deception detection than females in a committed relationship" (p. 1418). Additionally, they also concluded that females in committed relationships had an enhanced ability to detect truthful messages. However, the current study may supply evidence to suggest that individuals may not differ in their ability to identify cues to deception accurately, but instead mated and non-mated women have different accuracy rates due to variations in their perceptions of deception.

Johnson and colleagues reported that the detection accuracy of single women was higher following the evaluation of men deceptively "faking good" (lies to increase desirability), yet they failed to replicate these findings when men were "faking bad" (lies to decrease desirability; p. 1419). If a single woman was duped into mating, she would likely suffer greater reproductive costs from a man faking good than a man faking bad. The results of the current study may be applied to offer a new interpretation of Johnson and colleagues' findings.

It was expected that single women would endorse the truth-bias when costs were low but reduce their reliance when costs were higher. Johnson and colleagues' (2004) data support this expectation, in that significant differences were not found between singles and those in committed relationships when appraising men faking bad (lower cost deception). However, as costs increased (faking good), single individuals reduced their reliance on the truth-bias. Internal perceptions indicating a reduced bias towards honest responses resulted in a reduced accuracy for detecting truthful messages (52.6%) and an increased accuracy for deceitful messages (65.8%; Johnson et al., 2004). Conversely, women in committed relationships, who faced lower potential costs than single women, continued to rely on the truth-bias while evaluating men faking good. In opposition to single women, partnered women produced internal perceptions that were more biased towards truthful responses, thus resulting in increased accuracy for truthful messages (80%) and reduced accuracy for deceptive messages (40%; Johnson et al., 2004).

The Effects of Priming Mate Value on Perceptions of Veracity

To provide further evidence that reproductive costs were the foundation for the elevated perceptions of deception, participants were also divided into two priming conditions (high mate value and low mate value primes). Priming has been suggested to

transpire outside the conscious mind as a form of implicit memory that can influence the decision-making process (Jacoby, 1983). Individuals mating with a high mate value partner would endure fewer reproductive costs than individuals mating with a low mate value partner. Therefore, those primed with high mate value were expected to experience continued reliance on the truth-bias, similar to other individuals at lower risk of reproductive costs (men and those in committed relationships). Alternatively, those primed with low mate value were expected in incorporate higher levels of Type I errors and perceive higher levels of deception, consistent with those at greater risk of reproductive costs (women and single individuals).

Although those primed with high and low mate value overall did not differ in perceived level of deception overall, they differed in their perceptions of deception depending on the content of the message. A significant two-way interaction revealed that priming participants with low mate value produced significantly higher perceptions of deception (increased the likelihood of Type I errors) when evaluating higher cost messages. Conversely, priming participants with high mate value resulted in a continued reliance on the truth-bias (increased Type II errors) during the evaluation of mate value statements. During the appraisal of neutral statements (low cost messages), both priming conditions produced similar perceptions.

The Effects of Message Content on Perceptions of Veracity

Although men and women (single and those in relationships) face asymmetrical risks in general, it is the nature of the trait being examined that ultimately inflicts the costs. The discrepancy in perceived deception following high versus low cost messages indicates that women (and other individuals at high-risk) do not produce enhanced perceptions of deception from all messages. Instead, the results indicated that perceptions of deception only deviated when the differences in cost were highly

asymmetrical. In particular, women, while at greater general risk of reproductive costs than men, only reduced their reliance on the truth-bias (potentially increasing the production of Type I errors) during the evaluation of messages with the capacity to inflict high costs (mate value statements). These findings for women were found to generalise to other groups facing similar asymmetrical costs. Similar patterns in perceptions of deception were found in results pertaining to groups at higher and lower risk according to the participant's sex, relationship status, and priming condition. Furthermore, those individuals accruing additional costs by belonging to more than one high-risk subgroup displayed the most heightened perceptions of deception.

Abandoning the Truth-bias

The vignettes, whereby the participants were asked to evaluate the deceptiveness of statements made by speakers, produced situations of uncertainty. Participants were expected to resolve these by presumably using cognitive heuristics employed in typical veracity judgements. From this perceptive, it is important to note that the majority of participants experienced fluctuations in the truth-bias. The findings clearly revealed that high reproductive costs reduced reliance on the truth-bias. It is possible that the potential risk of reproductive costs may become high enough for the individual to abandon the truth-bias all together.

If people were absolutely truth-biased, an accuracy rate of 100% would be expected for honest messages. However, to date, not one study has found a 100% accuracy rate for honest messages. The results of this study have shown that not all individuals are equally truth-biased, and that varying degrees of bias are applied depending on the circumstances. The use of a four-point perceived deception scale (1 = extremely likely to be truthful, 2 = more likely to be truthful than deceptive, 3 = more likely to be deceptive than truthful, 4 = extremely likely to be deceptive) allowed the

collection of continuous data regarding the level of perceived honesty or deception. Assuming the probability of a statement being truthful was 50%, as average deception scores decreased below 2.5 (mid-point in the scale) messages would be rated as increasingly more likely truthful than deceptive (truth-biased), while average scores that increased above 2.5 signified the reverse (lie-biased). Table 4.1 displays the average perceived deception scores for each of the investigated factors, including the participant's sex, relationship status, priming condition, and message content. Scores residing at the bottom of Table 4.1 belong those individuals who indicated the strongest reliance on the truth-bias. The results showed that as additional low risk factors accumulated, individuals maximised the likelihood of Type II errors and revealed greater perceptions of honesty. As the group associated with the greatest number of low cost conditions, high mate value primed men in committed relationships evaluating neutral statements, indicated the strongest adherence to the truth-bias and reported that the messages were “extremely likely to be truthful”. These individuals maximised the likelihood of Type II errors or under-perceiving deception.

Subgroups clustered in the middle of Table 4.1 were still biased towards the truth, yet displayed a milder expression of the truth-bias. These groups revealed that the messages being evaluated were “more likely to be truthful than deceptive”. Individuals representing more high-risk groups maximised the potential number of Type I errors produced and indicated greater perceptions of deception. Low mate value primed women evaluating high cost statements (three high cost subgroups) were found to express an equal likelihood of truthfulness and deceptiveness, resulting in an average response equal to the mid-point of the scale (2.50). However, those occupying all four high cost conditions were expected to endure the highest reproductive costs and were found to be the only individuals to cross over into the realm of being lie-biased (score >

2.5). After being primed with low mate value, single women's average deception score indicated that mate value statements were "more likely deceptive than truthful". This finding indicates that individuals at the greatest risk maximised the potential number of Type I errors produced, supporting the proposal that the truth-bias is cost sensitive and under high cost conditions may even be reversed.

Table 4.1
Perceived Deception (M ± SD) According to Participants' Sex, Relationship Status, Priming Condition, and *Message Content (N =104)*

Number of subgroups occupied	Subgroups	Deception score *M (SD)*
4	MV statements, Single, Women, Low MV prime	2.57 (.29)*
3	MV statements, Women, Low MV prime	2.50 (.28)
3	MV statements, Single, Women	2.47 (.26)
3	MV statements, Single, Low MV Prime	2.33 (.36)
2	MV statements, Women	2.39 (.28)
2	MV statements, Low MV prime	2.28 (.36)
2	MV Statements, Single	2.27 (.34)
1	Mate value statements	2.20 (.36)
1	Women	2.06 (.47)
1	Single	2.03 (.42)
1	Low MV prime	1.96 (.49)
1	High MV prime	1.90 (.46)
1	Committed relationship	1.84 (.52)
1	Men	1.81 (.47)
1	Neutral, statements	1.70 (.39)
2	Neutral statements, Committed relationship	1.61 (.43)
2	Neutral statements, High MV prime	1.70 (.39)
2	Neutral statements, Men	1.67 (.42)
3	Neutral statements, Men, High MV prime	1.64 (.43)
3	Neutral statements, Committed, High MV prime	1.63 (.46)
3	Neutral statements, Committed, Men	1.43 (.48)
4	Neutral statements, Committed, Men, High MV prime	1.40 (.45)

Note. MV = Mate value. * = Lie-Biased.

Summary and Significance of Study 1

Lies outside the deception laboratory occur frequently (Hancock, 2007). Even when cues of deception, such as facial expressions and voice tones, are evident people still only display chance levels of detection (Ekman et al., 1991). With the persistence of lies and the lack of ability to detect accurately, this study aimed to provide evidence that an additional system existed to assist people in avoiding deception. The results

indicated that humans may have a dual system operating to escape deception. This dual system involves individuals scanning communications for veracity (direct detection of deception) and cost (indirect avoidance of deception). If enough observable evidence supporting either a truthful or a deceitful conclusion is provided, then the information is dealt with accordingly. If the veracity of a message is ambiguous or undetermined, then the interaction is scanned for potential costs as well. If the interaction potentially elicits little to no reproductive costs, then perceptions of deception will also be minimal. Under these circumstance individuals continue to employ their initial truth-biased mindset. However, as costs increase, the asymmetry between high and low risk groups increases. As the asymmetry in costs increases, perceptions of deception also become increasingly asymmetrical. Therefore, as costs are elevated those individuals at higher risk decrease the likelihood of accepting messages as truthful. Type I errors increase in likelihood compared to conditions of lower risk lower risk where Type II errors are maximized. Heuristics and mental shortcuts such as this may result in many mistakes, yet these errors function to reduce other potential costs that may be greater than those generated by the error itself.

This study aimed to test the proposal that perceptions of veracity versus deception fluctuate as a function of asymmetrical costs. Perceptions of deception will be equivalent in individuals when costs are equivalent, however, as costs become increasingly asymmetrical those individuals at greater risk will maximise the number of Type I errors produced. Additionally, the results of this study may supply an explanation for why accuracy rates vary among individuals who are typically truth-biased. Thus this study extends previous findings on the truth-bias and may provide new avenues for future research. Future investigations could increase the types of

deception employed beyond those involving reproductive costs to determine the ecological validity and generalizability of the model generated by this study.

Finally, as this study primarily examined perceptions of deception according to the characteristics of the receiver, little focus was placed on the role of the speaker. While asymmetrical risks between men and women produced variations in veracity judgements, it is anticipated that individuals will also display differential expectations as to whom they believe is more likely to lie in a mating scenario. While Study 1 indicated that men and women alter their perceptions of deception to maintain their reproductive resources (avoid costs) as receivers, Study 2 explores what types of individuals are expected to use deception as a tactic to gain reproductive resources.

CHAPTER 5
STUDY 2: THE SPEAKER-BIAS: THE INFLUENCE OF A SPEAKER'S SEX AND ATTRACTIVENESS ON PERCEPTIONS OF DECEPTION

The Prevalence of Lying

It is widespread practice in most cultures to denounce the act of lying, yet deception remains prevalent in every society (Lewis & Saarni, 1993). Diary studies designed to document all communications for one week, with a particular focus on deceptive interactions, suggested that individuals tell an average of approximately two lies every day (DePaulo et al., 1996; Serota, Levine, & Boster, 2010). One particular study indicated that 20%–33% of daily communications were deceptive (DePaulo et al., 1996). More recently, similar methodologies have found approximately 26% (Hancock, Thom-Santelli, & Ritchie, 2004) and 22%–25% (George & Robb, 2008) of our daily interactions contain some form of deception, producing approximately 1.58 and 0.59 lies per day, respectively. Popular sources also reveal alarming rates of deception. Results from 2,861 *Reader's Digest* subscribers revealed that 93% confessed to one or more kinds of dishonesty at work or school, and confession rates as high as 96% were reported when asked about dishonest acts towards family or friends (Kalish, 2004). While results fluctuate in regards to the exact frequencies of lying, researchers consistently report deception as ubiquitous.

Methods for Detecting Deception

Previous research methodologies endorse detection as a sole tactic when dealing with potential deception. Detection involves various techniques designed to identify deception accurately during or after the formation of a lie. Methodologies have been designed to test the accuracy of determining a statement's veracity by using nonverbal cues (Ekman & Friesen, 1969), sanctioned (participants are instructed to lie) and unsanctioned lies (participants lied without instruction, Feeley & deTurck, 1998),

manipulated levels of cognitive load during the formation and execution of lies (DePaulo et al., 2003; Zuckerman et al., 1981), high-stakes lies (Levine et al., 2006; Levine et al., 2010), and strategic questioning (Levine, Shaw, & Shulman, 2010a). Participants' confidence in detecting lies was expected to correlate with actual accuracy; however, confidence (72.9%) was significantly higher than overall accuracy (57.2%; DePaulo et al., 1997). Further, meta-analysis revealed small effect sizes for even the strongest indicators of deception (DePaulo et al., 2003). The latter meta-analysis suggested that cues containing little to no predictive value may be too heavily weighted when attempting to detect deception. Nevertheless, the majority of research methodologies suggest that detecting deception is possible. While statistically significant, the accuracy of detecting deception is typically poor, for example, 57% in early reports (Kraut, 1980; DePaulo et al., 1997) and 54% more recently (Bond & DePaulo, 2006; Li, 2011). Only approximately 10% of published results differ by more than 10% from chance (Levine, Shaw, & Shulman, 2010b).

However, there remains one cognitive bias that appears to affect communications greatly, known as the truth-bias (McCornack & Parks, 1986; initially titled the truthfulness-bias by Zuckerman et al., 1981; and Zuckerman et al., 1984). This cognitive bias results in the veracity effect (Levine et al., 1999) that involves a consistent improvement in accuracy rates for detecting truthful messages. The veracity effect describes the reliable finding that truthful statements are more accurately identified compared to deceptive statements. Gilbert and colleagues (1990) theorised that incoming information is, by default, perceived as truthful, and identified people as generally truth-biased. These findings have led researchers to conclude the veracity of the message being judged is one of the most influential factors in accurate detection.

Pre-Detection Avoidance of Deception

Over the course of human evolution, those individuals who could successfully deceive others had a distinct adaptive advantage (Knapp, Hart, & Dennis, 1974). Simultaneously, natural selection should have also favoured those individuals who found adaptive solutions to the problem of being deceived. Specifically, natural selection should have favoured counter-strategies that reduced the likelihood or consequences of being deceived. While research reveals the extensive prevalence of lies told in everyday life (Serota et al., 2010), as reviewed previously, findings suggest that individuals detect deception at levels only slightly better than flipping a coin (Bond & DePaulo, 2006). The behaviours favoured by natural selection, however, would not have been restricted to the single tactic of overt detection of deception. Despite contemporary deception research focusing primarily on the ability to detect lies, I anticipate that supplementary methods and biases are employed in the struggle against potential deception.

Study 1 revealed that a cost-dependent alternative strategy may exist, which involved a supplementary mental process influencing perceptions of deception as potential costs increase. Further, the results from Study 1 indicated that the degree with which an individual relies on the truth-bias may fluctuate depending on various factors. Based on the findings of Study 1, it was suggested that individuals scan incoming messages for both veracity and cost. If the level of accessible evidence of the veracity of the message was minimal, the pending judgements of deception were scanned for potential costs as well. Interactions that elicited fewer costs gave little reason to reduce the reliance on the default truth-biased heuristic. However, as costs increased and an individual's resources and time to verify veracity were reduced, the initial mental strategy of veracity seeking (detection) could result in an increased rate of missed

detections. Instead, individuals reduced their reliance on the truth-bias heuristic and substituted it for a safer approach of activating cost-dependent avoidance behaviours. These behaviours are suggested to function following the perception of potentially costly deception and inadequate evidence of veracity, resulting in individuals avoiding large costs by increasing the level of inferred deception.

The results from Study 1 suggested that during the selection phase of courtship, men and women encounter different frequencies of sex-specific costs for missed detections of deception. An earlier study found that 60% of women, while dating, claimed to have been lied to by a man in order to obtain sex, whereas 34% of men admitted to lying to obtain sex (Cochran & Mays, 1990). Cochran and Mays's (1990) results suggest that women are often the target of lies to elicit sex. As a result, an individual's fitness may rely on their ability to detect deception, which has been demonstrated to be exceptionally poor (54%; Bond & DePaulo, 2006). The victim of costly missed detections within the context of mating can endure severe fitness consequences. As women face greater potential costs in mating, the results of Study 1 suggested that they may be more likely to reduce their reliance on the truth-bias, resulting in an increased likelihood of attributing deception than men. Although studies related to the behaviours individuals employ to avoid deception are limited, it is hypothesised that perceptual biases, in addition to the truth-bias, exist to assist in the avoidance of deception.

Sex Differences between Receivers

One method to determine the importance of avoiding lies is to measure the degree of negative emotional reactions experienced when an individual discovers they have been the victim of deception. Levine, McCornack, and Avery (1992) found that compared to men, women report a greater negative emotional response upon

discovering deception and found lies more unacceptable regardless of the relationship with the liar or the content of the lie. While women report having a stronger negative reaction to discovered deception, limited support exists for sex differences in general deception detection abilities.

Some researchers have suggested that because women are fundamentally superior at decoding nonverbal cues, they may possess a better foundation for detection than men (Hall, 1978; Rosenthal & DePaulo, 1979a, 1979b; Rosenthal, Hall, DiMatteo, Rogers, & Archer, 1979). Researchers measuring sex differences in detection abilities among individuals in romantic relationships reported that regardless of the level of the relationship, women were better lie detectors (McCornack & Parks, 1990). However, this reported enhanced ability of women to detect deception was only found in romantic relationships (McCornack & Parks, 1990). This may suggest that women in romantic relationships simply have increased experience with the specific nonverbal cues from their partners and this may result in greater detection abilities.

When investigating deception among strangers, DePaulo and her colleagues (1993) hypothesised and found that during deceptive communications, women were more likely to have a higher rate of missed detections, and thus, a reduced capability compared to men. While no strict conclusion can be drawn about overall sex differences in deception detection, Li (2011) suggested that differences may not be direct but instead exist in the interactions between a speaker's sex and the receiver's sex.

Sex Differences between Speakers

Although Li (2011) failed to find significant sex differences in male and female participants' detection rates, other interesting results were observed in Li's findings. Firstly, results for general accuracy scores (54%; Li, 2011) equate to those previously

found by meta-analysis (54%; Bond & DePaulo, 2006). As noted previously, the veracity effect refers to the findings that individuals more accurately detect truthful than deceptive statements (Levine et al., 1999). Li's results also provide evidence of the veracity effect in overall accuracy scores (truth: 67%; lie: 41%) and within scores for both male (truth: 60%; lie: 42%) and female participants (truth: 69%; lie: 41%). However, an additional important variable was reported in Li's analysis. This factor influenced accuracy rates, similar to that of the veracity effect.

Li (2011) found that the speaker's sex had an effect on participants' accuracy rates. His findings regarding the overall accuracy rates for female speakers tended to parallel the accuracy rates for truthful statements, while the accuracy rates for male speakers mirrored the accuracy rates for deceptive messages. In particular, while truthful statements (67%) were more accurately identified overall than lies (41%), statements made by female speakers (67%) were detected more accurately compared to male speakers (40%). While Li (2011) interpreted this difference in accuracy scores as women being simply more transparent in communications, I suggest a much more deeply rooted alternative interpretation. Similar to the veracity effect, whereby the perceptual truth-bias generates an increased Type II error (assumption of honesty) rate in the judgements of truths versus lies, I suggest that a similar process exists in the evaluation of statements made by men and women. I propose that a cognitive bias exists that may assist in explaining the differences observed in accuracy scores between male and female speakers. This bias, termed the speaker-bias, is predicted to generate differential perceptions of veracity based on the sex of the individual delivering the message. In particular, greater levels of honesty are expected to be attributed to female speakers, while higher indications of dishonesty are anticipated for male speakers. To understand effectively the potential bias in perceptions of veracity based on the

speaker's sex, a comprehensive analysis of accuracy scores across three variables must be considered. The three factors that should be analysed are the receiver's sex, the speaker's sex, and the veracity of the message. Li (2011) is one of the few researchers to examine this interaction, and has currently provided some findings on the matter. If the sex of the speaker influences perceptions of veracity, and this effect is independent from the perceptions produced from the truth-bias, an interaction should manifest during the examination of these factors.

Evidence for the Speaker-bias in Male and Female Receivers

To explore the possible influence that a speaker's sex had on accuracy rates, male and female participants' evaluations of statements made by male and female speakers were observed (Li, 2011). Li (2011) reported that participants achieved an overall accuracy rate of 67% for truthful statements; however, the overall accuracy rate increased to 81% when restricted to the subset of responses pertaining to female speakers only. Alternatively, accuracy rates for truthful statements diminished from 67% to 53% when male speakers were being evaluated. Li reported similar trends for overall deceptive statements (41%), where judgements of female speakers (55%) continued to elicit superior accuracy from receivers than male speakers (25%).

In Li's (2011) study, female participants reported accuracy rates indicative of the veracity effect, with accuracy scores of 69% for honest statements and 41% for deceptive statements. By revealing overall accuracy scores of 68% for female speakers and 41% for male speakers, Li's results also provide evidence that men and women speakers are not judged equally. Additional support that men and women are fundamentally perceived differently exists when restricting the responses to the honest or deceptive conditions independently. Female receiver's accuracy rates for honest statements (69% overall) were enhanced when judging female speakers (84%) and

decreased when evaluating male speakers (55%). When judging deceptive statements (41% overall) female receivers' accuracy rates were also higher when evaluating female speakers (54%) compared to male speakers (25%).

In Li's (2011) study, male participants also exhibited deviations in accuracy scores consistent with both the truth-bias and the anticipated speaker-bias. Men's accuracy for honest and dishonest messages was consistent with the veracity effect. Men achieved higher accuracy for truthful statements (60%) compared to deceptive statements (42%; Li, 2011). Consistent with the proposed speaker-bias, male receivers were more accurate when judging statements made by female speakers (67%) compared to male speakers (34%). Additionally, Li's results indicated that the speaker-bias was also evident within male receivers' responses to either honest or dishonest messages individually. During the evaluation of truthful statements (60% overall), male receivers displayed an increased accuracy rate for female speakers (67%) telling the truth compared to male speakers (46%). The speaker-bias was also prevalent in male receivers' judgements of deceptive statements (42% overall), where their accuracy rate for female speakers (57%) was superior to that of male speakers (26%). Trends in Li's results revealed that male and female receivers produced similar accuracy scores when evaluating veracity. Li suggested that receivers were "extremely truth-biased when males are telling lies" (p. 32). Additionally, it was posited that receivers may be "less truth-biased when they are interacting with deceptive females" (p. 32). Study 1 indicated that fluctuations in perceptions of deception resulted from differences in potential costs. The extreme truth-bias noted in male speakers may suggest that men present fewer potential costs during communications than women. In particular, Li's conclusions may suggest that female liars present greater potential costs to receivers overall than male liars.

An assumption guiding Study 2 is that men and women's communications are associated with different levels of implicit perceptions of truthfulness and deceptiveness by receivers. Implicit perceptions are default perceptions integrated into the judgement process of a receiver's evaluations of veracity. In contrast to Li's (2011) interpretation, I propose that the perceptual biases underlying behaviour do not promote elevated perceptions of honesty from male speakers compared to female speakers. Further, I suggest that cognitive biases may be contributing to the differences in the perceptions of honesty and dishonesty between male and female speakers, and may influence a receiver's accuracy rates. Therefore, understanding implicit perceptions of honesty and dishonesty and how those perceptions differ between the sexes may serve as a functional guide in explaining the differences in accuracy scores for male and female speakers. In summary, I suggest that a systematic bias exists in evaluations of male and female speakers, otherwise referred to as the speaker-bias.

Deception Avoidance Replaces Deception Detection

While Li (2011) was not the first researcher to observe differences in the detection of lies made by male and female speakers, previous researchers reported an effect of a speaker's sex on accuracy rates of deception detection. Despite participants detecting deception at rates expected by chance (49%), Millar and Millar (1997) found that overall accuracy was higher when evaluating a female speaker (56%) compared to a male speaker (44%). This deviation in accuracy scores provides additional support that a difference may exist in the evaluation of men and women speakers. However, Millar and Millar's results were limited to overall accuracy, in which both honest and dishonest messages were considered simultaneously. As a result, Millar and Millar failed to investigate the crucial analysis that may have provided insight into the differences in implicit perceptions based on a speaker's sex. These perceptions are

expected to be observable within the interaction between the veracity conditions and the speaker's sex. For example, the accuracy rate in evaluating female speakers would be expected to be greater for honest messages compared to dishonest messages. Exploration of the interaction between perceptions of honesty and dishonesty for male and female speakers is the first aim of the present study.

Forrest and colleagues (2004) examined receivers' judgements of male and female speakers across both honest and dishonest conditions and found that lies told by women were more easily detected. They found that participants displayed a significant difference in their ability to detect honest messages accurately (70%) in contrast to dishonest messages (53%) when women were the speaker. However, participants did not significantly differ in their accuracy rates of honest messages (62%) compared to dishonest messages (58%) when men were the speaker. Since participants were able to significantly distinguish between the truths and lies of female speakers (and not male speakers), Forrest and colleagues suggested that "lies told by women were detected more easily than lies told by men" (p. 773). However, the accuracy scores for deceptive male and female speakers were similar. Therefore, a new interpretation is proposed: It was not lies by women that were more accurately detected, but truthful statements. This proposal is supported by the finding that female speakers' truthful statements were detected well above chance or with considerably more accuracy than honest statements made by male speakers. Forrest and colleagues' suggestion that receivers are superior at detecting lies from female speakers would be supported by higher accuracy scores in evaluating deceptive female speakers compared to deceptive male speakers. However, the accuracy scores for detecting lies from both male and female speakers are similar and remain slightly better than chance. Forrest and colleagues reported that deceptive male speakers (58%) were actually detected with greater accuracy than deceptive

female speakers (53%), a trend disconfirming their suggestion. The results, however, could suggest that a participant's detection accuracy may be influenced by both traits of the communicator and the veracity of the message being communicated (truth versus lie).

In summary, although it has been found that individuals typically perceive incoming information as truthful, resulting in a more accurate detection of truths compared to lies (e.g. veracity effect; Levine et al., 1999), the degree to which this occurs may not be equivalent for male and female communicators. I suggest that initial perceptions of honesty (implicit honesty) are elevated for female speakers and may contribute to the increased accuracy found for honest women. Specifically, it is proposed that the elevation in accuracy scores for honest women indicates that the degree to which an individual relies on the truth-bias may be greater when evaluating female speakers. However, while truthful conditions have been found to produce elevated levels of accuracy, in order to avoid greater costs, an individual must sufficiently detect deceptive messages.

As message receivers, men and women have been found to exhibit approximately equivalent abilities to detect deception across several studies (deceptive women speaker, 57%, Li, 2011; deceptive male speaker, 58%, Forrest, Feldman, & Tyler, 2004). However, even the highest accuracy scores resulting from divergent levels of truth-biased perceptions in male (58%) and female (57%) deceivers only just surpass chance (Forrest et al., 2004; Li, 2011). As previously discussed, Study 1 identified forms of avoidance behaviours that may have evolved to solve the adaptive problem of deception. Study 1 also indicated that accuracy rates may be affected by cost-sensitive perceptions produced to eliminate potential costs, which may at times result in reduced accuracy rates. As expected, evidence was found for a supplementary

process that reduced the truth-bias as the external cues to costly deception increased. The truth-bias is a unidirectional bias producing an assumption of honesty, erring in one predictable direction. However, reducing the bias towards honesty may result in a lower overall accuracy rate as assumptions begin to err in both directions (honest and dishonest). If competing biases are producing perceptions of honesty and dishonesty simultaneously, the enhanced ambiguity may result in a reduced accuracy rate. While the accuracy may decrease, fluctuations in the reliance on truth-biased heuristic would serve to protect individuals in circumstances where the veracity of a statement was unknown and the costs from a missed detection were high (Study 1). From this perspective, the likelihood that men and women are perceived as deceptive may also fluctuate if men and women were found to produce fundamentally different types of deception.

Previous research has indicated that men and women may engage in different styles of deception. In a college sample, men were found to produce over three times as many selfish lies compared to other-oriented lies (DePaulo et al., 1996). Further, women were reported to produce significantly more other-oriented lies than men. This finding indicates that men, more so than women, are likely to use deception as a means for self-gain. In the context of mating, this would signify that men were more likely to lie to gain access to sexual resources. Similar to Study 1, the current study explored deception within the context of mating in which men have been found to use deception to a greater degree to acquire sexual resources. Cochran and Mays (1990) found that more men (34%) than women (10%) had lied in order to have sex. Conversely, 60% of women, compared to 47% of men, had been lied to for the purpose of. These fundamental differences between the types of lies men and women commit may produce a greater expectation that men will be deceptive in the mating market.

Study 2 builds on Study 1 by exploring the expectations of mating deception from male and female speakers. The first goal of this study was to examine if perceptions of honesty and dishonesty varied as a function of the speaker's sex. It was hypothesised that individuals would expect that female speakers to be a more likely source of truthful statements compared to male speakers. Conversely, it was predicted that participants would expect male speakers to be more likely to be responsible for deceptive statements compared to female speakers.

Attractiveness and Interpersonal Deception

The gender of a speaker may not be the only factor that has an effect on perceptions of honesty and dishonesty. One characteristic reported to greatly affect a receiver's judgements of another is the speaker's perceived level of attractiveness. Consistent findings reveal that individuals have different reactions to others perceived as attractive compared to those who are unattractive (Hatfield & Sprecher, 1986; Reingen & Kernan, 1993; Katz, 1996). During initial encounters, people tend to prefer and desire the company of others whom they find physically attractive (Hatfield & Sprecher, 1986). When examining the effects of attractiveness in teachers' evaluations of their students, teachers were found to perceive students with higher levels of physical attractiveness as having greater academic competence, popularity, sociability, and confidence (Lerner, Delaney, Hess, Jovanovic, & von Eye, 1990). However, Katz (1996) reported that judgements of attractive and unattractive peoples' academic work were similar when performance was high. Instead, attractiveness was only influential when inferior performance was being evaluated. Attractive students received greater leniency and were excused for behaviour that would be considered unacceptable from unattractive students. This is an example of the attractive-leniency effect (attractive individuals are treated with more leniency than those who are unattractive) and is also

reflected in the common phrase that 'what is beautiful is good' (Dion, Berscheild, & Walster, 1972).

The behaviours and qualities of attractive people are preferred and viewed as more positive than qualities of unattractive people. Therefore, the differential perceptions produced in the judgements of attractiveness often result in different outcomes for those who are attractive versus those who are unattractive. Physically desirable individuals often benefit from the leniency and positivity they receive from receivers. Conversely, unattractive individuals are met more frequently with reduced levels of leniency and positivity often resulting in a less desirable outcome compared to attractive individuals.

While previous research consistently demonstrates the effect attractiveness has on receivers' overall perceptions and opinions of personal characteristics, a speaker's attractiveness has also been found to have effects on the receiver's reactions and judgements of veracity during communications (Burgoon & Hale, 1988; Katz, 1996; O'Sullivan, 2003). For example, an attractive individual is *expected* to produce greater perceptions of honesty compared to an unattractive individual. While a speaker's attractiveness may produce perceptual differences in receivers' judgements of veracity, these perceptions are suggested to be broader in nature. For example, attractive people are generally evaluated as more trustworthy (Burgoon & Hale, 1988; Katz, 1996; O'Sullivan, 2003) and therefore would be expected to be less deceptive. Several theories have been formulated to provide an explanation as to why differential perceptions in trustworthiness based on an individual's level of attractiveness exist.

Attractive versus Unattractive Speakers

One concept that provides an explanation for differential perceptions based on attractiveness is Burgoon and Hale's (1988) expectancy-bias. Burgoon and Hale

suggested that expectations are strongly integrated with perceptions. For example, if an individual looks like an honest person, then that individual is expected to be honest, and thus will not attempt to deceive you. According to the expectancy bias, attractive people do not look like liars; thus, they do not raise as much suspicion as unattractive persons, even in the presence of deceptive behaviour. They proposed that higher levels of attractiveness moderate the perception of displayed deception cues. As a result, attractive liars should be perceived to be less deceptive than unattractive liars. Unfortunately, those perceived as less attractive do not receive the reduced sensitivity to deceptive cues experienced by attractive individuals, thus their behaviours more often produce perceptions of deception in receivers. Burgoon and Hale's results supported their proposed expectancy bias and revealed that upon displaying the same deceptive cues, unattractive individuals were viewed as more deceptive than attractive individuals.

Katz (1996) explained this phenomenon in terms of the halo/horns effect. Men and women who are perceived as more attractive are also considered more interesting, sociable, sensitive, generous, and trustworthy than unattractive individuals. These positive perceptions of attractive people are naturally elicited by what is referred to as the halo effect. On the contrary, unattractive men and women are subjected to the horns effect, whereby unattractive individuals are perceived as mean, sneaky, dishonest, and antisocial.

Pfizer (2005) produced intriguing results when researching the effects of a speaker's attractiveness on perceived deception. Support was found for the general hypothesis that attractive speakers would be considered less deceptive than unattractive speakers (Pfister, 2005). However, Pfister originally predicted this effect would only occur when cues to deception, such as shifts in posture and reduced eye contact with

the speaker, were present. The results revealed the attractiveness bias to be much more broadly utilised than initially predicted. As expected, Pfister found significant differences in the ratings of deception between attractive and unattractive speakers when deception cues were present. In particular, the results indicated that unattractive persons were viewed as more deceptive than attractive persons. Inconsistent with their hypothesis, however, the halo/horns attraction bias was also present in the absence of deception cues. These results imply that biases related to the relative physical attractiveness of a speaker and subsequent deception ratings exist before, during, and after actual deception cues are perceived. In summary, perceptions of physically attractive speakers appear be desensitised to the deceptive scrutiny unattractive people endure.

In a previous section, a speaker's sex was predicted to influence the perceived veracity of a speaker's message. The second aim of the current study was to determine if implicit perceptions of honesty and dishonesty also vary as a function of the speaker's attractiveness. Thus, in the current study, it was hypothesised that unattractive individuals, compared to attractive individuals, would be rated as more likely to be the speaker character following deceptive messages. On the contrary, it was predicted that after a statement was revealed to be truthful, participants would indicate that attractive individuals were more likely to be the speaker compared to unattractive individuals.

Additional Factors Influencing Perceptions of Veracity and Generation of a 'Lie Index'

The third aim of this study was to examine two interrelated factors known to greatly affect the perception of veracity. The first factor involves the frequency with which an individual encounters (or expects to encounter) deception related to a specific

trait. The possibility of a missed detection is likely to increase as the frequency of deception involving a particular trait increases. High volumes of deception require more demanding and consistent levels of scrutiny to ensure no costs are endured as a result of a missed detection. Therefore, traits that are more commonly lied about or falsified (higher frequency of deceptive attempts) may be perceived as more costly. Levine, Park, and McCornack (1999) employed a methodology that incorporated lie measures where the proportion of total lies utilised varied, and found that as lies increased, the percentage of deception accurately detected decreased. These researchers used three separate conditions to determine the effects of lie frequency on accuracy, whereby 25%, 50%, and 75% of statements were deceptive and the remaining percentage of statements were truthful. Levine and colleagues revealed that at the lowest frequency of deceptive statements (25% deceptive, 75% truthful) participants had the highest level of accuracy (59.5%). The condition involving equal frequency of deceptive and truthful messages (50% / 50%) produced an accuracy rate of 51.9%. However, Levine and colleagues found that the condition that incorporated the greatest percentage of deceptive messages (75% deceptive, 25% truthful) also produced the lowest level of accuracy (39.8%). These findings support the notion that as deception increases in frequency, the percentage of deception resulting in a missed detection increases.

The second factor that may influence perceptions of veracity is the evaluation of how difficult it is to achieve a successful detection of deception. Not all deception is equally easy to detect, thus deception related to different traits is likely to vary in detection difficulty. As the likelihood of detecting deception decreases, the possibility of a missed detection increases. Researchers investigating consumer behaviours proposed that a communication's verifiability (the ability to determine veracity) is

commonly used when evaluating that message's truthfulness (Calfee & Ford, 1988). Calfee and Ford (1988) revealed that communications that were more easily verifiable were also associated with fewer judgements of deception and reduced suspicion. Therefore, detection difficulty is an additional factor known to influence the level of deception perceived.

Deception frequency and detection difficulty are expected to interact and facilitate varying degrees of avoidance behaviours. Deception avoidance behaviours are those behaviours directed at avoiding the consequences of being deceived and have been found to result in the over-inference of deception. Those traits low in both frequency and detection difficulty will extract lower levels of avoidance behaviours (less inferred deception). However, lies that are less frequent but are easily detected will elicit equivalent avoidance behaviours as those lies that are infrequent but exceptionally difficult to detect. Traits indicating a higher frequency and higher difficulty should result in the greatest levels of avoidance behaviours. The current study measured the perceived frequency and difficulty of detection for a range of traits associated with mate selection. As both of these factors are suggested to influence an individual's perceptions of deception, ratings for these factors were averaged into a single measure. Henceforth, the combination of these factors will be referred to as the Lie Index. Traits with high scores on the Lie Index are those lied about frequently with detection of those lies highly difficult, whereas traits with low scores are lied about less often and detection is less difficult.

Taking into consideration the nature of the traits men and women may be expected to lie about or falsify to deceptively acquire mates may assist in revealing potential differences in implicit perceptions of male and female speakers. The current study investigated traits men and women typically have been reported to weight

significantly when selecting a mate including infidelity, health, social level (social acceptance), non-work related skills, similarity, financial resources, physical fitness, intelligence, weight, age, parenting, attraction, and height (Buss, 1989a, 2007; Haselton, Buss, Oubaid, & Angleitner, 2005; Li, Bailey, Kenrick & Linsenmeier, 2002). Li, Bailey, Kenrick, and Linsenmeier (2002) suggested the term social status may be linked with negative connotations, alternatively they used the label "social level" (p. 951). The current study measured social level in the form of peer acceptance.

To construct the Lie Index, participants were instructed to imagine themselves in a situation that involved a member of the opposite sex trying to secure a date with them. Participants were presented with 16 characteristics that an individual might falsify or lie about to increase their chances of securing a mate. Participants were requested to evaluate each characteristic on a scale of one (not very likely to encounter this type of lie) to six (very likely to encounter this type of lie) to express their perceived frequency of each type of lie. In addition, participants were also asked to evaluate each item in terms of how difficult detection of the lie would be, from one (very easy) to six (very difficult). These scores were averaged together to express how frequently participants expected to experience each lie in conjunction with their judgements of how difficult it would be to identify the deceptive attempt.

If an individual uses deception to increase their chance of mating he or she should positively manipulate traits that their potential mate finds attractive in order to optimise success. Therefore, men and women were predicted to lie more frequently about traits relevant to their own mating strategies. Men were predicted to lie more frequently about resources and social level, whereas women were expected to lie or deceive more commonly about age and attractiveness. However, while these forms of deception were predicted to occur more frequently, they were not predicted to be

equally detected. A trait that is overtly observable in nature, such as attractiveness and age, may be detected more easily due to the increased likelihood of verifying the truth. While deception related to observable traits, such as attractiveness, age, and weight may be attempted regularly, verifiability would only require a brief period of observation. Conversely, deception related to traits that are linked to high mate value for men may not be as easily verifiable, thus resulting in detection that is more difficult. Therefore, it was predicted that traits that men may falsify to acquire mates deceptively would be ranked higher on the Lie Index. On the contrary, it was hypothesised that traits women may manipulate to secure a potential mate will be ranked lower on the Lie Index.

Aims and Hypotheses of Study 2

The first portion of this study focused on the role of an individual's sex and level of attractiveness on perceptions of veracity. Deception has been primarily documented utilising the common methodology of known speaker gender and unknown message veracity. However, the speaker-bias is expected to be directly evident if the circumstances were reversed and the veracity of the message is known, while the sex and level of attractiveness of the speaker remains anonymous. The current method employed a scenario in which participants read short fictional written vignettes involving an anonymous speaker character (unknown attractiveness level and sex) answering questions regarding biographical information posed by a receiver character of known sex. Upon completion of reading each vignette, participants were informed as to the veracity of the statement (either honest or dishonest) and asked to identify the anonymous speaker character from a selection of photos. The photos included men and women of both high and low levels of facial attractiveness (Braun, Gruendl, Marberger, & Scherber, 2001). Producing scenarios that required participants to link photos of

individuals to honest and dishonest interactions was expected to provide a direct insight into any biases that might exist across individuals varying in sex and attractiveness.

Eight hypotheses were tested to determine if participants' perceptions of truthfulness and deceptiveness changed depending on the speaker's sex and level of attractiveness. Although the employed scenarios were fictitious and therefore accuracy rates could not be determined, these situations were predicted to elicit different implicit perceptions of honesty and dishonesty for various speaker traits. Recall that implicit perceptions of honesty and deception are those internal default perceptions of veracity based on the speaker's trait being evaluated. These implicit perceptions are suggested to exist prior to deception occurring and may influence how potential deception is evaluated. The first four hypotheses examined the influence that a speaker's sex had on participants' perceptions of that speaker's truthfulness and deceptiveness, while the final four tested the role of attractiveness on those same perceptions.

The last part of the study aimed to determine fundamental differences in the perceptions of how frequent and difficult it is to detect lies related to sex-specific mate selection criteria. Participants were asked to judge traits on a scale of one (not very likely to encounter this type of lie) to six (very likely to encounter this type of lie) to indicate their perceived frequency of each type of lie. Additionally, participants were also requested to appraise each trait in terms of how difficult detection of the lie would be, from one (very easy) to six (very difficult). The Lie Index consisted of adding the ratings for the perceived frequency of lies (1–6) to the scores for the difficulty of detecting deception (1–6), whereby total scores were divided by two to produce the Lie Index (1 – 6). Higher scores on the Lie Index indicated an overall higher probability of encountering deception and higher difficulty of detecting the lie. The frequency and verifiability (detection difficulty) have been independently researched, and both were

found to affect perceptions of veracity. However, I suggest that these two factors are assessed simultaneously; thus, the combined perception of these two variables may result in a more accurate understanding of how deception is generally evaluated rather than exploring each factor independently. Therefore, the final set of hypotheses examined expected sex differences in the frequency and difficulty of detecting deception concerning traits related to men's versus women's mating strategies. The results were used in the generation of a Lie Index.

The first set of hypotheses examined the role of sex in the speaker-bias. These predictions examined the perceived likelihood that men and women were the anonymous speaker and compared these perceptions when statements were either truthful or deceptive. A significant two-way interaction was predicted between the sex of the speaker and the veracity of the message, indicating that men and women are evaluated differently depending on the veracity of the message. The first prediction was that following honest messages, female photos would be rated with a greater likelihood of being the anonymous speaker compared to male photos. To further test the prediction that implicit perceptions of honesty would be more associated with photos of women, a second planned contrast examined the subset of responses pertaining to only the ratings of female photos. In particular, it was predicted that ratings of female photos would indicate a significantly greater likelihood of being the anonymous speaker when messages were honest compared to those that were dishonest. The second prediction anticipated an opposite trend in perceptions of deception. It was expected that following statements that were revealed as deceptive, photos of men would be rated as significantly more likely to be the anonymous speaker compared to ratings of photos of women. To provide additional support that implicit perceptions of deception would be more associated with photos of men, a subsequent investigation examined the subset of

scores pertaining to only the ratings of male photos. In particular, it was hypothesized that the ratings of male photos would indicate a significantly greater likelihood of being the anonymous speaker when messages were deceptive compared to truthful.

The second set of hypotheses tested the second aim of the study, which involved the role of attractiveness in the speaker-bias. The predictions examined the perceived likelihood that photos of attractive and unattractive individuals were the anonymous character following truthful or deceptive statements. A significant two-way interaction was predicted between the attractiveness of the speaker and the veracity of the message, indicating that attractive and unattractive individuals are evaluated differently for honest and dishonest messages. The first prediction was that following truthful messages, participants would rate photos of attractive individuals as significantly more likely to be the anonymous character compared to photos of unattractive individuals. The prediction that implicit perceptions of honesty would be associated with photos of attractive individuals was also tested in an alternative way. A follow-up prediction examined the subset of responses pertaining to only the ratings of photos of attractive individuals. Specifically, it was hypothesised that ratings of attractive photos would indicate a significantly greater likelihood that they were the anonymous speaker following truthful compared to deceptive statements.

An additional prediction investigated the frequency with which attractive and unattractive individuals were assumed to be the speaker following deceptive statements. Specifically, the expectation was that following statements that were revealed as deceptive, ratings of photos of unattractive individuals would indicate a significantly greater likelihood of being the anonymous speaker compared to ratings of photos of attractive individuals. To provide additional support that implicit perceptions of dishonesty would be associated with unattractive photos, a supplementary

investigation examined the responses corresponding to only the rating for photos of unattractive individuals. In particular, it was predicted that ratings of photos of unattractive individuals would be rated as significantly more likely to be the anonymous speaker when messages were revealed to be deceptive compared to those that were truthful.

The final hypotheses aimed to place traits related to men and women's mating selection criteria on the proposed Lie Index. In review, the highest score on the Lie Index indicates that the trait has a high average frequency of deception and a high average detection difficulty. The final hypotheses predicted a difference between the Lie Index ratings of the those traits men and women value as mate selection criteria. It was predicted that traits that are universally more attractive to women (e.g. financial resources and social level) would rank higher on the Lie Index compared to those traits universally attractive to men (e.g. physical attractiveness and age). Specifically, participants were predicted to indicate a significantly higher rating when evaluating resources compared to both attractiveness and age (separately). Additionally, participants were expected to report a significantly higher Lie Index rating for social level compared to both attractiveness and age (independently).

CHAPTER 6
STUDY 2: METHOD AND RESULTS

Study 2: Method

Participants

Participants (N = 117, 54 men and 63 women) were James Cook University undergraduate psychology students and members of the Townsville region general community. Participants ranged in age from 18 to 52 years old (M = 22.19, SD = 5.44). Participants reported their ethnic heritage (where their ancestors were from) was primarily European (78.6%), North American (8.5%), and other (8.5%). Additional demographic information is presented in Table 6.1.

Table 6.1
Demographic Characteristics of Study 2 Participants (N = 117)

Variable name	Level of variable	Frequency	Percentage
Relationship status	Single	65	55.6%
	Committed relationship	49	41.9%
	Missing data	3	2.6%
Participant education	Some high school	0	0.0%
	Completed high school	20	17.1%
	Some TAFE / apprenticeship	4	3.4%
	Completed TAFE / apprenticeship	4	3.4%
	Some university degree	56	47.9%
	Completed university	23	19.7%
	Some postgraduate degree	4	3.4%
	Completed postgraduate degree	6	5.1%
	Missing Data	0	0.0%
Ethnic heritage	Aboriginal/TSI	1	0.9%
	North American	10	8.5%
	European	92	78.6
	South American	1	0.9%
	African	0	0.0%
	Asian	1	0.9%
	Other	10	8.5%
	Missing data	1	0.9%

The Human Ethics Committee at James Cook University granted ethical approval for this research project (refer to Appendix E for a copy of ethical approval). All data were collected via an online questionnaire (surveymonkey.com). Participants

volunteered via the JCU Psychology department research pool and subsequent snowball recruitment methods. Participants who signed up through the research pool were granted credit points for their relevant psychology courses; however, general community members were not provided any compensation. All postings for recruitment informed participants of the nature of the study, expected completion time, age restriction of 18 years old, and provided contact information of both principle investigator and appropriate research supervisor (refer to Appendix F for a copy of the information sheet and Appendix G for informed consent form).

Materials

Demographic measures. The age, gender, ethnicity, level of academic achievement, and relationship status of the participants were collected.

Vignettes. Twenty-six vignettes were prepared. Each vignette contained a fictitious anonymous 'speaker' (Person X) who, following being questioned by a receiver character, provided personal/biographical information. The questions posed to the speaker character concerned traits such as current health, resources, age, intelligence, relationship status, mate value, emotional fidelity, sexual fidelity, similarity, and parenting. Questions were phrased so that lies about the traits would be more costly than truthful answers. Specific examples included "When Brandon asked if Person X has ever sexually cheated on a partner, Person X said 'never'" and "When a young man asked how much Person X earned last year, Person X told him '$80,000'". At the end of each vignette, the participant was informed as to whether the speaker (Person X) was telling the truth or was lying to the receiver. Vignettes did not indicate the sex of the speaker, but did indicate the sex of the receiver. Each vignette consisted of two versions in which the sex of the receiver varied to create situations in which both men and women were the receiver. Participants only completed one version of each of

the 26 vignettes. Following each vignette, participants were instructed to indicate, from a selection of eight photos, the likelihood (from 0% to 100%, in intervals of 10%) that each person depicted in the photos was the anonymous speaking character (Person X). Therefore, a higher score indicated a greater perceived likelihood that the person in the photo selected was the anonymous speaker. For example, if a participant selected 60%, this indicated a 60% likelihood that the individual in the photo produced the message in the vignette. Photos varied in terms of sex and attractiveness (high / low). Participants provided ratings for all photos following both truthful and deceptive messages, and the average ratings for particular conditions were used in the statistical analysis. For example, the ratings of photos of women following truthful messages were averaged together and compared against the average of all photos of men following truthful messages. Please refer to Appendix H for a sample page from the survey.

Photos. A selection of photos was utilised (Braun, Gruendl, Marberger, & Scherber, 2001; refer to Appendix H). The photos were generated using special algorithms (Morpher 3.0) to 'mix' two facial pictures of individuals (same sex) in a systematic way. The final image was a compound of properties from both faces, resulting in an average of the two original faces. Braun and colleauges (2001) refer to this technique as morphing. Starting with a series of photos of both men and women, all photos were independently rated for attractiveness. Sequentially ordered, the most unattractive female or male photo was morphed with the second most unattractive respective same-sex photo (W1–2; for women), in the next step, W3 and W4 were combined and so on. Newly morphed images were again rated for attractiveness. Photos were rated on a seven-point Likert scale from 1 (very unattractive) to 7 (very attractive).

Male photos pre-ratings. Fifty-three individuals rated the facial attractiveness of 16 morphed male faces (Braun et al., 2001). Twelve photos were selected for the current study, in particular, the six photos rated as having the highest and lowest levels of facial attractiveness. Ratings of attractive male photos ranged from 3.81 to 5.60 (M = 4.38), while those of unattractive male photos ranged from 2.51 to 3.38 (M = 2.70).

Female photos pre-ratings. Sixty-three raters judged the facial attractiveness of 32 morphed faces of women (Braun et al., 2001). Twelve female photos were selected for the current study. Again, six different photos rated as having relatively higher and lower levels of facial attraction were chosen. Because more women's photos were available than photos of men, attractive and unattractive photos of women were selected to match the ratings of selected males. This selection process of female faces was utilised to create equivalent attractiveness ratings between the sexes. Ratings of attractive female photos ranged from 4.08 to 5.17 (M = 4.44), while unattractive female photos ranged from 2.48 to 2.73 (M = 2.59).

Lie Index. Participants were asked to evaluate 16 different traits in terms of the expected frequency that lies about them would occur, ranging from 1 (highly unlikely) to 6 (highly likely) and how difficult detection of the lies would be from 1 (very easy) to 6 (very difficult). For each trait, these two scores were combined and averaged to create the Lie Index, whereby higher scores generally indicated a higher probability of encountering deception and higher difficulty of detecting the lie. The traits involved in the Lie Index included sexual infidelity, emotional infidelity, physical health, sexual health, social level (social acceptance), non-work related skills, feelings of similarity, yearly earning and earning potential (financial resources), physical fitness, intelligence, weight, age, parenting ability, physical attractiveness, and height. From this list of traits the average ratings for financial resources and social level were tested against the

average ratings for attractiveness and age to determine if traits desired by women were higher on the Lie Index than the traits desired by men.

Procedure

After indicating their consent to participate, participants completed questionnaire items regarding their demographic characteristics. After completing the demographic section, participants were asked to read each vignette and indicate, from the selection of photos, the likelihood that each individual was the anonymous speaker character. Upon completion of the vignettes, participants were requested to complete the Lie Index. The Lie Index involved rating the selection of traits on the likelihood someone might deceive them in regards to those traits and how difficult it would be to detect the deceptive attempt.

Study 2: Results

General Analyses and Descriptive Statistics

A 2 (participant sex) X 2 (speaker sex) X 2 (speaker attractiveness) X 2 (message veracity) mixed model ANOVA was carried out to test whether the sex and attractiveness of a speaker had an effect on male and female participants' perceptions of veracity. A significance level of .05 was adopted for all inferential testing and a Bonferroni-corrected alpha was employed to reduce family-wise error when a considerable number of multiple comparisons were undertaken. The data were screened for accuracy in data entry of responses, potential outliers, deviations from normality, SES effects, missing data, and violations of assumptions prior to statistical testing. The aforementioned issues and factors were not found to affect the results, thus the analyses were undertaken without their further consideration. Table 6.2 contains the means and standard deviations for participants' ratings of male or female, and attractive or unattractive photos for truthful and deceptive messages. Participants rated photos by

indicating (from 0% – 100% in 10% increments) the likelihood the individual in the photo was the anonymous character.

Firstly, although not predicted, a weak main effect was found for message veracity, F (1, 115) = 4.00, $p < .048$, $\eta_p^2 = .03$. In vignettes where the speaker told the truth participants gave the rated individual(s) an average likelihood of 42.8% (*SD* = 14.4) of making the statement, whereas in vignettes where a lie was told, the likelihood was 41.5% (*SD* = 14.7). This may signify that participants were more certain (rated with a greater likelihood) of their selection of individuals when messages were revealed as truthful compared to deceptive. However, this may also indicate a hesitancy to label individuals as liars.

Table 6.2
Summary of the Average (M ± SD) Likelihood with which Men and Women, and Attractive and Unattractive Individuals were Judged to be the Speaker Following Honest and Deceptive Communications (N = 117)

Veracity condition	Male Speaker *M* (SD)	Female Speaker *M* (SD)	Attractive Speaker *M* (SD)	Unattractive Speaker *M* (SD)
Honest	40.93% (14.2)	44.45% (15.0)	46.70% (15.2)	38.68% (14.4)
Deceptive	43.88% (15.3)	39.01% (14.8)	42.36% (15.0)	40.54% (13.9)

The Effects of a Speaker's Sex on Perceptions of Veracity

The first set of predictions regarding the role of sex in the speaker-bias involved four planned comparisons to examine the relationship between a speaker's sex and veracity. A preliminary analysis did not reveal a significant main effect of speaker sex, F (1, 115) = 3.03, *ns*, indicating that the likelihood of photos of men and women being the speaker was statistically equal across all conditions. In other words, participants indicated that women (*M* = 41.8%, *SD* = 14.3) were equally likely to be the speaker as were men (*M* = 42.8%, *SD* = 14.0) across all conditions.

The perceived likelihood that men and women were the speaker following truthful versus deceptive statements was examined. Figure 6.1 displays the significant

two-way interaction between the speaker's sex and message veracity, indicating that photos of men and women were not equally likely to be the speaker in truthful versus deceptive conditions, F (1, 115) = 74.25, $p < .0001$, $\eta_p^2 = .39$. A Bonferroni-corrected alpha was employed for the following four planned comparisons (.05 / 4 = .0125).

A paired-samples *t*-test showed that following conditions that were revealed to be truthful, female photos *(M* = 44.45%, *SD* =15.0*)* were rated as having a significantly greater likelihood of being the anonymous speaker compared to male photos *(M* = 40.93%, *SD* = 14.2*), t (*116) = 6.69, $p < .0001$. The follow up prediction tested the expectation that honesty would be more associated with photos of women, than dishonesty. An additional planned contrast examined the subset of responses pertaining to only the ratings of female photos. As expected, women were rated as having a significantly greater likelihood of being the anonymous speaker following messages that were truthful (*M* = 44.45%, *SD* = 15.0*)* compared to those that were deceptive (*M* = 39.01, *SD* = 14.8), *t* (116) = 7.32, $p < .001$.

Additional planned contrasts were tested to examine the likelihood that men and women were judged to be the anonymous speaker following deceptive statements. Photos of men *(M* =43.88%, *SD* = 15.3) were rated as significantly more likely to be the anonymous speaker compared to ratings of photos of women *(M* = 39.01%, *SD* = 14.8), *t* (116) = 7.10, $p < .001$. A secondary test provided additional evidence that deceptiveness would be more associated with photos of men. An examination of the photos of men only indicated that they were rated significantly more likely to be the anonymous speaker when messages were deceptive *(M* = 43.88%, *SD* = 15.3*)* compared to truthful (*M* = 40.93%, *SD* = 14.2), *t* (116) = 3.48, $p < .001$.

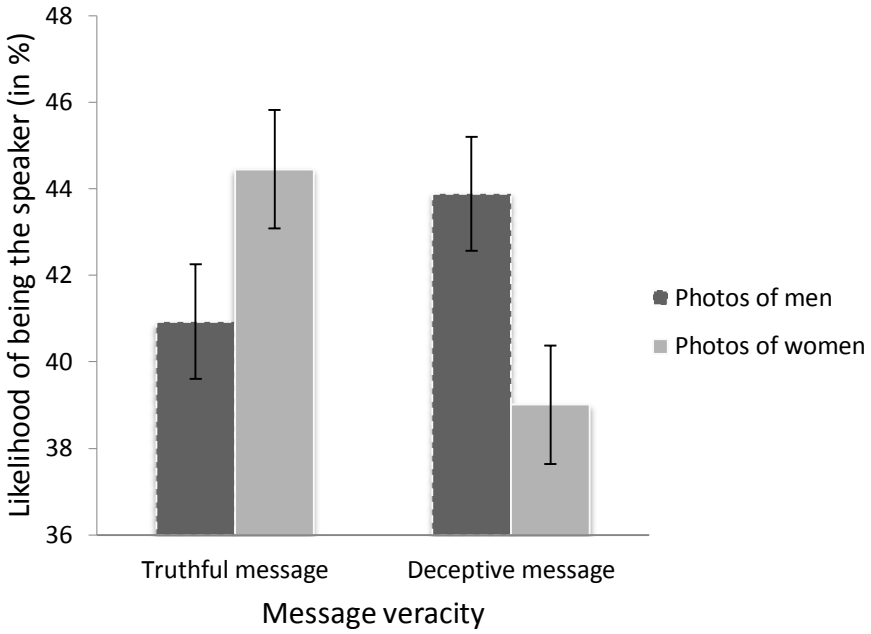

Figure 6.1. The mean likelihood (± SE) that men and women were the anonymous character in vignettes where truthful or deceptive messages were communicated.

The Effects of Attractiveness on Perceptions of Veracity

A preliminary analysis revealed an unexpected significant main effect for the attractiveness of the speaker, F (1, 115) = 145.81, $p < .0001$, $\eta_p^2 = .56$, two-tailed. Across all conditions participants rated attractive individuals with an average likelihood of 44.65% (SD = 14.6) of making the statement, whereas likelihood ratings for unattractive individuals averaged 39.68% (SD = 13.9). This signifies that participants rated attractive individuals as significantly more likely to be responsible for statements overall compared to unattractive individuals.

Additionally, a significant two-way interaction between the speaker's attractiveness and message veracity was found. This two-way interaction indicated that, as predicted, the likelihood that attractive and unattractive photos were the speaker was dependent on the veracity of the message, F (1, 115) = 36.15, $p < .0001$, $\eta_p^2 = .24$, two-tailed. To examine this interaction further, four planned contrasts were conducted to explore the relationship between attractiveness and veracity. The first prediction

investigated the likelihood that attractive and unattractive individuals were judged to be the anonymous speaker following truthful statements. Support was found for the prediction that following truthful messages, photos of attractive individuals (*M* = 46.70%, *SD* = 15.3*)* would be rated as significantly more likely to be the anonymous character compared to photos of unattractive individuals (*M* = 38.68%, *SD* = 14.1); *t* (116) = 12.82, $p < .0001$, one-tailed. Subsequent testing examined the subset of participant's responses pertaining to the rating of attractive photos only. The results supported the expectation that photos of attractive individuals would be rated as significantly more likely to be the anonymous speaker when statements were revealed to be truthful (*M* = 46.70%, *SD* = 15.3) than deceptive statements (*M* = 42.36%, *SD* = 15.1), *t* (116) = 5.48, $p < .0001$, one-tailed.

Planned contrasts examined the likelihood that attractive and unattractive individuals were the speaker following deceptive statements. An analysis revealed that following deceptive statements, participants indicated that photos of attractive individuals (*M* = 42.36%, *SD* = 15.1) were more likely to be the anonymous speaker compared to photos of unattractive individuals (*M* = 40.54%, *SD* = 15.1); *t* (116) = 2.57, $p < .011$, two-tailed. Although the *p*-value was less than the traditional critical value, because it was a directional prediction, this finding does not support the hypothesis.

Additional examinations were conducted to further explore this finding. As the three-way interaction between the participant's sex, the speaker's attractiveness and the veracity of the message did not reach significance, *F* (1, 115) = 1.76, *ns*, the sex of the participant did not seem to play a role. However, a significant three-way interaction was found between the attractiveness of the speaker, the sex of the speaker, and the veracity of the speaker's message, *F* (1, 115) = 12.07, $p < .001$, $\eta_p^2 = .10$. Follow-up

testing revealed that the trend to associate greater levels of deception with attractive individuals was limited to the evaluation of women. Testing indicated that attractive women (M = 40.86, SD = 15.5) were rated as significantly more likely to be the speaker following deceptive messages than unattractive women (M = 37.17, SD = 15.5), t (116) = 4.23, $p < .0001$, two-tailed. However, following deceptive messages, attractive men (M = 43.85, SD = 15.8) were rated as equally likely to be the speaker unattractive men (M = 43.90, SD = 15.8), t (116) = .06, *ns*. In addition, the four-way interaction between the sex of the participant, the attractiveness of the speaker, the sex of the speaker, and the veracity of the speaker's message was not significant, F (1, 115) = .030, *ns*, indicating that the participants' sex did not have an effect on these findings.

The final hypothesis regarding the relationship between the speaker's attractiveness and message veracity examined the subgroup of responses pertaining to the ratings of photos of unattractive individuals only. The prediction that this subset of individuals would be rated as more likely to be the anonymous speaker following deceptive statements was supported, t (116) = 2.17, $p < .016$, one-tailed. Unattractive individuals were identified as significantly more likely to be the anonymous character following statements revealed as deceptive (M = 40.54%, SD = 15.1) compared to truthful (M = 38.68% SD = 14.1).

Lie Index

The Lie Index examined the collective ratings of participants' beliefs regarding the frequency with which they might encounter deception and how difficult it would be to detect each type of lie. Participants' scores for frequency and difficulty of detection were rated with a maximum score of six for each measure. The ratings for deception frequency and difficulty of detection were averaged together to create a mean score,

also out of six. Men's (see Table 6.4) and women's (see Table 6.5) scores were combined to create the overall Lie Index (see Table 6.3), with higher scores generally

Table 6.3
The Means (± SD) for Ratings of the Frequency of Lies, Detection Difficulty, and Lie Index Scores for all Participants

		Lie Index		Lie frequency		Detection difficulty	
Traits	*N*	*M* (1-6)	*SD*	*M* (1-6)	*SD*	*M* (1-6)	*SD*
1. Infidelity	115	4.17	0.99	4.19	1.38	4.14	1.49
2. Health	114	3.73	0.90	3.76	1.19	3.70	1.17
3. Financial resources	116	3.71	0.87	3.73	1.41	3.68	1.22
4. Social level	114	3.61	0.89	3.86	1.28	3.35	1.30
5. Physical fitness	116	3.53	0.84	3.90	1.26	3.18	1.23
6. Intelligence	116	3.52	0.95	4.03	1.35	3.01	1.37
7.Feelings of similarity	115	3.49	0.88	3.85	1.27	3.14	1.31
8. Non-work skills	115	3.48	0.85	3.60	1.39	3.37	1.32
9. Age	116	3.28	0.98	3.15	1.39	3.40	1.34
10. Parenting	115	3.13	1.04	2.56	1.57	3.71	1.48
11. Weight	116	3.06	1.06	3.52	1.52	2.61	1.39
12. Physical attractiveness	116	2.84	1.09	3.49	1.47	2.19	1.42
13. Height	116	2.39	1.02	2.51	1.33	2.28	1.39

Note. *N* varies due to missing data

Table 6.4
The Means (± SD) for Ratings of Frequency of Lies, Detection Difficulty, and Lie Index Scores for Male Participants

		Lie Index		Lie frequency		Detection difficulty	
Trait	*N*	*M* (1-6)	*SD*	*M* (1-6)	*SD*	*M* (1-6)	*SD*
1. Infidelity	53	4.13	0.94	4.07	1.45	4.16	1.65
2. Health	53	3.67	0.89	3.63	1.47	3.64	1.34
3. Social level	52	3.61	0.90	3.74	1.30	3.45	1.56
4. Non-work skills	53	3.46	0.79	3.52	1.48	3.42	1.41
5. Financial resources	53	3.38	0.91	3.24	1.43	3.51	1.40
6. Feelings of similarity	53	3.37	0.79	3.67	1.23	3.08	1.19
7. Physical fitness	53	3.34	0.82	3.81	1.32	2.89	1.31
8. Intelligence	53	3.24	0.95	3.81	1.37	2.66	1.40
9. Weight	53	3.21	1.11	3.94	1.66	2.51	1.45
10. Age	53	3.23	1.01	3.07	1.45	3.38	1.35
11. Parenting	53	3.14	0.91	2.57	1.46	3.70	1.42
12. Physical attractiveness	53	2.78	0.90	3.67	1.52	1.91	1.13
13. Height	53	2.29	0.93	2.48	1.28	2.13	1.39

Note. *N* varies due to missing data

indicating a more frequent lie that is more difficult to detect. Each table (see Tables 6.3 – 6.5) includes the means and standard deviations of the likelihood of encountering a

lie (lie likelihood), the difficulty of detection (detection difficulty), and the combined scores (Lie Index) for each trait. The responses for emotional and sexual infidelity were averaged into the single trait Infidelity. In addition, the evaluations of current sexual health, history of sexual health, and physical health were also averaged into a single variable labeled Health.

Table 6.5
The Means (± SD) for Ratings of Frequency of Lies, Detection Difficulty, and Lie Index Scores for Female Participants

		Lie Index		Lie frequency		Detection difficulty	
Trait	*N*	*M* (1-6)	*SD*	*M* (1-6)	*SD*	*M* (1-6)	*SD*
1. Infidelity	62	4.20	1.04	4.27	1.40	4.13	1.36
2. Financial resources	63	3.98	0.73	4.14	1.27	3.83	1.04
3. Health	61	3.77	0.91	3.81	1.21	3.75	1.42
4. Intelligence	63	3.75	0.88	4.21	1.31	3.30	1.29
5. Physical fitness	63	3.70	0.84	3.97	1.20	3.43	1.12
6. Social level	62	3.61	0.89	3.97	1.25	3.27	1.03
7. Feelings of similarity	62	3.60	0.95	4.02	1.30	3.19	1.41
8. Non-work skills	62	3.49	0.91	3.67	1.32	3.32	1.25
9. Age	63	3.32	0.96	3.22	1.35	3.41	1.35
10. Parenting	62	3.12	1.15	2.55	1.67	3.71	1.54
11. Weight	63	2.93	1.01	3.16	1.30	3.70	1.35
12. Physical attractiveness	63	2.88	1.23	3.33	1.41	2.43	1.59
13. Height	63	2.47	1.09	2.54	1.38	2.41	1.40

Note. *N* varies due to missing data.

Comparison of Preferred Mating Traits on the Lie Index

It was expected that, collectively, the traits universally attractive to women (e.g., resources and social level) would have higher scores on the Lie Index than the traits universally attractive to men (e.g., attractiveness and age). As expected, the Lie Index ratings for the combined traits attractive to women were rated significantly higher than the combined traits attractive to men, F (1, 112) = 54.78, $p < .0001$, $\eta_p^2 = .33$, one-tailed. To examine this finding further, a 2 (participant sex) X 4 (preferred mating trait; resources, social level, attractiveness, and age) mixed model ANOVA was employed. The first aim of this analysis was to test the prediction that traits attractive to women (financial resources and social level combined) were rated higher on the Lie

Index than traits attractive to men (attractiveness and age combined). Secondly, the interaction between the participant's sex and preferred mating trait type was examined to identify expected sex differences within the ratings of preferred mating traits.

Simple tests indicated that, as anticipated, the overall ratings of financial resources (M = 3.71, SD = 0.88) were significantly higher on the Lie Index than ratings of attractiveness (M = 2.83, SD = 1.10), F (1, 112) = 56.26, p < .0001, one-tailed. Additionally, a planned comparison revealed that evaluations of financial resources (M = 3.71, SD = 0.88) were also significantly higher than ratings for age (M = 3.29, SD = 0.98), F (1, 112) = 12.36, p < .0002, one-tailed. Ratings for social level (M = 3.61, SD = 1.29) were also rated significantly higher on the Lie Index than lies related to attractiveness (M = 2.83, SD = 1.10), F (1, 112) = 46.85, p < .0001, one-tailed. In addition, lies related to social level (M = 3.61, SD = 1.29) were significantly higher than those related to age (M = 3.29, SD = 0.98), F (1, 112) = 9.45, p < .0001, one-tailed.

Table 6.6
Sex Differences in Lie Index Ratings for Financial Resources, Social Level, Physical Attractiveness, and Age (N = 116)

Traits analysed	Men		Women		Sex diff
	M	*SD*	*M*	*SD*	*F(1, 115)*
Financial resources	3.38	.91	3.98	.73	15.81*
Social Level	3.61	.90	3.61	.89	.01^
Physical attractiveness	2.78	.90	2.88	1.23	.32
Age	3.23	1.00	3.31	.96	.25

Note. ^ Missing data for two participants.*p < .001

The subsequent analysis of the Lie Index (summarised in Table 6.6) included a series of one-way ANOVAs employed to test the effect of a participant's sex on Lie Index ratings for resources, social level, age, and attractiveness independently. Only one sex difference was found to be significant. Women's scores for resources (M = 3.98, SD = 0.73) were significantly higher than men's (M = 3.38, SD = 0.91), F (1, 115)

= 15.81, $p < .0001$. No other significant sex difference existed between resources, social level, age, or attractiveness. However, one exploratory finding was significant at the adjusted alpha level for the comparison of all traits (.05 / 13 = .003). Women (M = 3.75, SD = 0.89) were found to rate the trait of intelligence significantly higher on the Lie Index than men (M = 3.24, SD = 0.95), F (1, 115) = 9.20, $p < .003$.

An analysis comparing the traits men and women universally find attractive was conducted to test the effect of participants' sex on these evaluations and is summarised in Table 6.7. The results revealed a significant two-way interaction between the participant's sex and preferred mating traits, indicating that the rating for some traits systematically varied as a function of participant sex, F (1, 112) = 2.95, $p < .016$. The results indicated a sex differences in the comparison between both resources and attractiveness (F (1, 112) = 4.79, $p < .015$, one-tailed), as well as resources and age (F (1, 112) = 5.04, $p < .013$, one-tailed). However, the results indicated that men and women did not differ in the comparison between both social level and attractiveness (F (1, 112) = .20, *ns*), as well as social level and age (F (1, 112) = .18, *ns)*.

Table 6.7
Sex Differences in the Comparison of Lie Index Ratings for Financial Resources and Social Level versus Physical Attractiveness and Age (N = 113)

Traits analysed	Men		Women		Sex diff
	F	*df*	*F*	*df*	*F(1, 112)*
Financial resources vs. Physical attractiveness	3.74**	(1, 51)	7.05**	(1, 61)	4.79*
Financial resources vs. Age	0.83	(1, 51)	4.91**	(1, 61)	5.04*
Social level vs. Physical Attractiveness	5.25**	(1, 50)	4.53**	(1, 60)	.200
Social level vs. Age	2.33	(1, 50)	1.99	(1, 60)	.188

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

CHAPTER 7
STUDY 2: DISCUSSION

This study focused on the implicit perceptual judgements of anonymous individuals in either honest or deceptive communications by examining if evaluations of veracity varied as a function of a speaker's sex and level of facial attractiveness. In addition, this study aimed to examine the differential perceptions associated with traits relevant to men and women's universal mate selection criteria. The results supported most of the proposed hypotheses, but possible explanations for those expectations resulting in non-significant findings are advanced. Potential limitations of this study and considerations for future research are also discussed.

The Relationship between a Speaker's Sex and Perceptions of Veracity

Unlike many previous studies, Study 2 did not utilise situations that involved actual deception resulting in an accuracy rate for veracity. Instead, fabricated vignettes were utilised in efforts to isolate changes in a receiver's implicit perceptions of honesty and dishonesty relevant to the speaker's characteristics. Study 1 found that biases in judgements of veracity were produced based on the characteristics of the receiver, which resulted in increases or decreases in perceptions of deception. This second study operated under the general assumption that biased perceptions of men and women as speakers may result in deviations in perceptions of veracity. Potential biases in the judgements of veracity that influence the generation of Type I (assumption of deception) perceptual errors may serve as a crucial factor when attempting to predict when an individual will reduce their reliance on the truth-bias.

The results for all hypotheses related to participants' perceptions based on the speaker's sex were supported. The first four hypotheses were designed to determine if men and women as communicators (speakers) produced different implicit perceptions

of honesty and dishonesty in receivers. Support was found for the expectation that photos of women would be rated with a greater likelihood of being the speaking character compared to photos of men; however, this main effect of speaker sex was qualified by the interaction with message veracity. The results revealed that while evaluating only the likelihood ratings for photos of women, participants indicated a significantly greater likelihood that women were the anonymous speaker following statements that were honest compared to dishonest. Testing that examined which sex was likely to be the speaker following deceptive messages revealed the reverse relationship. The findings indicated that photos of men were rated with a greater likelihood of being the speaking character compared to photos of women following deceptive statements. Additionally, men were also rated as significantly more likely to be the speaker following messages that were dishonest compared to honest.

McCornack and Parks (1986) suggested that perceptions of individuals are truth-biased in nature. In particular, when people make evaluations of an individual's veracity, they produce increased perceptions of honesty. The results of the current study indicate that, while both men and women may be truth-biased in general, the extent of this bias may be influenced according to the characteristics of the communicator being evaluated. Women were rated as more likely to be responsible for truthful statements, indicating that female speakers produce strongly implicit perceptions of honesty (compared to male speakers). Photos of men revealed the opposite trend, whereby they were rated as more likely to be responsible for deceptive messages, indicating a stronger implicit perception of dishonesty (compared to female speakers). This finding supports the initial proposal that biased perceptions are formed during the evaluation of men and women speakers. The existence of perceptual differences in the evaluations of honesty in men and women will add to the literature regarding how cognitive biases

affect evaluations of others. In addition, the ability to predict underlining perceptual errors individuals may make during the evaluation of deception will assist in building a more comprehensive theory as to why the accuracy rate of deception detection is low.

The truth-bias has been reported to affect the accuracy rates of individuals, whereby honest statements have an increased accuracy of detection (veracity effect; Levine et al., 1999). However, I suggest that the extent to which an individual relies on the truth-bias heuristic varies as a function of speaker sex. As a result, the sex of the speaker is likely to affect accuracy rates as well. As discussed earlier, Li's (2011) results were consistent with the veracity effect—truthful messages (66.7%) were significantly more accurately detected than deceptive messages (41.1%). Accuracy rates for truthful messages were 16.7% higher than expected due to chance (50%), whereas rates for deceptive messages were 8.9% less accurate. In addition, the accuracy rate for truthful and deceptive messages differed by 25.6%. Li also demonstrated that accuracy rates for female speakers (67.3%) were greater than male speakers (39.5%). Accuracy rates for female speakers were 17.3% greater, while those for male speakers were 10.5% lower than accuracy rates predicted by statistical probability. The total difference between accuracy rates between male and female speakers elicited a difference of 27.8%. I proposed that comparing the two factors increasing accuracy rates (women and honesty combined) and the two factors inhibiting accuracy (men and dishonesty combined) would result in an even larger difference in accuracy scores. To examine this potential interaction from previous data informally, I observed Li's (2011) accuracy scores from four different conditions: honest female speakers, dishonest female speakers, honest male speakers, and dishonest male speakers.

In order to generate the highest accuracy, the conditions relevant to the truth-bias (truth) and the speaker-bias (women) that facilitate increased accuracy rates should

be combined. Reviewing Li's (2011) data, situations involving the evaluations of honest women speakers produced an accuracy rate of 80.6%, the highest recorded accuracy rate in the study. Alternatively, when combining the two conditions resulting in reduced accuracy rates (deceptive statements and male speakers) the opposite effect was anticipated to occur. A re-examination of Li's results revealed that when male speakers were deceptive, participants scored the lowest level of accuracy in the study (25.2%). The accuracy rates of participants judging women telling the truth (80.6%) and men lying (25.2 %) differed by approximately 55%. This informal comparison of the truth-bias and the speaker-bias may reveal the reasonably equivalent effect these two perceptual biases have on the resulting accuracy rates, each appearing to influence accuracy by approximately ±10%–15%. In addition, interactions that combine factors that facilitate greater accuracy (increase accuracy by 10%–15%) with factors associated with reduced accuracy (decrease accuracy 10%–15%) should result in accuracy rates fairly equivalent to chance. According to Li's results, accuracy rates tended to be reasonably similar in the two conditions in which the truth-bias and speaker-bias conflict (increased accuracy for veracity, decreased accuracy for speaker sex, and vice versa). Specifically, accuracy rates for deceptive female speakers were 54.7% compared to an accuracy rate of 52.5% for honest male speakers.

Researchers have suggested that factors related to nonverbal communications may be responsible for some of the variance in accuracy rates (DePaulo, 1992; Forrest et al., 2004; Li, 2011). Ekman and Friesen (1969) suggested that in order for deception to be successful, individuals must avoid 'leaking' cues of their deception. According to Ekman and Friesen, deception is correlated with emotional cues that are conveyed nonverbally, and cannot be completely controlled by the conscious mind. Facial expressions are suggested to be a source of nonverbal cues and were proposed to be

connected with emotions, whereby specific emotions are hardwired to automatically trigger particular facial muscles. Although individuals may attempt to suppress and control cues of deception, some cues are still likely to be 'leaked'. Due to this leakage, DePaulo (1992) suggested that those individuals who are more intense or spontaneous while expressing their emotions are expected to experience less success with deception than those individuals who are less emotional and expressive.

Sex differences have been found in relation to emotional expressiveness. Women have been reported to be nonverbally warmer in that they smile and gaze more at individuals they are speaking with, and their facial expressions are more decipherable and animated (Hall, 1984; DePaulo, 1992). The observed difference in the level of expressiveness between men and women is one possible explanation for some of the variance in accuracy scores based on the speaker's sex. For example, due to women's reduced ability to control their expressions as well as men, DePaulo (1992) suggested that women would experience greater difficulty attempting to covertly hide deception. However, the receiver's implicit perceptions of honesty and dishonesty may also serve as a crucial factor facilitating different outcomes during judgements of veracity. While a deceptive communicator can influence and control many factors related to their own nonverbal leakage, other factors that influence their perceived honesty may be more difficult to manipulate. The results of the current study revealed that the sex of the speaker creates a biased perception of veracity. The biased perceptions produced from the sex of the speaker may in its self serve as a cue to potential deception. An individual will not be able to control or manipulate biased perceptions resulting from their biological sex in the same manner they may be able to control facial expressions or other leakage cues. Therefore, the sex of the speaker may serve as a stable factor that produces positively biased perceptions of deception when

speakers are male. In addition, implicit perceptions of honesty incorporated into a receiver's evaluations of women may be a contributing factor to enhanced accuracy rates for honest women communicators. Further, the increased honesty perceived from women is consistent with the previous findings for the truth-bias. However, in relation to deceptive communications, receivers are faced with two factors that may facilitate reduced accuracy. Male speakers may be less expressive, and thus may produce deception that is less likely to be detected. In addition to overt cues, receivers appear to have two internal perceptual biases that may conflict with one another when operating simultaneously.

These two internal biases are the truth-bias and the speaker-bias. The truth-bias produces an increased overall perception that incoming messages will be truthful compared to deceptive, whereas the speaker-bias integrates the increased expectation that deception will occur more frequently when the speaker is a man compared to a woman. The conflicting nature of the biased perceptions related to male communicators may lead to greater uncertainty when attempting to evaluate deceptive messages from men. During the evaluation of men, the truth-bias produces increased perceptions of honesty; conversely, the speaker-bias produces increased perceptions of dishonesty. The conflicting nature of these two cognitive biases may result in a reduced likelihood of accurately detecting deception. I suggest that these conflicting implicit perceptions are a contributing factor to the decrease in accuracy scores during the evaluation of male communicators. Finally, the consistency between an individual's truth-biased mindset and their biased perceptions of honesty in women speakers contribute to the increased accuracy rates in evaluating female communicators.

One factor that should be considered while interpreting the results of the present study is the orientation of the lie. DePaulo and colleagues (1996) discovered that

although more lies were told in self-interest, a large number of other-orientated lies also occurred. Other-orientated lies are lies considered to protect another from worry, embarrassment, or hurt feelings. DePaulo and colleagues found that approximately one out of every four lies observed was classified as an other-orientated lie. Further, women were reported to commit more other-orientated lies than men (DePaulo et al., 1996). The present study utilised deception formulated in self-interest, or self-interested lies according to DePaulo and colleagues. While previous findings indicated that men produce deception that is more selfish and the present study found that greater levels of deception are perceived in male speakers, future studies should examine if this pattern persists outside the realm of selfish deception. Study 1 revealed that increased perceptions of deception typically followed increases in perceived cost. From this perspective, the biased expectation that men will be deceptive may be reduced during the evaluation of other-oriented lies. Alternatively, because women are expected to formulate more other-orientated lies, the biased perceptions of honesty for women may also be reduced when other-oriented lies are examined. However, future research will be required to determine if the speaker-bias is influenced by the orientation of the lie.

The Relationship between a Speaker's Attractiveness and Perceptions of Veracity

The second set of hypotheses investigated the role of attractiveness in the speaker-bias. As expected, a significant two-way interaction was found between the speakers' attractiveness and message veracity, indicating that attractive and unattractive individuals were evaluated differently depending on whether the statement was honest or dishonest. Photos of attractive individuals, compared to unattractive individuals, were rated as more likely to be the speaker following honest messages. Furthermore, photos of attractive individuals were also rated with a higher likelihood of being the speaker character following messages that were revealed to be honest compared to

dishonest. However, the findings failed to support the hypothesis that photos of unattractive individuals would be rated as significantly more likely to be the anonymous speaker during dishonest messages compared to attractive individuals. Nonetheless, the final hypothesis was supported indicating that photos of unattractive individuals were significantly more likely to be the anonymous speaker following statements that were revealed to be dishonest compared to honest.

According to Burgoon and Hale's (1988) expectancy-bias, expectations are based on initial perceptions. If an individual appears trustworthy, they are expected to be honest and will not attempt to deceive you. Individuals perceived as attractive are more often perceived to exhibit positive traits such as trustworthiness, thus eliciting the expectation that attractive individuals are more likely to be honest. Using the halo/horns effect, Katz (1996) expanded on this bias. Attractive individuals are suggested to be affected by the 'halo' effect, whereby they are perceived as more interesting, generous, sociable, sensitive, and trustworthy. The current study indicated that generally implicit perceptions of honesty, compared to dishonesty, were significantly greater for attractive individuals and were thus consistent with Burgoon and Hale's (1988) expectancy-bias and Katz's (1996) halo effect. The results also indicated that implicit perceptions of honesty were greater for attractive individuals compared to unattractive individuals.

Burgoon and Hale (1988) explained that while attractive speakers should generate fewer perceptions of deception from receivers this effect was reversed for unattractive speakers. This reversal in perceptions was expected to result in ratings that indicated less physically attractive individuals were more likely to be responsible for dishonest messages. Similarly, Katz (1996) suggested that unattractive men and women are likely to experience the horns effect, whereby they are perceived as more mean,

sneaky, dishonest, and antisocial than attractive individuals. The results of the present study examined the ratings of only photos of unattractive individuals to determine the implicit perception associated with unattractiveness. This finding indicated that this subset of ratings was more likely to be the speaker character when messages were revealed to be deceptive. However, when comparing the likelihood that attractive and unattractive individuals were the speaker, an unexpected result was found. The hypothesis that photos of unattractive individuals would be rated with a greater likelihood of being the speaker following deceptive messages compared to photos of attractive individuals was not supported.

While most of the findings support the expected interactions between attractiveness and veracity, the expected difference in implicit perceptions of deception between attractive and unattractive speakers was not found. Possible reasons for these unanticipated findings were considered. To provide a more comprehensive understanding of the unexpected findings, further testing explored the relationship between attractiveness and deception. This unexpected result did not differ based on the sex of the participant, but did vary depending on the sex of the speaker. A significant three-way interaction was found between the veracity of the message, the speaker's attractiveness, and the speaker's sex. Follow-up testing for this finding revealed that after deceptive messages, the increased likelihood that photos of attractive individuals were the anonymous character compared to photos of unattractive individuals was limited to the evaluation of photos of women. Following dishonest messages, participants indicated a higher likelihood that attractive women (40.86%) were the anonymous character compared to unattractive women (37.17%). Conversely, participants indicated a nearly identical likelihood that attractive (43.85%) and unattractive men (43.90%) were the speaker following dishonest communications.

The results indicate that attractive individuals, particularly attractive women, were simultaneously perceived as both more honest and more deceptive than unattractive individuals. One possible explanation is that this result is linked to the finding that attractive people were more likely to be considered the speaker across all conditions. Attractive women may have received a higher likelihood rating overall compared to unattractive women because they represent the types of individuals participants expected to be in the vignettes utilised. The vignettes involved a series of short interactions in a mate selection scenario. Since attractiveness is a valued trait, individuals displaying higher levels of physical attractiveness should have greater success in mating than their peers (Rhodes, Simmons, & Peters, 2005). Rhodes and colleagues (2005) found that attractive individuals had an increased number of sexual partners within their respective optimal mating strategies, whereby attractive men had more short-term sexual partners and attractive women had more long-term sexual partners than their unattractive counterparts. Rhodes and colleagues also found that after measuring various components of physical attractiveness (e.g. face, body, symmetry, averageness, and sexual dimorphism), those individuals of superior phenotypic quality had greater mating success than lower quality individuals. Further, during initial encounters, individuals tend to prefer and desire the company of other individuals whom they perceive as physically attractive (Hatfield & Sprecher, 1986). Overall, attractive persons are more sought after, have more mating interactions, and have greater success in mating (Hatfield & Sprecher, 1986; Rhodes et al., 2005). Therefore, it is reasonable to suggest that these perceptions may have carried over into the judgements of photos being evaluated in this study.

In corroboration with Burgoon and Hale's (1988) expectancy-bias, if attractive persons are expected to be the more likely type of individual to be involved in a mating

situation, then it is possible that overall, the likelihood ratings for the photos in the vignettes were skewed to include more attractive individuals regardless of veracity. This result may indicate that some percentage of the participants disregarded the unattractive photos as potential anonymous characters in the vignettes and increased their focus on the attractive photos. This may provide insight as to why photos of attractive individuals were rated as more likely to be the speaker than unattractive photos in both honest and deceptive conditions. In addition, within the responses related to only unattractive photos, they were rated as significantly more likely to be deceptive characters than honest characters. Thus, it is suggested that these considerations be addressed in future research.

One recommendation is that future research include and control the variable of receiver attractiveness. A methodology that manipulated the receiver's attractiveness would incorporate scenarios where individuals of both high and low attractiveness could be viewed as equally suitable mates. Measuring interactions between the speaker's attractiveness and the receiver's attractiveness would not only provide further insight, but also potentially eliminate some of the possible limitations of the current study.

Construction and Examination of the Lie Index

When researching mate selection criteria, men's universal desire for attractive mates and women's universal desire for mates with an abundance of resources have produced two consistently well documented sex differences (Buss, 1989a; Li et al., 2002). A pattern was observed during the analysis of individual characteristics within the Lie Index that indicated a division between the mating criteria universally valued by men from those universally valued by women. Physical attractiveness (a trait universally attractive to men) was the second lowest trait on the Lie Index, followed

only by deception related to an individual's height. The perceived frequency of deception related to attractiveness was just below the average frequency recorded across all traits; however, it was rated the least difficult form of deception to identify. Further, deception related to attractiveness was rated easier to detect than lies about traits such as height and weight. On the contrary, lies about financial resources (a trait universally attractive to women) were rated among the top three traits measured, and was rated similarly to costly traits such as infidelity. These two items (resources and attractiveness) deviated significantly in their scores on the Lie Index. The expected differences in ratings between traits universally attractive to men or women formed the basis for generating hypotheses related to the Lie Index.

The first analysis of the Lie Index revealed that the overall ratings for traits universally attractive for women (financial resources and social level) were significantly different to the ratings of traits universally attractive to men (attractiveness and age). Furthermore, planned comparison to determine if this pattern existed across all four traits individually revealed that the overall ratings for financial resources were significantly higher on the Lie Index than ratings for attractiveness and age, individually. Additionally, Lie Index ratings for social level were also significantly higher on the Lie Index than lies relating to attractiveness and age, independently.

The next set of analyses revealed the two-way interaction between trait type and participant sex was significant, indicating that the participant's sex had a significant effect on Lie Index scores of the different traits. The significant interaction between the trait type and participant sex was produced by two different findings. While financial resources were rated significantly higher in the Lie Index than attractiveness overall, a significant two-way interaction revealed that the difference between financial resources and attractiveness was greater for women compared to men. Ratings for financial

resources were significantly higher on the Lie Index compared to ratings for age overall. Additionally, the significant two-way interaction also indicated that the difference between financial resources and age was only significant for female participants.

A series of one-way ANOVAs were utilised to test the prediction that female participants compared to male participants would rate traits universally attractive to women higher on the Lie Index. Conversely, it was expected that male participants compared to female participants would rate traits universally attractive to men lower on the Lie Index. The ratings for financial resources were found to differ significantly based on the sex of the participant. Specifically, women rated resources significantly higher on the Lie Index than men. No other significant sex difference existed between resources, social level, age, or attractiveness. However, one exploratory finding was significant at the appropriately adjusted alpha level for the examination of all traits (.05 / 13 = .003). Women were found to rate the trait of intelligence significantly higher on the Lie Index than men. While minor variations exist between the rankings of individual traits in the Lie Indices of male and female participants (see Tables 6.5 and 6.6), few significant sex differences were observed. Out of the 16 traits measured, only two sex differences were statistically significant. Female participants' ratings for both financial resources and intelligence were the only traits significantly higher on the Lie Index than the ratings of male participants. These findings may indicate that, in relation to the traits measured, men and women tended to have similar perceptions about the frequency that deception occurs and how difficult deception is to detect.

The traits that are universally attractive to women (e.g. resources and social level; see Table 6.3) received higher ratings on the Lie Index. Conversely, the characteristics that are universally attractive to men (e.g., attractiveness, age; see Table

6.3) are noticeably lower on the Lie Index. In a mate selection setting, women may not have an equal ability as men (due to the nature of women's traits) to deceptively increase their level of attractiveness to the opposite sex. Attractiveness is one of the qualities women may manipulate to attract higher quality men; however, it was rated as the easiest type of lie to detect. Therefore, women face a greater degree of difficulty when attempting to deceive men about their physical attractiveness. Women face a more overtly observable and easily confirmable task of altering their physical appearance (in ways that affect both age and attractiveness). Conversely, men's deception related to resources may require more time and effort to verify. These findings may assist in explaining the foundation for biases in perception such as the speaker-bias.

The speaker-bias suggests that participants experience more implicit perceptions of honesty when evaluating female speakers (increased reliance on the truth-bias), while producing more implicit perceptions of deception with male speakers (reduced reliance on the truth-bias). In a mate selection context, individuals may modify their truth-bias when evaluating men to incorporate increased perceptions of deception. This reduced reliance on the truth-bias may result because the efforts to verify the veracity of mate value statements produced by men are generally more demanding (higher detection difficulty). If individuals incorporate the perception that there is an increased likelihood that they may be successfully deceived by a man, they may decrease the number of missed detections by reducing their reliance on the truth-bias. Conversely, the likelihood of failing to detect deception-related traits such as attractiveness and age is perceived to be much lower (low detection difficulty). A strategy that implicitly judges women as an equally high source of deception (compared to men) would result in a higher frequency of false positives (increased errors). Therefore, it would be

unnecessary to apply this strategy to female speakers because individuals can better rely on their powers of observation to determine the veracity of physical cues. Individuals may remain truth-biased towards women communicators without exposing themselves to increased costs of missing difficult detections.

An informal examination of the Lie Index revealed that while financial resources and social level are higher on the Lie Index (traits preferred in men by women), and age and attractiveness are lower (traits preferred in women by men), traits such as intelligence and feelings of similarity were rated in the middle of the Lie Index. Intelligence (Li et al., 2002) and feelings of similarity (Buss, 2007; Haselton et al., 2005) were two traits found to be valued equally by both men and women in the pursuit of a mate. The general findings of the Lie Index indicate that traits men seek from women are the least frequently lied about and easiest to detect. Traits valued by both men and women are lied about at moderate levels and somewhat difficult to detect. Finally, traits valued by women are at the top of the Lie Index and are presumed to be more likely to be lied about and more difficult to detect. Generally, as a trait increases in attractiveness to women the more likely it will be the target of deception and the more difficult it will be to detect, whereas the reverse holds for traits men find attractive.

This study provides preliminary evidence that traits themselves may be differentially evaluated. Traits at the top of the Lie Index may produce different perceptions than those at the bottom. Insight provided by the Lie Index offers an additional perspective on the existence of differential judgements of speakers based on their sex. The Lie Index ratings coincide with the perceptions produced from the speaker-bias; thus provide support for the hypothesised increased reliance on the truth-bias when evaluating female speakers, but not male speakers. The results from the

analysis of the Lie Index provide an introductory investigation into a potential hierarchy of traits that stimulate different perceptions of deception. Study 3 employed a more formal analysis of the possibility of a hierarchy and hypothesised that more resources would be utilised in efforts to avoid traits ranking higher on the proposed hierarchy.

Implications of Sex and Attractiveness on Deception Detection

This study offers intriguing results that could be extended in future deception research and may have some practical implications for the general public. Since humans are bombarded with potential deception on a daily basis (DePaulo et al., 1996; Serota et al., 2010), the effects of perceptual biases concerning veracity based on a speaker's sex and attractiveness can have practical applications in everyday life. The results suggested that women and attractive people were significantly more likely to be perceived as truth-tellers. On the contrary, men were frequently judged as more likely to be engaging in deception. These mental shortcuts in daily perceptions of trustworthiness may serve a crucial function in our daily life, for example, when individuals do not have a sufficient amount of time to carefully appraise every individual they encounter on their level of trustworthiness. Instead, individuals may formulate a rapid evaluation process of others by employing biases that have been shaped, in some degree, by generations of individuals facing the same selective pressures. However, while such expectations can be economical cognitively, they could also lead to stereotyping and erroneous or lingering attributions of deception (Burgoon & Hale, 1988). Snap decisions in judgements could occur during scenarios that carry serious consequences to the speaker if evaluations of their veracity are incorrect. Therefore, considering the implications of this natural bias can assist in reducing the consequences that may result from potential errors in perception.

When the over-inference of deception results in a false positive, it is not always a harmless error. There are many situations where false perceptions of deception may carry direct and severe consequences for the accused. One environment that emphasises the importance of truth seeking is the judicial system. Acting on an accurate perception of honesty is imperative within legal proceedings. Jurors, for example, are typically normal citizens asked to make important judgements in regards to criminal and legal disputes. This role may include evaluating not only a witness's potential veracity, but also involves the sentencing of defendants. Any false positives resulting from errors in the perceptual judgements of deception can lead to unfair evaluations and increased sentencing. In fact, this already appears to be the case, unattractive individuals already receive longer criminal sentences than attractive individuals (Abwender & Hough, 2001). The difference in perceptions of attractive and unattractive individuals is not limited to only defendants. This bias may also extend to perceptions of the witnesses or lawyers providing conflicting evidence. Cases involving the testimony of female witnesses or arguments made by female lawyers might register stronger indications of truthfulness (increased further by facial attractiveness) than ensuing arguments formulated by men (or unattractive) lawyers. These biases are heavily engrained into our innate behavioural perceptions, which most likely formed over generations of individuals facing similar selective pressures. It is unlikely that a deeply engrained bias such as the speaker-bias will change without conscious assistance. Until these biases are common knowledge and considerations are made to correct them, unattractive individuals should seek to utilise the most influential techniques feasible in order to increase their perceived attractiveness. Manipulating their attractiveness may increase the likelihood of others appraising them as trustworthy and possibly decrease the level of perceptual discrimination.

Summary and Significance of Study 2

Bond and DePaulo's (2006) meta-analysis suggested that deception detection accuracy is only slightly better than chance. Many theories and methodologies have been utilised to offer an explanation or indication as to why humans perform so inadequately. The current study aimed to test the proposition that implicit perceptions of veracity are not equal for male and female (or attractive and unattractive) speakers. Differences in perceptions of honesty based on a speaker's characteristics were proposed as additional means to protect individuals from deception and to reduce the reliance on detection as the sole tactic in escaping costly deception. In summary, the present study provided support that female speakers are more implicitly associated with honest statements, while male speakers are more likely to be associated with deception. Further, attractive individuals were rated as more likely to represent an honest compared to dishonest individual, while unattractive individuals were rated as more likely to represent a dishonest compared to honest individual. The appraisal of an individual was found to be biased depending on the sex and attractiveness of the speaker. This bias has been termed the speaker-bias.

The present study also explored the perceived frequency and detection difficulty of deception related to a selection of traits. This study supplied a preliminary indication that traits themselves might be differentially evaluated. Traits scoring at the top of the Lie Index produced different perceptions than those traits scoring at the bottom. The Lie Index served as an introduction to the influence that an individual trait may have on the avoidance of deception. Findings from the Lie Index indicated the possibility that perceptions of deception produced from individual traits were processed hierarchically. Study 3 aims to expand on this finding by providing a more formal analysis of a potential hierarchy in perceptions of deception. I propose that investigating the

hierarchy with which individual traits are judged remains crucial in understanding the systematic process employed in the avoidance of deception. Finally, understanding the nature of deception avoidance can assist in explaining how we navigate the abundance of deception produced in everyday life, despite our poor ability to detect it accurately.

CHAPTER 8
STUDY 3: THE LIE-RARCHY: AN EXAMINATION OF PREFERENCES IN AVOIDING DECEPTION, TRADE-OFFS, AND THE HIERARCHY OF LIE AVOIDANCE BEHAVIOURS

Differences in Mating Preferences and Strategies

Human courtship is a tenaciously selective process (Buss, 1989a). The offspring produced from successful courtships entangle the genetic fates of men and women, who both provide an equal genetic contribution. However, sex differences in mating behaviours and desired characteristics, suggested to result from an asymmetry in parental investment, have been thoroughly documented (Bateman, 1948; Buss 1989b; Symons, 1979; Trivers, 1972). Women have a greater initial physiological investment in their offspring (internal gestation, shared nutrition, and lactation), and therefore should be more discerning than men in their choice of potential mates. Conversely, women engaging in indiscriminate copulations increase the likelihood of mating with lower quality men and ultimately enduring fitness costs. Therefore, women should optimise their reproductive strategy by pursuing long-term relationships with men who are capable and willing to invest greatly in their offspring. Conversely, men have a significantly lower minimum investment (copulation) required to produce a child. As a result, men should opt for a strategy of pursuing a higher frequency of sexual partners. To facilitate an increase in the numbers of partners, men should also pursue a shorter term of commitment with each partner.

Buss (1989b) studied 37 cultures around the world and revealed several universal sex differences in relation to preferred mating characteristics. Women value traits related to resource acquisition (e.g., financial resources and social level) in potential partners more than men. However, men, who are constrained by access to reproductive females, desire qualities indicating reproductive capacity (e.g., fertility,

attractiveness, and youth). Although evolutionary theory outlines the most beneficial strategies for men and women (see Buss, 1989b; Buss & Schmitt, 1993), individuals often deviate from their respective "optimal" strategy.

Compromising Strategies

Mate selection standards are dynamic in nature and internal perceptions of potential mates may undergo fluctuations depending on the current environment. If men's and women's optimal strategies were not open to compromise, little mating at all would likely occur. Instead, individuals may evaluate various factors of the environment and potential mates in gauging the degree of compromise to employ. A compromise from the optimal standard may result in a strategy that is the most advantageous for that individual, given their current qualities. Researchers have demonstrated that standards of mate selection criteria change over time, and can fluctuate over margins of time as brief as a few hours.

Observations from a field study found that individuals revise their internal perceptions of attractiveness as time to acquire a mate becomes increasingly constricted (Pennebaker et al., 1979). Pennebaker and colleagues (1979) arranged their data collection to commence in social venues near the local university. Men and women were asked to appraise the attractiveness of other men and women at three preselected periods throughout the night: 9:00 p.m., 10:30 p.m. and 12:00 a.m. (30 minutes prior to closing). As time diminishes, the prospect of successfully selecting, approaching and securing a reproductive partner within an individual's mating standards become progressively improbable. Results indicated that an individual's perceptions of the attractiveness of the opposite sex increased as closing time approached. Further, as the likelihood of acquiring a mate decreased, individuals altered their perceptions of attractiveness to allow more mates to qualify under their minimum standard. This effect

demonstrated that attractiveness ratings of others earlier in the night (when more time existed to secure a mate) were lower than late in the night (when securing a mate was difficult under strict time restraints). This flexibility of physical attractiveness standards was attributed to factors related to mate selection because this difference was only observed between opposite-sex interactions (no significant change in attractiveness scores of same-sex judgements occurred over time). These results provide one elegant example of the malleable nature of mate selection criteria.

Negotiating Minimum Selection Standards

While adaptations resulting from selection pressures related to mating have produced strategies that are conditional, these strategies typically incorporate a minimum standard (Kenrick, Groth, Trost, & Sadalla, 1993; Regan, 1998a). Minimum selection standards are employed to exclude members of the opposite sex who do not possess acceptable levels of desired characteristics. These standards are suggested to be conditional, given the current availability of the quantity and quality of mates. Further, these minimum selection standards have been proposed to change depending on specific variables related to mating. One specific factor proposed to affect men and women's minimum selection standards is the context of the relationship. Consistent with this expectation, Regan (1998a) found that individuals demanded a higher minimum standard during long-term relationships, and negotiated compromises as relationships shifted to short-term commitment (Regan, 1998b).

Men and women differ in their willingness to compromise their minimum standards (Regan, 1998b). An adaptive problem for men who pursued short-term mating strategies is locating numerous fertile partners possessing sufficient quantities of desired characteristics. Men compromise their minimum standards for short-term mating as one solution to increase the quantity of potential reproductive prospects (e.g.,

fewer restrictions enforced exclude fewer women). Women's mating strategies, whether short-term or long-term, still carry greater inherent risks compared to those that men face. Due to this increased risk, women's mate selection standards have been proposed to remain reasonably stable regardless of relationship duration.

Compromise and Mate Value

Another factor that comes into play when negotiating the optimal degree of compromise in an individual's mate selection standards is their own mate value. An individual's self-perceived mate value is a quantified personal estimate of their value as a reproductive partner in a relationship (Surbey & Brice, 2007). While various mating attributes (Buss, 1989a) contribute to an individual's overall mate value, mate value may be estimated by an approximation of self-perceived "attractiveness" to members of the opposite sex. According to social exchange or equity models of relationships, men's and women's procedures for mate selection parallel that of stock markets (e.g., Blau, 1964; Walster, Walster, & Berscheid, 1978). Men and women increasingly attempt to maximise their profits from the mutual sharing of traits and resources during mating. Men and women exchange their own desirable personal characteristics for as many preferred qualities as possible in a partner. From this economic perspective, patterns of relatively equal trades of characteristics would emerge. During this mutual exchange, highly valued traits are exchanged for equally sought after attributes. Conversely, individuals who possess less desirable mating traits will be traded with others of equivalent value. Murstein (1970) conceptualised that if an individual proceeded to diminish rates of rejection (lower potential cost) by pursuing a mate of lower quality (lower profit), the resulting rewards of this compromise would be minimal. However, if an individual increased potential costs by elevating his or her selection criteria (increased likelihood of rejection) to incorporate only higher value mates (high profit),

rewards would be high but infrequent. Both approaches to mate selection are suggested to result in a relatively risky strategy. Therefore, in order to optimise their current mating strategy, an individual must have an accurate understanding of their own mate value.

Altering Self-Perceived Mate Value in Men

Self-perceived mate value has been suggested to interact with other self-reported measures. Additionally, self-perceived mate value has also been found to affect the mating strategies an individual employs. Lalumière, Seto, and Quinsey (1995) found that in men with higher levels of physical symmetry (physical attractiveness) there was a positive correlation between self-perceived mate value and socio-sexuality, a measure in which higher scores indicate increased willingness to engage in short-term sexual relationships. Results indicated that higher self-perceived mate value was also positively associated with higher numbers of total sexual partners in men (Lalumière, Seto & Quinsey, 1995). Other researchers propose that an individual's mating preference is influenced by their level of self-esteem (Kiesler & Baral, 1992). Although Brase and Guy (2004) theorised that self-esteem may consist of an array of diverse domain-specific elements, elevated self-esteem was strongly associated with higher self-perceived mate value. Surbey and Brice (2007) conducted a study to investigate the potential changes in preferred mating strategies following artificial enhancements to their self-perceived mate value.

To examine possible shifts in mating strategies, Surbey and Brice (2007) tested participants in two sessions. Session 1 collected baseline measures of an individual's self-perceived mate value and preferred mating strategies (desired relationship context and preferred level of attractiveness). Correlations were employed to test pre-manipulation relationships between self-perceived mate value and willingness to

engage in casual or short-term sexual relationships. This initial testing phase revealed that higher ratings of self-attributed mate value were positively correlated with higher preferences for engaging in short-term or casual sexual relationships.

In the second session of testing, participants were supplied with a fabricated result from their preceding mate value assessment. Each participant was evaluated as "significantly more favourable than average" in an attempt to increase their self-perceived mate value (Surbey & Brice, 2007, p. 39). Following this manipulation, men reported a significant increase in their levels of self-perceived mate value. The enhancement in men's self-perceived mate value scores was also followed by a significant shift in their preferred mating strategies. Men reported an increase in their willingness to engage in short-term or casual sexual relations. One interpretation is that the newly elevated self-perceived mate value limited the level of compromise individuals' were willing to employ. Men decreased their willingness to engage in committed relationships in pursuit of the more optimal male mating strategy (short-term mating). Additionally, after receiving positive assessment of their worth as a mate, men showed increased intentions to pursue attractive compared to average-looking women. This shift in intentions could also be interpreted as a reduction in the level of compromise regarding mate quality, with men reporting a decrease in willingness to pursue average-looking women. When receiving external evaluations that they were "significantly more favourable than average" (Surbey & Brice, 2007, p. 39) men opportunistically optimised their mating strategy. Following the false belief that they were rated as favourable mates, self-perceived mate value increased, along with preferences for short-term relationships with more attractive women. Overall, men demonstrated considerable flexibility in their mating strategy evident by shifts in both their mate selection criteria and desired relationship duration.

In summary, men who possess (or perceive they possess) qualities greatly desired by women are more likely to pursue shorter-term mating strategies. The more likely a man will be successful engaging in a short-term strategy, the greater the likelihood of engaging in that strategy.

Altering Self-Perceived Mate Value in **Women**

Lalumière and colleagues (1995) reported no relationship between women's self-perceived mate value, socio-sexuality, and overall number of sexual partners. Surbey and Brice's (2007) results also revealed no significant change in women's self-perceived mate value following their manipulation. Correspondingly, no changes were found in the second phase of testing for women's intentions to pursue casual versus committed relationships or attractiveness levels in desired partners. Women as "choosers" were not affected to the same extent as men by external indications about their worth as a mate. From a social learning perspective, women may not respond to sources of social influence that promote sexual promiscuity because they do not experience the same degrees of positive reinforcement that men receive. However, measures of self-perceived mate value in women have been reported to have effects on their selection criteria of potential mates in different ways (Regan, 1998b). Regan found women with higher self-perceived mate value increased the likelihood of pursuing their optimal strategy while engaging in minimal compromise. In contrast to men, who changed strategies to employ a more optimal strategy, women became more selective within the same strategy they were currently implementing. In review, as self-perceived mate value increased, women did not systematically change their preferred mating strategy; instead, women became less compromising of their selection criteria.

Conflicting Sexual Strategies and Strategic Interference Theory

Due to sexual asymmetry in parental investment, men and women have been exposed to different adaptive problems in mating. Despite the preponderance of evidence outlining the optimal mating strategies for men and women, both sexes engage in both long-term and short-term relationships (see review in Buss & Schmitt's 1993 Sexual Strategies Theory). However, short-term mating is reported as a greater motivational drive for men than women. Men, compared to women, are more likely to implement short-term relationships to pursue the greater frequency of sexual partners they desire (Schmitt, 2003). Men reported a greater probability of soliciting prostitutes, up to two times as many sexual fantasies, and were more likely to accept sexual invitations from an attractive stranger compared to women. While women may face adaptive problems or circumstances that elicit amendments to their strategies (from long-term to short-term investments), women still profit most from extended relationships with increased commitment. Consequently, men consistently employ short-term strategies significantly more than women (Buss, 1989a; Buss & Schmitt, 1993; Schmitt, 2003). Schmitt (2003) replicated these results across 52 nations around the globe.

Men and women have contrasting optimal mating strategies; thus, conflict arises when a man and a woman both engage in their preferred strategy simultaneously. Conceptually, men possessing the qualities that are deemed most desirable by women should engage in the optimal strategy available for men (e.g., short-term commitment, low investment, and increased frequency of attractive mates). On the contrary, women displaying the characteristics that men report most desirable should adopt the most advantageous existing strategy for women (e.g., long-term commitment, high investment, resource abundant mates). Consequently, it is expected that conflict will

occur when men's strategy of employing short-term seduction confronts the long-term commitment strategy of women and vice versa (Buss, 1989a). Consistent with Buss's (1989a) Strategic Interference Theory, conflict transpires when the strategies of one individual interferes with the objectives, desires, or success of strategies of another. Negative emotions such as anger and upset are activated as a result of conflict between men and women during courtship (Buss, 1989a; Mandler, 1975, 1984). The personal distress and negative emotions experienced are proposed to serve a particular utility as an adaptive solution to strategic interference. Firstly, enduring increased levels of anger and upset draw additional awareness and emotional importance to the interactions in which interference occurred. Secondly, situations that render negative emotions are marked for storage by memory. Further, these emotions serve as a motivational tool to assist in decreasing or alleviating the source of interference.

One major source of interference and subsequent negative emotions is the discovery of deception. Within the context of mate selection, deception is utilised to increase the likelihood of successfully acquiring a partner. The traits that increase the probability of securing a mate vary between the sexes; thus, the sources of interference and negative emotions resulting from intersexual deception also differ between men and women (Buss, 1989a; Haselton et al., 2005).

Sex Differences in Emotional Reactions to Intersexual Deception

Haselton, Buss, Oubaid, and Angleitner (2005) found sex differences in the emotional reactions (upset) to various types of intersexual deception. Women reported greater levels of negative emotions (upset) during mating interactions that involved interference with their preferred mating strategies. Women desire and pursue men high in status and resources, and were subsequently found to be more upset than men upon discovering a partner had exaggerated these qualities. Women also aspire for a mate

who has deep feelings and desires a long-term commitment. When measuring negative emotions related to deceptive displays of deep feelings, which typically coincide with long-term commitment, women reported significantly greater levels of upset than men. As part of a shorter commitment strategy, men deceptively concealing third party sexual involvements are a major source of interference for women. Although issues with infidelity negatively affect men as well, women reported a greater level of upset when deceived regarding existing commitments to others. Haselton and colleagues (2005) revealed that women responded with greater levels of upset to all measured types of deception. However, men also experienced interference with their mating strategies and negative emotions of upset from intersexual deception. Women providing men with a false likelihood of sexual access (being sexually led on) within short-term mating causes major interference for men employing this strategy. Thus, men, more than women, reported greater upset when deceived about the potential for sexual access.

Deception Regarding Preferred Traits

Although measuring negative responses to deception has provided insight into sex differences in the emotions involved, what types of deception men and women most commonly utilise is still a topic of debate. From an evolutionary perspective, attempts at intersexual deception should correspond with the criteria relevant to each sex-specific optimal mate selection preference. Keenan, Gallup, Goulet, and Kulkarni (1997) examined expectations regarding potential lies and found that women expected men to lie more frequently than other women. Women also held strong expectations that men would falsify their personal economic resources. On the other hand, men did not have significant expectations that women would use deception regarding their physical characteristics. In undertaking a replication of these results, Benz, Anderson,

and Miller (2005) found that men had the expectation that women would conceal or alter physical attributes in attempts to deceive men. Tooke and Camire (1991) reported that women were more likely to manipulate their physical features to appear more attractive (e.g. used make up to alter their facial attractiveness, wore heels to increase their height, and used tanning to alter their natural skin colour). The authors considered this a type of deception employed by women. These researchers also suggested that deception relating to fiscal resources was more frequently observed in men (e.g., spending money on the opposite sex when they cannot afford it and misleading members of the opposite sex about career expectations). Overall, research findings indicate that traits which lead to greater success in mating are often the target of intersexual deception.

Of the total number of potential mating characteristics, not all traits are equally desirable. Li and his colleagues (2002) demonstrated that individuals seek sufficient levels of some traits before attempting to acquire other traits. Using a budget methodology, Li and colleagues found that when choices were greatly restricted participants focused on particular traits, referred to as necessary traits. Li and colleagues suggested that following sufficient acquisition of these "necessary" traits individuals began shifting their values to incorporate extra characteristics. Sex differences existed within necessary traits; men classified physical attractiveness, while women reported resource acquisition as necessary. Although it was not initially predicted, the researchers found intelligence was reported by both men and women as an essential characteristic in a potential long-term partner. While these traits are considered "necessary", they are also likely to be the target of deception.

Essential Deception Avoidance

Both men and women have been found to present themselves as more desirable than they are in reality (Tooke & Camire, 1991). However, to receive the greatest benefit from deception in mating, lies should aim to fictitiously increase those characteristics viewed as necessary. If necessary traits are absent in an individual, or below the suitor's minimum standard, success in courtship with that suitor is particularly improbable. The use of deception to increase ancillary personal traits fictitiously would be superfluous if essential traits were not first satisfied. Thus, successful deception aimed at increasing highly preferred traits would gain a significant advantage over comparable individuals falsifying less desirable qualities. Therefore, if specific mating criteria are appraised as necessary, and successful deception regarding them highly beneficial, then these traits should receive considerably greater frequencies of deceptive attempts. Alternatively, traits should be the subject of fewer deceptive attempts the lower their desirability. While individuals use deception that coincides with appropriate reproductive strategies to acquire mates (Tooke & Camire, 1991), selection should favour individuals who systematically avoid the consequences of deception.

Throughout evolutionary history, victims of unreciprocated transfers of resources because of deception suffered many costs. Our ancestors were those individuals who managed to implement a beneficial process of approaching this adaptive problem. Specifically, within the context of mate selection, individuals who unknowingly or as a result of deception produce offspring with a partner who possesses substandard levels of essential traits will endure fitness losses. Therefore, natural selection should favour those individuals who possessed some form of defence against these forms of deception. Study 1 and Study 2 suggested that avoidance behaviours

triggering the over-perception of deception may have co-evolved as a counterstrategy in the defence against deception. If a specific fluctuation in perceptions of deception co-evolved in humans as a method to avoid fitness loses, then sensitivity to this behaviour should vary as a function of cost. Accordingly, avoidance behaviours should be strongest for those traits that inflict greater consequences on survival and reproduction.

Hierarchical Model of Deception Avoidance

Human mental processes, in many cases, operate within a hierarchy of strategic requirements and preferences. For example, humans have basic needs: air, water, and food. If during the hunt for food we encounter a period of intense dehydration, priorities are altered and water becomes our primary motivation over food. Similarly, if in the quest to secure water we endure an episode of breathlessness, once more, our priorities shift to match the most pressing need. Thirst will most likely fail to register in our conscious mind until satisfactory quantities of oxygen have been acquired. Correspondingly, this strategic pattern of processing has also been documented within the context of human mate preferences. The most pressing (and beneficial) requirements in a reproductive partner (necessary traits) are pursued first. A courtship attempt would most likely result in rejection if a member encompasses ancillary traits but displays insufficient levels of desirable necessary traits. A necessary trait (air) is hierarchically required before shifting to the next strategic priority (water). This hierarchical pattern of processing is anticipated to manifest in the human approach to avoiding deception, whereby greater preferences to avoid deception are hierarchically structured according to potential costs.

Humans have been observed to be truth-biased, whereby all incoming information is perceived as initially truthful in nature (McCornack & Parks, 1986).

However, Study 2 revealed that the degree of reliance on the truth-bias heuristic (perceptions of initial honesty) was not equivalent for male and female speakers. Incoming messages from female speakers were more likely to be judged as being honest, indicating a greater reliance on the truth-bias during the evaluation of women. A reduced reliance on the truth-bias results in an increased perception of potential deception, which may result in increased attributions of deception towards the communicator. While evaluations of men and women were not found to produce equal perceptions of deception, it is expected that different types of lies will produce asymmetrical perceptions of deception. Further, it is predicted that the falsification of some traits will elicit a higher probability of triggering avoidance behaviours than others. For the current study, potential mating traits were fundamentally structured into a hierarchy of four separate tiers. Traits classified higher in this hierarchy would presumably result in greater reproductive costs, thus communications regarding these traits are more likely to result in perceptions of deception than traits lower in the hierarchy. Conversely, deception regarding traits categorised in lower tiers was not expected to inflict as severe costs, therefore evaluations of communications regarding these traits would remain reasonably truth-biased.

Top Tiers of Deception Avoidance

In the proposed hierarchy, or 'Lie-rarchy', the top two tiers were expected to be most associated with deception, whereby missed detections would affect an individual’s ability to pass on their genes to the next generation successfully. It is anticipated that deception directly related to survival will constitute the top tier in the hierarchy of lie avoidance. Deteriorated health or death can cause severe loses to both men’s and women’s fitness, particularly if those individuals have failed to produce offspring yet or if offspring are in early stages of development. The presence of

pathogens may result in a reduced ability to acquire necessary resources, nurture offspring, and acquire new mates. The existence of a pathogen in a parent also increases the likelihood of transmission to their offspring. Therefore, within the context of mate selection, a major issue concerning the survival of an individual or their offspring is the use of deception to conceal contagious or genetic pathogens. Additionally, deception related to non-contagious health factors may also negatively affect the victim of the deception. Individuals who fail to detect deception from potential partners who conceal health vulnerabilities or reduced physical capacity may also unknowingly pass these limitations on to their offspring. Therefore, deception related to an individual's physical health is suggested to constitute the highest tier in the hierarchy.

Infidelity represents the second tier in the hierarchy. Victims of infidelity endure loses of reproductive and economic resources used by their partner to attract and maintain the covert affair. Extra pair copulations may increase paternal uncertainty or the probability of termination of the previous relationship, inflicting additional costs on the deceived. Individuals abandoned following an episode of infidelity may suffer from significant reductions in resources (economic or reproductive) and parental care (if children are present). Additionally, individuals will be forced to re-enter the mating markets in efforts to secure a new mate.

Sex differences were anticipated to exist in the evaluations of deception related to both health and infidelity. It was expected that the sex exposed to greater potential costs from deception about health and infidelity would compensate with a greater effort to avoid these types of deception. While health and infidelity are important to men and women, women face greater potential costs from diminished health and episodes of infidelity due to the increased parental and physiological investments they provide for

offspring (Bateman, 1948; Buss, 1989b; Symons, 1979; Trivers, 1972). Therefore, women are anticipated to place a greater emphasis on avoiding deception related to health and infidelity compared to men.

Lower Two Tiers of Deception Avoidance

The next two tiers in the hierarchy are related to lies that following a failed detection would affect the quality of genetic material passed on, rather than one's general ability to pass on genes via mutual offspring as in the top two tiers. Tier III and Tier IV include essential and auxiliary mate selection criteria items, respectfully. The third tier represents a selection of essential mate selection qualities such as resources (women's mating criteria), attractiveness (men's mating criteria), and intelligence as the subsequent strategic focus following acquisition of Tier I and Tier II qualities. Offspring produced exhibiting strong displays of essential traits will gain a significant advantage over those who do not exhibit these traits. Consequently, those individuals that are successfully deceived in regards to necessary traits are more likely to produce offspring that express suboptimal levels of those traits.

Finally, the fourth tier constitutes a selection of auxiliary characteristics. Auxiliary traits are additional qualities that may not be as essential as Tier III traits but have still been suggested to be integrated into an individual's mate preferences and thus are expected to produce observable avoidance preferences. Following the discovery of deception by a partner with whom they would like to pursue a relationship, traits such as feelings of similarity and age were found to produce below average levels of emotional upset when compared to 24 other mating-relevant characteristics (Haselton et al., 2005). Reduced negative reactions to the discovery of deception may result in a reduced preference to avoid such deception. In addition, previous research has also found that parenting skills, weight, and social level (e.g. social popularity or

sociability) were all considered during the selection of a romantic partner (e.g., Botwin, Buss, & Shackelford, 1997; Buss, 1989a; Li et al., 2002). Therefore, Tier IV traits included feelings of similarity, age, parenting skills, weight, and social level.

If individuals avoid deception related to health (Tier I), fidelity (Tier II), and necessary items (Tier III), but are successfully deceived in regards to auxiliary traits, they are likely to endure lower costs, but still adequate costs to warrant behavioural awareness. While Tier IV traits theoretically impose lower costs in comparison to higher tiers, they are still valued traits in a potential partner. Therefore, any lingering energy or ability should be utilised to avoid as much residual deception as possible to provide the individual with the greatest potential mate. The traits proposed to represent each tier are displayed in Figure 8.1.

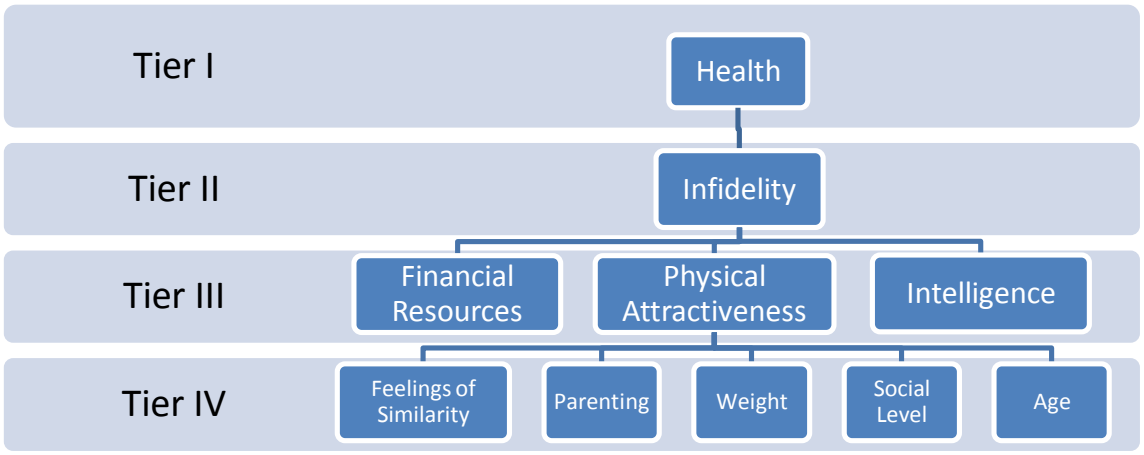

Figure 8.1. The proposed hierarchy of preferences to avoid lies or 'Lie-rarchy'

Aims and Hypotheses of Study 3

When an individual is evaluating traits higher in the hierarchy, it is highly beneficial not to be successfully deceived. When resources or abilities to detect deception are low, individuals should take appropriately high precautions to ensure top tier lies do not result in missed detections. However, as choices and resources increase an individual should not assign all further resources and focal awareness to the same

top tier items. If secondary resources were simply combined in the effort to avoid strictly top tier deception, other forms of deception could pass undetected. Higher frequencies of lower costs may collectively equate to the costs of successful top tier lies. Therefore, appropriate proportions of lie avoidance measures should exist to parallel relevant costs. Higher cost deceptions should constitute higher percentages of lie avoidance efforts, while lower cost lies should receive appropriately lower levels of avoidance efforts.

The benefits gained by increasing from high avoidance to extremely high avoidance efforts would be minimal. Similarly, our oxygen intake (a Tier I human necessity) constantly mirrors the need required to avoid the costs of deprivation. Simply because oxygen registers as a "necessity" does not mean oxygen intake should be maximised at all times, rather, it should be optimised. When an individual is satisfied with their oxygen levels, additional oxygen intake faces decreasing marginal utility. Avoidance behaviours are predicted to operate under the same principle guidelines. Once an individual has protected themselves from deception related to Tier I items, they should shift their priorities to the next costly tier (Tier II). Theoretically, this hierarchical model for deception avoidance may persist across all traits depending on the available energy and resources of the individual.

The current study aimed to test the proposition that avoidance behaviours are strategically (hierarchically) analysed in relation to potential costs. Additionally, when resources or choices are limited, individuals are expected to increase their focus on deception involving higher tier characteristics. Conversely, as resources become less restricted, individuals are anticipated to begin trading off proportions of higher tier traits to incorporate a more inclusive defensive strategy against deception (e.g., involving more auxiliary traits).

In the current methodology, participants allocated lie avoidance tokens to indicate the degree that they wished to avoid potential lies across ten selected categories. Participants distributed these tokens towards traits across two budget restrictions: a low budget (ten tokens, one token per lie) and high budget (30 tokens, three tokens per lie). Each tier was expected to be allocated a significantly greater percentage of the tokens than the tiers below (average per lie). When employing a similar budget methodological design, it was reported that the differences in distributions were most observable when increased restrictions were incorporated into the participant's allocation procedure (Li et al., 2002). Therefore, the inter-tier comparisons were examined within the low budget condition. Specifically, it was hypothesised that Tier I lies (health) would constitute a significantly larger proportion of low budget allocations compared to each of the lower tiers. Accordingly, it was predicted that Tier II lies (infidelity) will be allocated significantly more low budget tokens than Tier III lies (essential traits; men = intelligence and attractiveness, women = intelligence and resources) and Tier IV lies (auxiliary traits). Finally, Tier III lies (essential traits) were predicted to receive significantly more lie avoidance tokens than Tier IV lies (auxiliary traits) in low budget conditions.

The high budget condition was used to analyse potential trade-offs following the shift from a low budget condition to a high budget condition, or vice versa. The high budget allocations were predicted to differ from those of the low budget condition. When resources were heavily restricted, participants were anticipated to over-protect against those higher cost tiers. In contrast, as resources become more available, participants were expected to employ a more inclusive strategy against deception. As the budget increased, higher tier items faced diminishing utility and participants were predicted to begin making trade-offs in the form of allocating more tokens to auxiliary

characteristics. These trade-offs were anticipated to occur between the highest tier (increased protection when resources were restricted) and the lowest tier (decreased protection when resources were restricted) in the high budget condition. The Tier I trait was predicted to receive a significant reduction in the percentage of token allocations in the high budget compared to low budget condition. The opposite was hypothesised for Tier IV lies; in particular, Tier IV traits were predicted to receive an increased percentage of the budget when restrictions are lifted (high budget). However, changes in allocations for particular Tier IV traits are expected to be sex-specific if the valuation of the trait varies according to sex. Specifically, men were expected to trade-off token allocations towards Tier I to incorporate increased allocations towards avoiding deception related to a women's age as the budget transitioned from low to high. Additionally, women were predicted to reduce their token allocations to Tier I to include an increase distribution towards avoiding deception related to a man's social level as budget restrictions were lifted.

CHAPTER 9
STUDY 3: METHOD AND RESULTS

Study 3: Method

Participants

Participants (N = 147) were James Cook University undergraduate psychology students and members of the Townsville region general community. Participants comprised 67 men and 78 women (two participants did not report their sex), ranging in age from 18 to 34 (M = 22.70, SD = 3.51). Additional demographic information is presented in Table 9.1.

Table 9.1
Demographic Characteristics of Study 3 Participants (N = 145)

Variable name	Level of variable	Frequency	Per cent (%)
Relationship status			
	Single	71	48.3
	Committed relationship	72	49.0
	Missing data	4	2.7
Participant education			
	Completed high school	20	13.6
	Some Tare / apprenticeship	5	3.4
	Completed Tare / apprenticeship	7	4.8
	Some university degree	66	44.9
	Completed university	28	19.0
	Some postgraduate degree	12	8.2
	Completed postgraduate degree	6	4.1
	Missing Data	3	2.0
Ethnicity			
	Australian	60	40.8
	Aboriginal/TSI	2	1.4
	North American	27	18.4
	European	33	22.4
	African	2	1.4
	Asian	19	12.9
	Other	4	2.7

Note. *ns* = 67 men and 78 women (two participants did not indicate their sex).

The James Cook University Human Ethics Committee reviewed and approved the research proposal (see Appendix J for a copy of ethical approval). Online questionnaires were utilised as the primary method of data collection (surveymonkey.com). Participants were recruited from the JCU Psychology department

research pool. All individuals who were recruited through the JCU research pool were allocated course credit points, however general community members were not provided any compensation. All participation invitations and online postings (e.g., research pool) for recruitment informed participants of the nature of the study, anticipated end time, age restrictions, and provided contact information of both principle investigator and appropriate research supervisor (refer to Appendix K for a copy of the information sheet and Appendix L for the informed consent form).

Materials and Procedures

Participants were provided with a consent form prior to participating. This form acknowledged the aims of the study, while addressing issues related to confidentiality and participants' ability to withdraw or refuse to answer questions at any time. Following reading the information sheet and indicating their consent, participants were asked to answer questions regarding their personal demographic information. Participants then completed the budget allocation task. Participants were instructed to imagine the following situation: "you are talking with a member of the opposite sex in person and he/she is trying to secure a date with you". Participants were then provided with a list of ten traits and a specific quantity of lie avoidance tokens. The list contained ten different personal traits that one might lie about regarding themselves within a dating scenario in order to increase their chances of success with a potential partner. Using the specified number of lie avoidance tokens, participants distributed the tokens to finish the statement "I do not want to be tricked or lied to about their true…". Lie avoidance tokens were assigned to demonstrate the strength of their preference to avoid deception about each individual trait. Participants were instructed that distributing more tokens to a single topic would indicate a stronger preference to avoid that type of lie. Topics of lies were randomly ordered for each participant and specific examples

included health, history of infidelity, physical attractiveness, money earned or earning potential (financial resources), intelligence, how similar they feel they are to you, and age. This task was divided into two independent budgets restraints: a low budget (10 tokens, one token per lie) and high budget (30 tokens, three tokens per lie). Refer to Appendix *M* for example pages of the methodology. Finally, the two budgets were presented in random order to each participant to counterbalance the order of conditions and reduce possible carry-over effects

Study 3: Results

General Analyses and Descriptive Statistics

The data were screened for accuracy in data entry of responses, potential outliers, deviations from normality, SES effects, missing data, and violations of assumptions prior to inferential analyses. After ensuring the aforementioned factors did not play a role in the results, the analyses were undertaken as follows. A 2 (participant sex) x 2 (budget restriction) x 10 (trait type) mixed model ANOVA and planned comparisons were employed to test the proposed hypotheses. A significance level of .05 was generally employed but corrected for family-wise errors by adopting Bonferroni-corrected alphas when a significant number of multiple comparisons were undertaken. Token allocations were re-calculated into percentages of the total budget and implemented as the dependent measure. Mean percentages for both low budget and high budget token allocations across all ten traits are displayed in Table 9.2.

Low Budget Allocations: Determining Avoidance Priorities

In implementing a budget restriction, it was anticipated that potential differences in distribution patterns would be most evident when greater restrictions were incorporated into the participant's selection process (Li et al., 2002). Therefore, the hypotheses were analysed using the responses from the low budget conditions.

Table 9.2
Mean Percentage of Tokens Allocated to all Traits for Low and High Budget Restrictions (N = 145)

	Low Budget Mean (%)		High budget Mean (%)		Per cent change	
Characteristics	Men	Women	Men	Women	Men	Women
Tier I						
Health	31.10	36.95	26.04	32.76	–5.06**	–4.19**
Tier II						
Infidelity	14.51	18.86	13.77	19.32	–0.74	0.46
Tier III						
Physical attractiveness	11.02	7.34	10.36	3.36	–0.66	–3.98**
Financial resources	6.07	6.00	7.960	6.87	1.89	0.87
Intelligence	11.49	8.69	11.65	9.86	0.16	1.17
Tier IV						
Weight	3.05	1.74	4.01	2.70	0.96	0.96
Parenting	5.17	7.02	5.81	7.24	0.64	0.22
Feelings of Similarity	9.91	6.08	10.28	8.18	0.37	2.1**
Age	4.95	5.59	6.94	6.39	1.99*	0.81
Social Level	2.73	1.71	2.96	3.32	0.23	1.61**

Note. *ns* = 67 men and 78 women (two participants did not indicate their sex). *p < .05. **p < .01.

Table 9.3
Comparison of Preferences to Avoid Deception Regarding the Tier I trait (Health) versus all other Traits in Tier II-IV in the Low Budget Condition (N = 145)

	Low budget allocations			
Deceptive Traits	*M* (%)	*F (1, 143)*	η_p^2	*p*
Tier I (Health) vs.	**34.01**			
Tier II (Infidelity)	**16.74**	**70.15**	**.33**	**.0001**
Tier III	**8.40**	**156.14**	**.52**	**.0001**
Physical attractiveness	9.17	129.59	.48	.0001
Financial resources	5.97	185.35	.56	.0001
Intelligence	10.07	120.52	.46	.0001
Tier IV	**4.80**	**251.78**	**.64**	**.0001**
Feelings of similarity	8.10	152.18	.52	.0001
Parenting	6.03	193.52	.58	.0001
Age	5.34	242.14	.63	.0001
Weight	2.32	278.35	.66	.0001
Social Level	2.22	285.92	.67	.0001

Note. All comparisons of individual traits reflect a Bonferroni-corrected alpha ($\alpha = .05/9 = .005$). *M* (%) = Mean percentage of allocated tokens.

Tier I findings and comparisons. A planned comparison revealed that deception related to a potential partner's health (Tier I, $M = 34.01$, $SD = 20.11$) accounted for a significantly larger percentage of participant's low budget allocations compared to Tiers II-IV traits combined ($M = 9.96$, $SD = 1.61$), F (1, 143) = 162.61, $p < .0001$, $\eta_p^2 = .53$, one-tailed. Table 9.3 provides the statistical analysis of preferences

to avoid deception about one's health compared to each of the other recorded forms of deception within the low budget condition. Separate ANOVAS on the percentage of tokens allocated to each individual trait revealed all traits in lower tiers differed significantly from health (Table 9.3). While deception about health received the most tokens from both sexes, women (M = 36.95%, SD = 21.30) allocated a significantly greater proportion of their low budget to avoid health deception compared to men (M = 31.10%, SD = 18.43), F (1, 143) = 4.04, $p < .002$, $\eta_p^2 = .03$, one-tailed.

Table 9.4
Comparison of Preferences to Avoid Deception Regarding the Tier II trait (Infidelity) versus all other Traits in Tier III-IV in the Low Budget Condition (N = 145)

	Low budget allocations			
Deceptive trait	*M* (%)	*F(1, 143)*	η_p^2	*p* <
Tier II (Infidelity) vs.	**16.74**			
Tier III	**8.40**	**36.46**	**.20**	**.0001**
Physical attractiveness	9.17	24.03	.14	.0001
Financial resources	5.97	56.48	.28	.0001
Intelligence	10.07	17.63	.11	.0001
Tier IV	**4.80**	**99.44**	**.41**	**.0001**
Feelings of similarity	8.10	28.52	.17	.0001
Parenting	6.03	65.54	.31	.0001
Age	5.34	70.08	.33	.0001
Weight	2.32	123.61	.46	.0001
Social level	2.22	151.82	.52	.0001

Note. All comparisons reflect a Bonferroni-corrected alpha ($\alpha = .05/8 = .008$). *M* (%) = Mean percentage of allocated tokens.

Tier II findings and comparisons. In relation to the Tier II trait, men and women both identified infidelity as the second most preferred type of deception to avoid during the low budget condition. A planned comparison revealed that preferences to avoid lies regarding infidelity (Tier II, M = 16.74, SD = 12.96) accounted for a significantly larger percentage of low budget allocations compared to all other lower tier lies combined (M = 6.60, SD = 3.38), F (1, 143) = 65.68, $p < .0001$, $\eta_p^2 = .32$, one-tailed. Table 9.4 shows the low budget preferences to avoid lies about infidelity compared to all lower tier lies independently. Although lies about infidelity represented the second most selected item for both sexes, women (M = 18.69%, SD = 13.04)

distributed a significantly greater proportion of their low budget to avoiding deception related to infidelity compared to men (M = 14.46%, SD = 12.60), F (1, 143) = 3.93, p < .02, η_p^2 = .02, one-tailed.

Tier III findings and comparisons. Results revealed that preferences to avoid lies regarding Tier III traits combined (M = 8.40, SD = 6.28) accounted for a significantly larger percentage of low budget allocations compared to all Tier IV traits combined (M = 4.80, SD = 3.25), F (1, 143) = 65.68, p < .0001, η_p^2 = .20, one-tailed. Subsequently, each Tier III trait was analysed against all the Tier IV traits combined and planned comparisons tested individual predicted relationships. Table 9.5 presents the planned contrasts between each of the Tier III traits and the remaining five Tier IV traits using a Bonferroni-adjusted alpha (α = .05/5 = .01). In the restricted token condition, the simple effect of sex for each Tier III trait was examined. Men were predicted to allocate a greater percentage of their tokens to avoid deception related to an individual's attractiveness compared to Tier IV traits. This hypothesis was supported. Preferences to avoid deception related to an individual's attractiveness accounted for a significantly larger percentage of men's low budget allocations compared to all Tier IV traits combined, F (1, 66) = 13.96, p <.0001, one-tailed. As expected, the difference between the ratings of attractiveness and Tier IV traits was significantly greater for men than women, F (1, 143) = 2.87, p < .046, one-tailed. Men were also hypothesised to indicate higher deception avoidance preferences for deception related to an individual's level of physical attractiveness compared to women. In support of this hypothesis, men (M = 11.21%, SD = 11.60), more than women (M = 7.41%, SD = 7.76), indicated a significantly higher preference to avoid lies related to physical attractiveness in low budget conditions, F (1, 143) = 5.52, p < .010, one-tailed.

Table 9.5
Preferences to Avoid Deception about Attractiveness, Resources, and Intelligence (Tier III) Compared to Tier IV Traits (N = 145)

	Men		Women		Overall Mean	
Tier III trait vs.	*M* (%)	*F*(1,66)	*M* (%)	*F*(1, 77)	*M* (%)	*F*(1, 143)
Physical attractiveness	**11.22**		**7.41**		**9.17**	
Feelings of similarity	10.13	.18	6.35	.73	8.10	.62
Parenting	5.01	11.19*	6.91	.12	6.03	8.39*
Age	4.94	13.43**	5.69	1.76	5.34	14.28**
Weight	3.09	25.56**	1.66	37.84**	2.32	59.54**
Social level	2.91	25.77**	1.62	33.54**	2.22	57.40**
Total Tier IV	**5.22**	**13.96****	**4.44**	**10.37***	**4.80**	**25.11****
Financial resources	**6.15**		**5.81**		**5.97**	
Feelings of similarity	10.13	2.94	6.35	.13	8.10	2.85
Parenting	5.01	.55	6.91	.61	6.03	.001
Age	4.94	.56	5.69	.01	5.34	.406
Weight	3.09	4.76	1.66	19.80**	2.32	19.27**
Social level	2.91	5.41	1.62	18.04**	2.22	19.73**
Total Tier IV	**5.22**	**.49**	**4.44**	**1.90**	**4.80**	**1.98**
Intelligence	**11.66**		**8.69**		**10.07**	
Feelings of similarity	10.13	.38	6.35	3.14	8.10	2.05
Parenting	5.01	15.14**	6.91	1.81	6.03	15.59**
Age	4.94	15.05 **	5.69	4.58	5.34	19.41**
Weight	3.09	26.59**	1.66	41.44**	2.32	64.74**
Social level	2.91	29.15 **	1.62	66.54**	2.22	79.97**
Total Tier IV	**5.22**	**17.20****	**4.44**	**20.02***	**4.80**	**36.61****

Note. All comparisons of individual traits reflect a Bonferroni-corrected alpha (α = .05/5 = .01). *n*s = 67 men and 78 women (two participants did not indicate their sex). *$p < .01$. **$p < .001$.

Additionally, women were hypothesised to distribute a significantly greater percentage of their tokens towards avoiding lies about financial resources compared to Tier IV lies. The results did not support this prediction. In the low budget condition, women did not allocate a greater percentage of their tokens towards deception related to financial resources compared to all Tier IV lies combined, F (1, 77) = 1.90, *ns*. The results also failed to support the expectation that this difference would be greater for women than men, F (1, 143) = .07, *ns*. Further, women were anticipated to indicate higher preferences to avoid deception related to financial resources compared to men. This hypothesis was also not supported. Women (M = 5.81%, SD = 8.43) did not indicate a significantly higher preference to avoid lies related to financial resources in low budget conditions compared to men (M = 6.15%, SD = 10.20), F (1, 143) = .05, *ns*.

Overall, tokens allocated towards deception related to an individual's intelligence constituted a significantly greater percentage of men's (F (1, 66) = 13.96, p < .0001.) and women's (F (1, 77) = 10.372, p < .002.) low budget allocations compared to all the Tier IV lies combined. As anticipated, the difference between the ratings of intelligence and Tier IV traits was equivalent between men and women, F (1, 143) = 1.54, *ns*. Additionally, intelligence was expected to be equally valued by both sexes. As predicted, a significant difference was not observed between the preferences of men (M = 11.66%, SD = 11.48) and women (M = 8.69%, SD = 8.08) to avoid deception related to a partner's intelligence, F (1, 143) = 3.31, ns.

Table 9.5
Sex Differences in Preferences to Avoid Deception about Attractiveness, Resources, and Intelligence (N = 145)

	Men		Women		Sex diff	
Tier III trait	*M* (%)	*SD*	*M* (%)	*SD*	*F(1, 143)*	*p*
Physical attractiveness	11.21	11.60	7.41	7.76	5.517	.01
Financial resources	6.15	10.20	5.81	8.43	0.047	.41
Intelligence	11.66	11.48	8.69	8.08	3.313	.07

Differences in Allocations between Low and High Budgets

Table 9.2 also presents the differences in percentages of tokens allocated in the low versus high budget conditions. Tier I was predicted to receive an increased emphasis when the budget was restricted and participants were predicted to reduce this emphasis as restrictions were lifted. Specifically, the trait classified under Tier I was expected to be allocated a significantly lower percentage of tokens in the high budget compared to the low budget condition. The opposite was hypothesised for Tier IV lies, in particular, those lies were expected to receive an increased percentage of the budget when restrictions were lifted. Figure 9.1 displays the differences in percentages for each tier from the low budget to the high budget condition for all participants.

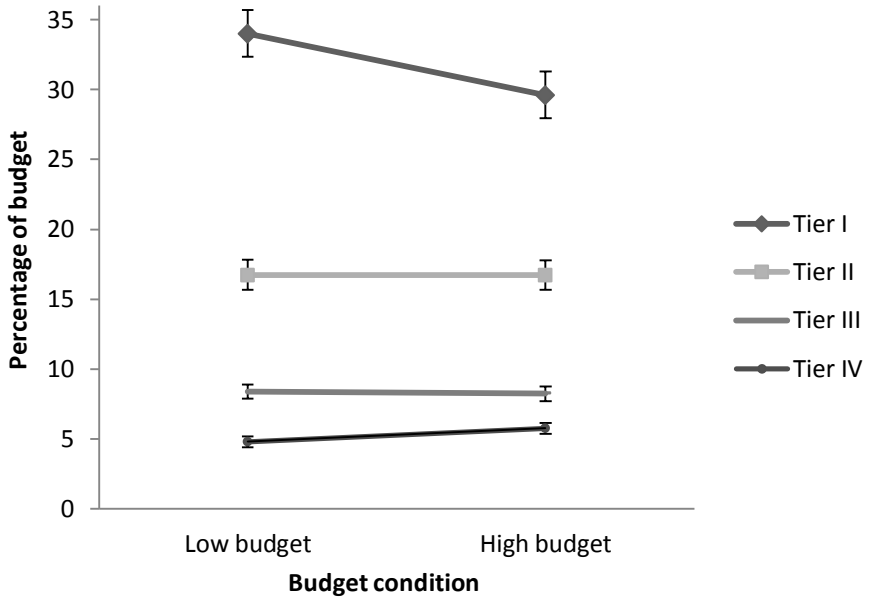

Figure 9.1. Average proportion (± SE) of tokens allocated to each tier across high and low budget conditions for all participants (*N* = 145*)*

Paired-samples t-tests were utilised to examine the effects of budget on each of the traits for both men and women separately, as some trade-offs were expected to be sex-specific. Traits in Table 9.2 resulting in an overall negative change are those lies that proportionally decreased as budgets become more generous. Conversely, overall positive changes in token allocations between budgets represented a proportional increase in distribution from the low to high budget condition.

Men's Trade-offs

The percentage of men's tokens allocated to deception related to health significantly decreased from the low budget condition (M = 31.10, SD = 18.43) to the high budget condition (M = 26.04, SD = 16.86), t (64) = 3.27. $p < .002$. Conversely, men allocated a greater percentage of their tokens to deception related to age in the high budget (M = 6.94, SD = 6.65) compared to the low budget (M = 4.95, SD = 7.37), t (64) = 1.97, $p < .05$. However, this result failed to achieve significance at the Bonferroni-adjusted alpha level ($\alpha = .05/10 = .005$).

Women's Trade-offs

The percentage of women's tokens distributed to deception associated with health significantly declined from the low budget condition (M = 36.95, SD = 2.30) to the high budget condition (M = 32.76, SD = 19.30), t (73) = 3.60. $p < .003$. Women's preferences to avoid deception related to physical attractiveness also significantly decreased from the low budget (M = 7.34, SD = 7.70) to the high budget (M = 3.36, SD = 4.35), t (73) = 4.84, $p < .0001$. Conversely, women's preferences to avoid deception related to social level significantly increased from the low budget (M = 1.71, SD = 4.09) to the high budget (M = 3.32, SD = 4.39), t (73) = 3.06, $p < .003$. Further, women's preferences to avoid deception related to similarity increased from the low budget (M = 6.08, SD = 7.92) to the high budget (M = 8.18, SD = 7.23), t (73) = 3.06, $p < .009$, however, failed to attain significance at the Bonferroni-adjusted alpha level ($\alpha = .05/10 = .005$).

CHAPTER 10
STUDY 3: DISCUSSION

The current study tested a series of hypotheses that preferences to avoid specific types of deception were strategically (hierarchically) ordered. Men's and women's preferences to avoid deception were expected to vary as a function of the cost to the receiver that would result from failed detection. This study provides a unique addition to the deception detection literature, in that preferences to avoid being deceived about another person's traits were evaluated hierarchically, instead of single traits being compared independently. The current methodology measured the degree with which participants preferred to avoid lies about different characteristics of potential partners. The traits involved were selected based on previous literature and theory to represent a reasonable sample of qualities individuals may falsify during mate selection.

Preferences to Avoid Deception

Avoidance preferences were measured across two different budget restraints (high and low) so they could be compared. Participants allocated limited tokens across a selection of traits to indicate their preference to avoid being deceived about each trait. Employing budget restrictions also circumvented the potential problem of participants wishing to avoid every kind of deception in its entirety and forced them to choose. Based on evolutionary reasoning, the ten mate selection traits employed were expected to fall into one of four hierarchical tiers. Traits that participants greatly preferred not to be deceived about were expected to receive an increased percentage of token allocations. Characteristics in higher tiers were hypothesised to be allocated a significantly greater percentage of the tokens in the restricted budget condition compared to the traits represented in the lower tiers. It was also predicted that as resources and choices became more generous, individuals would begin to trade off

portions of higher tier avoidance preferences to incorporate a more inclusive defence against the range of deception that exists (without sacrificing the structure of the hierarchy).

Patterns within Low Budget Allocations for Tier I

When implementing a budget system into a participant's selection process, it was predicted that differences in allocation patterns would be most distinct when heavy limitations are utilised (Li et al., 2002). The highest tier items (Tier I) were hypothesised to incorporate topics of deception related to the greatest potential costs an individual may encounter. Deception related to physical or sexual health issues affects all aspects of life and could result in extremely costly missed detections that may affect an individual's ability to survive. Additionally, if a Tier I trait failed to be detected the victim may endure heavy fitness costs in terms of their ability to produce or nurture offspring. Therefore, deception related to health was predicted to receive the largest proportion of participants' deception avoidance tokens when compared to the remaining three tiers. The results of the study supported this hypothesis and showed that, within a restricted budget, both men and women wished to avoid lies about a potential date's health more compared to lies about all other traits. Overall, participants allocated 34% of their tokens towards avoiding health related deception.

Deception designed to covertly conceal health issues or a partner's reduced physical capacity was a major adaptive problem for our species. Individuals may conceal immunological vulnerabilities, engaging in unhealthy risky behaviours, and limitations resulting from current or on-going health concerns. Therefore, our ancestors were those individuals who acquired and utilised a systematic process to circumvent deception about a partner's health. Although efforts may be made to conceal health issues some observable cues may still be produced that may be directly detected by the

receiver. Despite the potential leakage of evidence of the health status of the speaker, the results of the present study indicated that great emphasis was placed on avoiding deception related to health issues. The results supported the proposition that avoidance preferences were hierarchically structured in relation to the potential costs of a missed detection. Deception related to physical and sexual health constitutes heavy potential costs following a missed detection. To combat this, participants paired deception carrying greater potential costs (Tier I) with heightened preferences to avoidance these types of deception. Participants allocated approximately one-third of their tokens to avoid deception related to health. Moreover, Tier I received twice as many tokens as Tier II and included a greater percentage of allocations than all three Tier III traits combined.

Sex Differences in Tier I Allocations

The Lie Index generated in Study 2 revealed that men and women had similar perceptions about the frequency and difficulty of detecting lies regarding a selection of traits. However, the results of this final study demonstrated that the extent to which men and women prefer to avoid those types of deception may differ significantly. The current results indicated that participants wished to avoid deception related to health most of all, with men (30.43%) and women (37.17%) both allocating a significant proportion of their budget to this trait. While men and women distributed the most tokens towards avoiding lies about health, a significant sex difference was found between men and women's allocations. Women were found to allocate a significantly greater number of their tokens than men to avoid deception related to health. Specifically, within a restricted budget, women allocated an additional 5.85% of their tokens towards avoiding deception related to health compared to men. This difference

in avoidance preferences is suggested to result from the asymmetry in parental investment (Bateman, 1948; Buss, 1989b; Symons, 1979; Trivers, 1972).

While avoiding concealed health issues from a potential partner should be important to both sexes, health concerns potentially have an asymmetrical effect on women's and men's reproductive abilities. Women have a greater initial physiological investment in their offspring than men (internal gestation, shared nutrition, and early child care; Bateman, 1948; Buss, 1989b; Symons, 1979; Trivers, 1972). Therefore, the health and early development of an offspring may be more heavily dependent on the health of the mother than the father. Women have been found to prefer men with evidence of immunocompetence. Women who successfully mated with a man of greater immunocompetence would receive fitness benefits when passing them on to their offspring. Therefore, any undetected concealments of an immunodeficiency would result in fitness losses. Undoubtedly, women may not "catch" the immunological vulnerabilities or health limitations falsified or concealed by men. However, in addition to the costs of passing inferior immunocompetence to their offspring, women may suffer further reproductive costs if the man is unable to acquire sufficient resources or provide parental care due to immunological limitations. As predicted, the results of this study indicated that women compensated for this asymmetry in potential costs of health related deception by demonstrating a greater preference to avoid such dishonest acts compared to men.

Patterns within Low Budget Allocations for Tier II

The second tier represented deception by which a missed detection would affect an individual's ability to pass on their genes to the successive generation. Losing a mate or an abundance of resources to a non-genetically related third party mate as a result of infidelity could have severe consequences for both men and women. Women

benefit greatly from pursuing and obtaining partners who possess an abundance of resources and are willing to share them (Buss, 1989b; Buss & Schmitt, 1993). Women's partners who engage in episodes of infidelity divert portions of potential resources (e.g. time, money, or energy) to competing women. Additionally, men face paternal uncertainly should their partner engage in covert infidelity, potentially resulting in heavy investments towards non-biological children. Therefore, it was hypothesised that infidelity would constitute a greater proportion of the low budget allocations compared to Tier III and Tier IV traits. The results supported this hypothesis and indicated that both men and women allocated the second highest percentages of their tokens to deception related to infidelity. Approximately 17% of overall token allocations were distributed towards avoiding deception related to infidelity.

Sex Differences in Tier II Allocations

Both women (18.69%) and men (14.46%) indicated infidelity as the second most preferred type of deception to avoid. However, differences were found in the extent to which each sex preferred avoiding this type of deception. Female participants indicated a greater preference to avoid deception about infidelity compared to their male counterparts. In particular, women distributed 4.23% more of their low budget tokens towards avoiding deception related to infidelity compared to men. This difference in avoidance preferences is also suggested to result from a disparity in optimal mating strategies (Buss, 1989b; Buss & Schmitt, 1993).

Individuals who engage in external romantic or sexual relationships indicate to their mate that there is a decreased probability of a long-term commitment. Buss (2003) suggested that the deceptive pursuit of external relationships was more likely part of a short-term mating strategy, which infringed on the likelihood of forming committed

relationships. Haselton and colleagues (2005) reported that overall, women experienced greater feelings of upset following the discovery of a concealed external relationship. Haselton and colleagues predicted that women experienced these negative feelings more than men due to the increased interference infidelity imposes on their preferred strategies (long-term mating). While men may still endure a reasonable level of reproductive costs or strategic interference as the victim of infidelity, these costs remain inferior to those costs potentially inflicted on women.

The results of the current study showed that both men and women highly prefer to avoid deception related to infidelity. However, women demonstrated a significantly greater preference to avoid deception about infidelity compared to men. This sex difference is consistent with Haselton and colleagues' (2005) finding that women are more negatively affected by infidelity. The participants in this study responded to the generic construct of infidelity, however more specific types of infidelity may produce stronger, or perhaps, different results. Sex differences have reported between the negative feelings experienced following explicitly emotional or sexual infidelity. When an episode of infidelity is particularly sexual in nature, men have been found to experience greater emotional upset (Haselton et al., 2005). While women have complete certainty of their maternity, sexual infidelity greatly compromises paternity confidence. Reduced paternal certainty increases the likelihood of investing in non-biological children and acts as a great source of interference to a man's mating strategy. Therefore, sexual infidelity has been found to produce greater upset in men than women. However, women's mating strategy involves a greater emphasis on acquiring a resource abundant mate (Buss, 1989a). Haselton and colleagues also suggested that, while men and women face fitness losses from their mate developing an external emotional relationship, women risk their partner diverting their economic resources to

other women. As a result, women have been reported to experience greater negative feelings following the discovery of their partner concealing external emotional involvements (Haselton et al., 2005). These findings suggest that women may prefer to avoid deception regarding emotional infidelity, whereas men may have increased concerns about being deceived about sexual fidelity. Future research may be required to confirm directly these anticipated sex differences in preferences to avoid deception related to emotional versus sexual infidelity.

Patterns within Low Budget Allocations for Tier III

Tier III focused on the falsification of three traits that Li and colleagues (2002) considered essential mate selection qualities. Three different characteristics have been suggested to represent this tier; fecundity in women (physical attractiveness), male ability to invest in offspring (financial resources), and the ability to solve problems (intelligence; Li et al., 2002). Two of these traits were predicted to be sex-specific; with physical attractiveness categorised as essential to men's mating criteria and financial resources essential to women's mating criteria. Li and colleagues found that intelligence was an essential mating criteria for both men and women.

Men's ratings of attractiveness. Tier III included deception directed towards falsifying physical attractiveness. While many traits may influence the likelihood of producing offspring, these qualities face diminishing utility if the mate is not fertile. Based on an evolutionary model, Li and colleagues (2002) proposed that when choices are limited, verifying fertility should be crucial for men during mate selection. Buss (1989a) suggested that observable traits related to a women's fertility contribute to a woman's attractiveness and have become an evolved preference of men. Consequently, modern men tend to desire attractive mates. Therefore, if women alter their appearance in ways to improve their attractiveness and hide their natural features they could

increase the likelihood of securing a higher quality mate. As a result, men were expected to possess a greater desire to avoid deception related to physical attractiveness compared to women. Overall, men allocated 11.22% of their tokens to avoid deception about physical attractiveness, while women allocated only 7.41%. Among the Tier III traits, attractiveness was the only trait found to elicit a sex difference. Buss (2007) suggested that although physical attractiveness was still expected to be valued by women, due to its relationship with health, the qualities that women desire, such as resources, are not as heavily correlated with physical attractiveness. Therefore, while Buss proposed that physical attractiveness is valued by both men and women, findings indicate that it is more strongly incorporated into the selection criteria of men. The current findings corroborate the previous findings by indicating that men also prefer to avoid deception related to attractiveness more than women. Consistent with the increased preference men place on an attractive mate, men compared to women also exhibited an increased preference for honest displays of attractiveness from potential mates. Further results indicated that men distributed a significantly greater percentage of their tokens towards avoiding deception with regard to attractiveness compared to Tier IV lies.

Women's ratings of financial resources. The second trait associated with Tier III is deception related to misrepresenting financial resources. While women's reproductive resources may be more connected with health and fertility, men's reproductive value is more intimately tied to their capacity to supply economic resources (Buss, 1989b; Symons, 1979). Accordingly, a women's success in mating is related to her ability to acquire a mate with an abundance of resources, which involves avoiding men attempting to fictitiously enhance their level of resources. In this study, women were expected to indicate a higher preference for avoiding deception associated

with financial resources compared to men. However, no sex differences were found with regard to preferences to avoid deception related to financial resources. Failing to support the predicted sex difference, this finding suggests that men and women equally value honest displays of financial resources. Additionally, the results of this study revealed that preferences to avoid deception related to an individual's financial resources did not result in a larger percentage of women's low budget allocations compared to auxiliary Tier IV traits collectively. Moreover, female participants allocated slightly less than 6% of their restricted budget towards avoiding deception related to resources.

Haselton and colleagues (2005) examined emotional reactions to deception. Their sample (approximately 19 years old) where of similar ages as the sample currently under analysis (approximately 22 years old). Their findings revealed that only 9% of men and 12% of women experienced the deceptive exaggeration of resources from a short-term partner ($p = .44$). Male and female participants in their study were not found to experience significantly different negative emotions from the discovery that a short-term partner had deceptively exaggerated their resources. However, Haselton and colleagues reported that only 4% of men and 11% of women experienced deceptive exaggerations of resources from long-term partners ($p < .01$). While women experienced significantly more deceptive exaggerations of resources than men from long-term partners, only 11% of women experienced this type of deception.

The women who had experienced long term partners exaggerating resources reported greater emotional upset than men. Strategic interference theory suggests that the stronger the negative emotion the greater the likelihood that emotion would serve to motivate the individual to reduce or remove the source of interference (e. g. deception). According to Haselton and colleague's (2005) findings, only the evaluation of long-

term partners produced a significant difference in emotions experienced from resource deception. The lack of a sex difference in preferences to avoid deception related to resources in the present findings may have resulted from not distinguishing between deception occurring in long-term versus short-term relationships. Future studies should investigate preferences to avoid deception from potential long-term and short-term mates. It would be expected that women's preferences to avoid resource deception would be greater than men's when evaluating potential long-term partners compared to short-term partners.

Intelligence. The final trait representing the third tier involves deception related to an individual's intelligence. While previous research indicated sex differences existed in relation to desiring attractive or resource abundant mates, Li and colleagues (2002) suggested intelligence is an essential mating preference for both sexes. Barkow (1989) posited that the quality of intelligence may signify other important traits, such as adaptability to a changing environment, parenting skills, and the aptitude to contend with competitors. Mates with reduced intelligence will endure hardships within the demands of social interactions and burdens of parenting offspring. Strong evidence has been found that variations in intelligence are heritable, therefore, any resulting advantage (or handicap) is likely to be passed to any offspring produced (Gray & Thompson, 2004; Miller, 2008). As intelligence has been suggested as an essential trait for both men and women when selecting a mate, deception related to intelligence was expected to receive a significantly greater proportion of low budget allocations than the Tier IV traits. The results indicate that intelligence accounted for a significantly larger percentage of both men and women's low budget token allocations compared to Tier IV traits. Overall, approximately 10% of the participants' tokens were utilised to indicate their preference to avoid deception that was aimed at falsifying a

potential partner's level of intelligence. As expected, men's and women's preferences to avoid deception related to intelligence were not significantly different.

Tier IV Allocations

Tier IV traits consisted of lies relating to auxiliary traits. These included deception about parenting skills, social level, age, weight, and feelings of similarity. Collectively, these traits constituted the smallest average percentage of allocations. Preferences to avoid deception related to parenting and parenting skills received approximately 6% of token allocations. Approximately 2% of tokens were distributed to avoid deception related to an individual's social level, while on average 5% of tokens were utilised to avoid falsifications of age. Additionally, around 2% of tokens were used to indicate a preference to avoid deception related to another's weight. However, an unexpected finding was recorded in relation to the final Tier IV trait. Post hoc comparisons revealed that preferences to avoid deception related to feelings of similarity where not significantly lower than any of the Tier III traits. Approximately 8% of tokens within the low budget were used to indicate the preference to avoid deceptive feelings of similarity.

The initial prediction that feelings of similarity would produce lower deception avoidance preferences was based on the findings that feelings of similarity generated average levels of emotional upset following the discovery of deception (when compared to a series of other factors related to mate selecetion). Haselton and colleagues (2005) measured the negative emotions involved following discovered deception related to feelings of similarity. These researchers defined one of their measures of exaggerated compatibility as "he/she led you to believe that you and he/she had many things in common when he/she knew you did not" (p. 21). Their results revealed that deception related to feelings of similarity only produced average to below

average emotional upset from participants. In addition, both men and women equally experienced negative emotions (upset) following the discovery that a partner deceptively exaggerated his or her compatibility (Haselton et al., 2005). The negative responses experience from deception related to feelings of similarity was part of the rationale for assigning this trait to Tier IV rather Tier III.

Similar to the findings of Haselton and colleagues (2005), the present results did not reveal a sex difference in preferences to avoid deception related to feelings of similarity. However, participants were found to place a greater overall emphasis on the avoidance of falsified feelings of similarity than anticipated. While initial expectations categorised feelings of similarity in Tier IV, participants' token allocations indicated it may be better placed as a Tier III trait. The results indicated that there was not a significant difference in the distribution percentages when similarity was compared to attractiveness, intelligence, and financial resources. In fact, participant's overall allocations indicated a greater preference towards avoiding false feelings of similarity than they did towards deception related to financial resources. While economic resources are a universal mate preference for females, previous research has found that feelings of similarity are commonly evaluated during mate selection (Buss, 2007; Haselton et al., 2005). Thiessen and Gregg (1980) referred to this desire for individuals to mate with others who share high levels of similarity between traits as positive assortative mating.

It is possible that emotional reactions may not serve as an intrinsic or reliable predictor for deception avoidance behaviours. Strategic interference theory (Buss, 1989a) suggests that one function of negative emotional responses is to motivate actions that will reduce or eliminate future sources of strategic interference. This may suggest that individuals with increased frequencies of interference would be more

motivated to *avoid* deception. This may indicate that previous experience with specific forms of deception would influence preference to avoid deception. The findings of this study reveal an inconsistency between the traits an individual prefers to avoid deception about and levels of negative emotions as documented by Haselton and colleagues (2005). They reported that following the discovery of deception from a potential long-term partner both feelings of similarity and age produced fairly equivalent and below average levels of negative emotions. However, the results of the current study showed that participants had a much greater preference to avoid deception related to feelings of similarity (8.1% token allocation) compared to age (5.4%). Pawlowski and Dunbar (1999) found that age deception typically occurs in populations of individuals substantially older (35 to 50 years) than those in the present study (average age of approximately 22 years old). Therefore, age might not be a relevant form of strategic interference yet for the present sample. Consistent with strategic interference theory, deception related to feelings of similarity may be more salient or relevant to the previous experience of the present sample rather than deception related to age and thus ranked higher in the hierarchy.

In summary, participants indicated a greater preference to avoid deception related to feelings of similarity than anticipated. While this study employed the broad measure of "feelings of similarity", to gain a more comprehensive understanding of this finding future research should investigate the preferred avoidance of the feelings of similarity between specific traits. In addition, the relationship between the intensity of negative emotions experienced as a result of deception and the subsequent avoidance of future deception should be explored. Finally, to examine the influence of increased exposure to deception, personal experiences with deception should be measured and controlled.

Trade-Offs in **Avoidance Preferences**

Participants were predicted to allocate a greater percentage of their tokens towards more costly forms of deception (higher tiers) and this pattern was expected to be most pronounced when choices were restricted. Conversely, as resources and choices became more generous, the strict focus on higher cost deception was expected to lighten in the form of trade-offs. Following the acquisition of sufficient token allocations, higher tier items undergo decreasing marginal utility as budgets become more generous (Li et al., 2002). In the high budget condition, higher tier items were predicted to decrease (compared to the low budget condition) in the overall percentage of tokens they receive. Therefore, the decrease in allocations of tokens towards higher tier items should result in an increased distribution in the lower traits. Auxiliary items, which were primarily disregarded during low budgets, were predicted to receive an increasing proportion of the budget as resources become more available. Directly investigating the trade-offs and identifying the strategic hierarchy of deception avoidance preferences may assist in understanding some of the elements of the assessment processes that help guide behaviours in mating.

Men's Trade-offs

When choices were more restricted, it was proposed that individuals would employ strategies that more actively avoided forms of deception that inflicted greater costs (higher tier items). As budget constraints were lifted, individuals were predicted to systematically incorporate more auxiliary traits into their allocations to produce a more inclusive strategy. However, an increase in allocations towards one trait is the product of a decrease in allocations towards another trait. Maintaining a strategy that only integrates the avoidance of extremely costly forms of deception would result in a higher frequency of missed detections related to auxiliary traits. When resources were

restricted, focusing awareness towards higher costs items may have resulted in the safest strategy. As restrictions were removed and additional tokens were available, it was proposed that allocating more tokens towards health (Tier I) may not be as beneficial as failing to allocate more tokens to age may be costly.

The results of this study revealed that the percentage of tokens allocated to deception related to health by men significantly decreased from the low budget condition to the high budget condition. When resources (tokens) were more restricted, men's preferences to avoid deception related to health were more prevalent. However, as budget constrictions were lifted, men began to engage in trade-offs, whereby token allocations showed an increased preference for avoiding specific auxiliary traits. In particular, the number of tokens men allocated to avoid deception related to health decreased by approximately 5% in the high budget condition compared to the low budget condition. Additionally, the results indicated that men allocated a greater percentage of their tokens to deception related to age in the high budget compared to the low budget condition (approximately 2% increase). However, it is important to note that while this finding approached significance ($p < .05$), statistical analysis failed to reach the Bonferroni-corrected alpha. This strong tendency to trade off avoidance preferences towards health to include an auxiliary trait such as age may serve as a defence mechanism in employing a more inclusive strategy against deception.

While men use attractiveness as a reasonable measure of fertility, a women's age may be used to indicate the length of time she will remain fertile (Buss, 1989b, 2007). Upon surveying married couples across 29 separate cultures, men universally desire women who are of a younger chronological age than themselves (Buss, 1994; Kenrick & Keefe, 1992). The age gap between partners during an individual's first marriage was reported to be an average of three years. However, as divorce occurs and

individuals remarry, the gap between men and women continues to grow, men always remaining women's senior. When men remarried for a second time, they were typically five years older, and this gap expanded to an average of eight years older at a third marriage (Buss, 1994; Kenrick & Keefe, 1992). As men re-enter the mating market, they still desire a mate who has lasting potential fertility. The results of the current study indicated that, within a restricted budget, men focused heavily on deception relating to attractiveness. However, as the restrictions were removed men started to trade off portions of their higher tier tokens. This trade-off indicated the preference for increased protection against deception in regards to the longevity of fertility in the form of an increased allocation of resources to avoid falsifications of age.

Women's Trade-offs

Women were also found to make specific trade-offs incorporating additional auxiliary traits when the budget was shifted upward. Women's token allocations indicated that two traits received a decreased percentage of the budget, while two other traits received an increased proportion of the budget, as budget restrictions were lessened. Women were found to trade-off a portion of their efforts to avoid deception associated with health and attractiveness. In particular, the percentage of women's tokens distributed to deception related to health significantly declined from the low budget condition compared to the high budget condition. Similar to men, women's token allocations towards preferences related to health decreased by 4% following the shift from a low to high budget. In addition, women's preferences to avoid falsification of physical attractiveness also significantly decreased (approximately 4%) from the low budget to the high budget condition. Conversely, token allocations to avoid deception associated with social level and similarity were higher in the generous budget condition. While constituting only a minimal percentage of low budget allocations,

results revealed that women almost doubled their allocations towards avoiding a falsified social level in the high budget condition. Additionally, women's preferences to avoid deception relating to feelings of similarity displayed a strong trend to increase (approximately 2%) from the low budget condition to the high budget condition. However, this finding did not reach statistical significance at the adjusted alpha level.

Women's observed trade-offs (as constraints are lifted) are suggested to be a method to incorporate additional sex-specific auxiliary traits to potentially reduce overall costs. When choices were less restricted, it is suggested that elevated avoidance (increased protection) of deception associated with health was not as helpful as decreased protection against deception related to social level was costly. This pattern also emerged in the allocation patterns of attractiveness in women. Women were also found to make a considerable trade-off of attractiveness to incorporate increased protection against additional traits. While women have been found to universally prefer men who have an abundance of resources (e.g., Buss, 1989b; Hill, 1945; McGinnis, 1958; Sprecher, Sullivan, & Hatfield, 1994), the ability to acquire resources is suggested to be gauged by a man's characteristics such as social status (Symons, 1979), also referred to as social level (Li et al., 2002). Previous research indicates that women desire resources, and a man's social level may serve as a useful cue when attempting to determine his potential for future resources (Symons, 1979). In addition, a man's occupancy higher on the social hierarchy may also indicate a greater stability of current and future resources than men lower in the social hierarchy. Therefore, while women's initial search involves the acquisition of a man with an abundance of resources, the ancillary pursuit involves securing men that have the access and ability to acquire additional resources in the future. Therefore, results revealed that as restrictions were lifted women traded off traits such as health and attractiveness to integrate greater

protection against deception indicating a false likelihood of future resources. In summary, when resources were less restricted, women indicated an increased preference for long-term resources in the form of avoiding deception related to a man's social level.

Hierarchies within Hierarchies

The results of this study provided support for the notion that human mental processes, in many cases, operate within a hierarchy of strategic necessities and preferences. The results indicated that higher tiers of deception were matched with appropriately higher levels of avoidance preferences. As an initial investigation into the structuring of avoidance behaviours, this study used general traits that are likely to embody a broad spectrum of additional sub-traits. I suggest that within each construct an internal hierarchy strategically guides the perceptions of the traits that constitute the greater construct. For example, within the context of human being's basic need for food, not all food is equally nutritious. Because food items vary in nutritional value, individuals are likely to employ a structured hierarchy of preferences during their pursuit of food. The classic food pyramid diagram demonstrates one example of how a general category such as food may contain internal aspects that are strategically preferred. Similar principles are expected to be operating within the traits utilised in this study.

Each trait measured in this study may involve multiple aspects or sub-traits. Not all forms of deception with the subgroups of an individual construct are expected to cause equal consequences should that deception fail to be detected. While the general construct is comprised from the average of all its internal subgroups, within each of these subcategories of deception, avoidance preferences are predicted to fluctuate to match the varying cost associated with the missed detection. For example, within the

construct of infidelity, an internal hierarchy is expected to exist within the avoidance preferences towards the variety of behaviours that constitute infidelity. There are many facets of infidelity that may be deceptively concealed. An individual may deceptively conceal the degree of emotional or sexual involvement, commencement or termination dates, the number of different partners, and various other issues. Although the full list of possibilities for concealing aspects of infidelity is much longer, it is suggested that these facets of infidelity vary in potential costs. Consistent with the theoretical structure of the Lie-rarchy the subcategories within each trait are expected to be strategically organised in relation to deception avoidance preferences in efforts to eliminate cost and facilitate rewards. To advance the findings of the current research, future research should investigate the suggested internal hierarchies of avoidance behaviours within individual constructs.

Summary and Significance of Study 3

Differing mating strategies and the use of deception by potential mates imposed adaptive problems for individuals over evolutionary time, resulting in the evolution of increasingly intricate strategies and counter-strategies. The current study posited the existence, and provided evidence, of a cost-dependent hierarchy within deception avoidance processes related to potential mate selection criteria. Preferences to avoid deception were found to be greatest for traits that if falsified, produced the greatest costs. In addition, variations in avoidance preferences were also found for specific traits when budgets were less constrained. Participants placed an increased importance on costly deception, which resides higher in the hierarchy, when choices were constrained and lowered their emphasis on these traits as restrictions were lifted. Some traits lower in the hierarchy that received a smaller percentage of tokens with the restricted budget, incurred an increased level of importance and tokens as resources increased.

The findings of this last study build on the findings of Study 1, which proposed that costly traits bias the perception of truthfulness. While Study 1 and Study 2 revealed that judgements of another's potential veracity may largely be a product of biased perceptions of the characteristics of the receiver (Study 1) and the speaker (Study 2), the present study also provided strong evidence that the trait being evaluated systematically influences perceptions of veracity. The following chapter will critically appraise the findings from all three studies and propose a general cognitive model of deception avoidance. This model will integrate the results from the present study along with the findings of Study 1 and 2 to exemplify and predict patterns in perceptions of deception.

CHAPTER 11
GENERAL DISCUSSION

This research project tested a series of hypotheses proposing that specific characteristics of a speaker and a receiver influence who is perceived to be deceptive and their level of deceptiveness. Study 1 was conducted with the general expectation that perceptual errors (Type I or Type II) occur while judging communications of unknown veracity. A relationship between the type of perceptual errors employed in the evaluation of deception and potential reproductive costs was also expected. Following a situation where an individual is uncertain as to the veracity of a statement, individuals are left to produce two types of errors; Type I and Type II (Green & Swets, 1966). To review: The production of Type II errors, commonly referred to as being truth-biased, signifies that an individual is evaluating incoming information predominately erring on the side of honesty (McCornack & Parks, 1986). This error was originally titled the truthfulness-bias by Zuckerman and colleagues (1981, 1984), but is now generally termed the truth-bias (McCornack & Parks, 1986). Internal perceptions that are biased towards truthful responses typically result in an increased accuracy for truthful messages (The veracity effect; Levine et al., 1999), and consequently a reduced accuracy in detecting deceptive messages. Although humans are fundamentally truth-biased, the present series of studies was based on the supposition that internal perceptions strategically fluctuate to assist in avoiding deception potentially inflicting non-trivial costs.

Study 1 tested the proposition that the likelihood of generating Type I and Type II errors was dependent on the severity of the reproductive costs involved. Women in general, but especially those not in committed relationships, primed with low mate value, and evaluating biographical statements made by men were expected to be at risk

of suffering greater reproductive costs. Conversely, men, but primarily those in committed relationships, primed with high mate value, and judging neutral statements unrelated to a partner's mate value were theorised to be at lower risk of reproductive costs. The production of Type I (over-inference of deception) or Type II errors (over-inference of honesty) were represented by participants' assumptions of honesty or dishonesty in evaluating messages of undetermined veracity. Differences in the perception of deception were identified between individuals as reproductive costs became increasingly asymmetrical. The findings clearly indicated that individuals systematically incorporated increased levels of Type I errors as costs increased.

Previous researchers proposed that costs resulting from errors in judgements of truthfulness were asymmetrical in single individuals and those in committed relationships, with single individuals at risk of greater reproductive costs (Johnson et al., 2004). Study 1 showed that when evaluating biographical information about a potential mate, single individuals and those in committed relationships did not perceive equivalent levels of deception. In particular, the group at risk of greater reproductive costs (single individuals) committed a higher number of Type I errors (reduced truth-bias) during the evaluation of potential deception in order to increase the likelihood of avoiding deception, whereas those in committed relationships generated more Type II errors and remained more truth-biased.

Study 1 also investigated the effects of priming high and low mate value on perceptions of veracity. Priming utilises implicit memory to influence the decision-making process and has been suggested to transpire outside the conscious mind (Jacoby, 1983). Individuals mating with a high mate value partner would endure fewer reproductive costs than individuals mating with a low mate value partner. Therefore, those primed with words relating to characteristics signifying high mate value were

predicted to experience continued reliance on the truth-bias, similar to other individuals at lower risk of reproductive costs (men and those in committed relationships). Alternatively, those primed with words connoting low mate value were expected in incorporate higher levels of Type I errors and perceive higher levels of deception, consistent with those at greater risk of reproductive costs (women and single individuals). When restricting the analysis to responses to higher cost statements relevant to a mating context, as expected those primed with low mate value exhibited an increased level of perceived deception or likelihood of producing Type I errors. Conversely, those primed with high mate value continued to express higher levels of the truth-bias in their responses to higher cost statements compared to those primed with low mate value. The effect of priming appeared to be limited to responses to statements relevant to mate value and not to neutral statements. When responses to both high (mate value) and low cost (neutral) statements were examined together, all participants continued to express equivalent and predominantly Type II perceptual errors (truth-biased) to low cost statements, regardless of the priming condition. Perceptions of deception are influenced by potential costs, when costs are low the asymmetry between individuals is also low. Ultimately, perceptions of deception were only expected to differ as costs became increasingly asymmetrical. Conversely, individuals in both priming conditions perceived greater levels of deception in higher cost statements compared to lower cost statements.

Both Study 1 and Study 2 examined the influence that an individual's sex had on perceptions of deception. These studies showed that the sex of the receiver and the sex of the speaker influenced who was considered deceptive and how deceptive they were perceived to be. Differences in responses to intersexual deception have been suggested to result from an asymmetry in parental and physiological investments in

offspring, in which women face greater potential risks than men in choosing a reproductive partner (Bateman, 1948; Buss, 1989b; Johnson et al., 2004; Symons, 1979; Trivers, 1972). Study 1 indicated that following the evaluation of higher cost deception, women (as receivers) generated greater levels of Type I errors and perceived greater levels of deception than men. On the contrary, men, who face lower potential risks from intersexual deception than women, continued to display greater levels of Type II errors and indicated a stronger presence of the truth-bias in their evaluations of potential deception. Study 2 extended the findings of Study 1 and indicated that the opposite patterns existed in the perception of male and female speakers. While male participants perceived lower levels of deception in others in Study 1, in Study 2 male characters in the vignettes were designated deceptive to a greater extent than female characters. Conversely, while female participants perceived greater levels of deception from others in Study 1, in Study 2 female characters were rated as more likely to be honest compared to men.

Study 1 also examined the influence of message content on perceptions of deception. Messages carrying higher or lower potential reproductive costs were expected to produce different perceptions of deception. In particular, individuals evaluating statements that carried low reproductive costs were found to produce greater levels of Type II (false negative) errors and remained more truth-biased. On the contrary, statements that carried greater costs were found to produce enhanced levels of Type I (false positive) errors and result in heightened perceptions of deception. These findings indicated that the perceptual differences generated by those at high and low risk of reproductive costs (ratio of Type I to Type II errors) only deviated as the differences in cost were increasingly asymmetrical. Study 3 further developed the expectation that costly traits were systematically and hierarchically processed. Study 3

showed that across ten traits related to mating, preferences to avoid the concealment or falsification of a trait increased as potential reproductive costs increased. Participants distributed significantly more resources to avoid higher cost deception compared to lower cost deception, and this increased desire to avoid costly deception was most pronounced when resources were highly restricted.

Integrating the implications from each of these of studies, I propose an alternative interpretation of the manner by which the truth-bias and perceptions of deception are cognitively processed. While previous research has indicated that incoming information is often assumed to be honest (McCornack & Park, 1986, 1990), the findings of the current research have provided evidence that fluctuations in perceptions of honesty occur across many factors. The results from Study 1 demonstrated that fluctuations in perceptions of veracity can result in extreme assumptions of honesty and dishonesty. Further, Study 1 indicated that the same perceptual process that resulted in most individuals being biased towards honesty may result in some individuals being biased towards deception.

Fluctuations in Sensitivity to the Truth-bias

Both Study 1 and Study 2 found that groups experiencing asymmetrical reproductive costs perceive veracity differently. While McCornack and Park (1986, 1990) suggested that individuals initially assume messages are honest, I suggest that as reproductive costs increase there may be a threshold where an individual will no longer indicate a bias towards honesty. Therefore, I suggest that a tipping point exists in the evaluation of potential deception and I refer to this tipping point as a deception-threshold. Thresholds, such as absolute threshold (the minimum intensity a stimulus can be detected) and differential threshold (the minimum level at which a distinction can be made between stimulus attributes) are generally discussed in the psychophysics

literature regarding sensory input (Gelfand, 1990). However, the theoretical concept of thresholds may apply behaviourally as well.

A deception-threshold, displayed in figure 11.1, is suggested to function in a similar fashion to the threshold of pain. For example, low intensity sensory input from an object touching the skin will be initially perceived as a non-aversive sensation of pressure. However, as the pressure increases in intensity, a point exists where the pressure will cross the threshold and be perceived as pain. At the point where the pain threshold is crossed individuals generally produce a noticeable change in their perception of the event and they modify their behaviour to remove or decrease the unpleasant stimulus. Findings have shown a sex difference in pain thresholds, indicating that women's pain threshold is crossed with a lower level intensity compared to men's pain threshold (Chesterton, Barlas, Foster, Baxter, & Wright, 2003; Garcia, Godoy-Izquierdo, Godoy, Perez, & Lopez-Chicheri, 2007). When evaluating communications and the deception-threshold, honesty (minimal perception of deception) serves as the default perception similar to the perception of pressure in the pain threshold. A stimulus that is less intense than the sensory threshold will not elicit any pain; similarly, perceptions of deception that are less intense than the deception-threshold will not elicit a change in error patterns. However, as perceptions of deception increase in intensity, a point exists where the threshold will be crossed. Crossing the deception-threshold is likely to result in behaviours aimed at removing or avoiding the source of the flagged perception. Just as different parts of the body appear to have different pain thresholds, messages communicating different information are expected to produce fluctuations in the likelihood of crossing the threshold of deception.

The results of Study 1 revealed that when the veracity of a statement is ambiguous, variations in sensitivity to the truth-bias exist across different messages. Those messages containing high cost content produced greater perceptions of deception. The increased perception of deception has a greater likelihood of crossing the deception-threshold, whereby the assumption of honesty is reduced and increased likelihood of Type I errors occur. Alternatively, lower cost messages produce minimal perceptions of deception, which are unlikely to cross the deception-threshold. These low intensity perceptions of deception are likely to result in stronger adherence to the truth-bias and produce high levels of Type II errors. The notion that perceptions of deception may be greatly influenced by the potential costs involved may also have implications in the avoidance behaviours explored in Study 3.

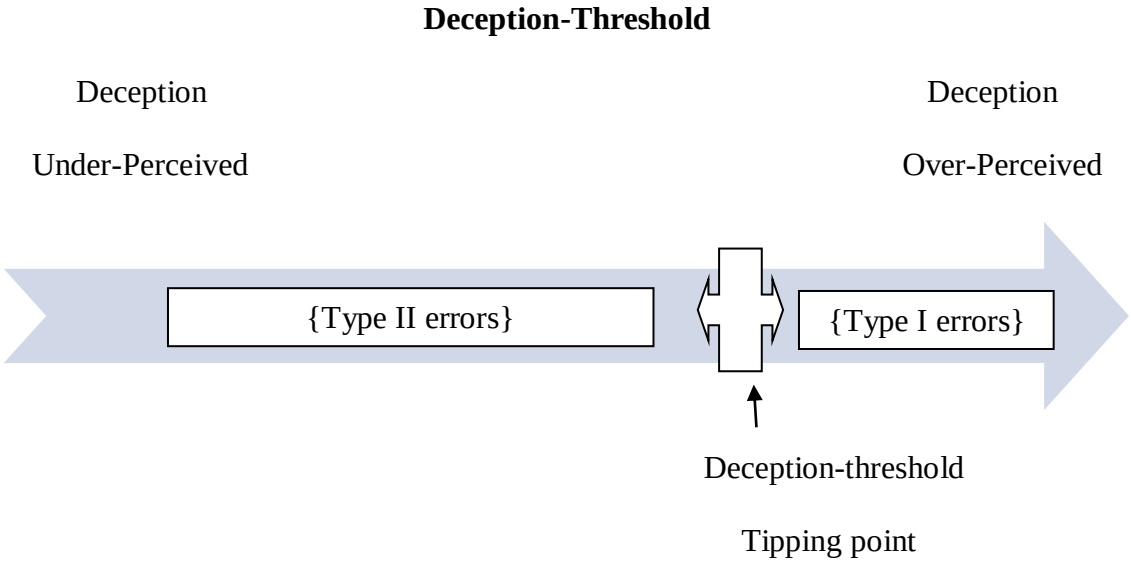

Figure 11.1 Predicted error types above and below the deception-threshold.

Study 3 indicated that, similar to the cost-dependent evaluations in Study 1, resources used to avoid deception were also distributed relative to the potential costs involved. Those individuals at higher risk were found to utilise more resources to avoid costly deception. Furthermore, I suggested that individuals judging the veracity of traits receiving higher avoidance preference ratings would exhibit an increased likelihood of

crossing the deception-threshold. This increased likelihood of crossing over would indicate a reduced sensitivity to the truth-bias and result in fewer truthful evaluations. Conversely, individuals judging the veracity of traits that received lower deception avoidance preference ratings would be less likely to cross the deception-threshold and more likely to remain truth-biased, while the veracity of the traits was determined.

Whereas I suggested that evaluations of individual traits may result in differing levels of reliance on the truth-bias, earlier researchers have suggested that reductions in the truth-bias may produce increases in the accuracy with which detection is detected (Stiff et al., 1992). Stiff and colleagues (1992) posited that increases in cognition towards external factors would reduce the truth-bias and result in more accurate detection. Understanding possible commonalities between those aroused to be suspicious and those evaluating costly traits may help explain why accuracy rates are relatively poor and introduce a new interpretation of how perceptions of veracity are produced as described below.

Suspicion and the Deception-Threshold

Manipulating levels of suspicion has been suggested to increase the mental processing employed in the evaluation of deception and produce more effortful and sophisticated thinking (Fein, 1996). While increasing suspicion was expected to result in increased accuracy of deception, researchers examining this proposal have produced conflicting results (Buller, Strzyzewski, & Comstock, 1991; Forrest et al., 2004; McCornack & Levine, 1990; Toris & DePaulo, 1985; Zuckerman, Spiegel, DePaulo, & Rosenthal, 1982). Some researchers have found that manipulating suspicion resulted in greater accuracy of deception (Forrest et al., 2004; McCornack & Levine, 1990). Alternatively, other researchers found that arousing suspicion did not produce any increases in accuracy rates of deception (Buller et al., 1991; Toris & DePaulo, 1985;

Zuckerman et al., 1982). Further, studies that manipulated suspicion often did so with a direct prime and reported that detection accuracy in primed individuals was frequently equivalent to those who were not primed to be suspicious (Buller et al., 1991; McCornack & Levine, 1990; Toris & DePaulo, 1985; Zuckerman et al., 1982).

The arousal of suspicion is often created by informing participants that they may encounter some degree of deception. For example, Burgoon, Buller, Ebesu, and Rockwell (1994) created suspicion by informing one group of the study that "in our research so far, we have discovered some people are far less than candid and truthful when answering these questions" (p. 312). Burgoon and colleagues' priming method was therefore more specific to the possibility, rather than the occurrence of deception. Stiff and colleagues (1992) incorporated the findings of earlier research regarding the diagnosticity of information, which suggested that individuals supplied with diagnostic information towards one outcome would construct more severe expectations in contrast to those with mixed or no diagnostic input. Considering the influence of diagnostic information, Stiff and colleagues advised participants that some individuals "were asked to be truthful during the interview, whereas others were asked to conceal their true reactions and respond deceptively" (p. 334). However, Stiff and colleagues were still unable to provide additional evidence that arousing suspicion increased the accuracy of deception detection. While the literature examining the influence of arousing suspicion on the accuracy of detecting deception is limited and conflicting, one reasonably consistent finding is that arousing suspicion often generates greater perceptions of deception, regardless of a statement's veracity (McCornack & Levine, 1990; Stiff et al., 1992; Toris & DePaulo, 1985).

It has been suggested that if there were any type of domain-specific strategy for deception-detection, it would likely function whether it was provoked directly or not

(Cummins, 1999). However, this line of reasoning may be misleading as perceptions of deception would assuredly be prompted if triggered directly. Clearly informing participants that potential deception is imminent has been found to produce increased perceptions of deception. However, the agenda of years of research has been to discover what factors affect perceptions of deception in the absence of the direct arousal of suspicion. Costly deception, as examined in the present studies, appears to produce increases in the perception of deception similar to those elicited by arousing suspicion without explicit instruction. The similarity in elevated perceptions of deception may indicate that the participants in Study 1 had the impression that the speaker was "less candid and truthful" or that the speaker of a high cost message may have "concealed their truth reactions". Integrating the findings from the current studies and earlier studies on suspicion may provide an explanation as to why overall accuracy rates remain just above levels predicted by chance.

In review, the evaluation of veracity can result in two potential errors, Type II (assumption of honesty when dishonest) and Type I (assumption of dishonesty when honest). While Type II errors have been proposed to serve as the default error type during typical communications, the current studies have demonstrated that both inherent and situational factors may increase the likelihood of producing a Type I error. In essence, Type II errors initially occur until they become too costly, at which point they are replaced with Type I errors. However, regardless of whether an individual produces a Type I or Type II error, they are still implementing biased responses that will result in false alarms or missed detections (errors).

Viewing both perceptual errors in their extremes (only using one error type to assess communications) results in comparable overall accuracy rates. Individuals producing biased perceptions of honesty and labelling all incoming messages

accordingly will produce a 100% accuracy for honest messages. However, this increased accuracy will consequentially produce a 0% accuracy rate for deceptive messages. The overall accuracy (combined accuracy for honest and dishonest messages) for someone expressing perceptions that are completely biased towards honesty would be 50%. An individual producing biased perception of dishonesty would receive the inverse accuracy scores for honest and dishonest messages, but the overall accuracy would also be 50%. Therefore, assuming an equal ratio of honest to dishonest communications were being evaluated, individuals producing extremely biased perceptions towards honesty or dishonesty would yield similar overall accuracy rates. As a result, I suggest that an accuracy rate is the outcome of a conglomerate of observations and perceptions and cannot suitably illustrate the complex and dynamic cognitive approach taken to avoid deception. As a final point, I propose that while individuals often have truthful perceptions of incoming information, these perceptions are not generated by all messages simply being labelled truthful. If the truth-bias produced exclusively honest perceptions then the accuracy rates for honest conditions would be considerably higher than typically found. Instead, I suggest that linking the notion of deception-thresholds along with the finding that perceptions of veracity are dynamic and cost-sensitive may provide a novel contribution to the cognitive approach to avoiding deception.

A General Cognitive Model of Deception Avoidance

I propose that the course of action through which individuals produce perceptual errors is both systematic and efficient. However, various concerns must be considered prior to extrapolating the findings of the present studies into a broader theoretical context involving the truth-bias. It is important to bear in mind that the types of lies employed in this series of studies were tailored to elicit behaviours expected to

aid in avoiding reproductive costs. The possibility remains that individuals employ independent mechanisms or heuristics to avoid other facets of deception. In particular, deception aimed at falsifying or concealing mating-irrelevant information may necessitate an alternative approach to be successfully avoided. Additionally, while a strict focus was placed on the role of perceptual errors in deception avoidance, this does not mean that individuals do not attempt to discover deception by other means, such as overt detection via verbal or nonverbal deception cues. The proposed interpretation of deception avoidance behaviours suggests that cognitive mechanisms are employed as an additional tactic alongside overt deception detection efforts. Further, I suggest that the state of being "truth-biased" does not simply result in the biased labelling of all communications as truthful. Instead, I anticipate that an estimation of veracity is also calculated that takes into consideration a variety of variables. While this process may culminate in perceptions of honestly more often than dishonesty, it remains a dynamic process capable of fluctuating across different circumstances. I expect that when an individual is evaluating another's communications the resulting perceptual assumption of honesty or dishonesty is generated by a two-step process.

The first step in this process involves the global calculation of the potential costs as they relate to personal and external factors and these costs are used to generate a total estimate of expected deception. The estimate of a message's veracity is expected to be a multifaceted, yet a relatively rapid evaluation process. Similar to the rapid process with which a series of physical features can be observed to produce a virtually instantaneous (100 millisecond) perception of attractiveness (Locher, Unger, Sociedade, & Wahl, 1993; Olson & Marshuetz, 2005), I propose that individuals evaluate various components of communications to produce a reasonably immediate estimation of deception. The computation of a deception estimate involves the

integration of a conglomerate of various personal and external factors. Study 1 and Study 2 revealed that a cost analysis involving an individual's relationship status, the content of the message, the speaker's attraction, the priming of mate value, and the sex of both the speaker and the receiver influenced perceptions of veracity. In general, personal and external factors that carry greater costs are expected to increase the estimate of potential deception, while evaluations of personal and external factors associated with reduced costs decrease the estimate of deception. In particular, individuals at a reduced risk of enduring reproductive costs in the mating market (e.g., men and those in committed relationships) are anticipated to generate lower deception estimates compared to those at higher risks of reproductive costs (e.g., women and single individuals). However, the potential reproductive costs involved are not the only factor involved in the production of a deception estimate. Factors such as the arousal of suspicion and other heuristics that have been found to influence the perception of veracity would likely contribute in the overall perception of deception. For example, the perceptions resulting from the probing heuristic (Levine & McCornack, 1994), the relational truth-bias heuristic (Stiff et al., 1992), and the infrequency heuristic (Fiedler & Walka, 1993), are all likely to be integrated into the total deception estimate.

The second phase in the cognitive approach to avoiding deception involves determining if the estimate of deception exceeds the threshold of deception. Individuals generating a lower deception estimate are not expected to cross the threshold of deception and are predicted to continue producing truth-biased Type II errors. Conversely, those individuals producing a deception estimate signifying elevated risk of deception are expected to cross the deception-threshold and begin to maximise lie-biased Type I errors as the deception estimate increases.

According to the proposed model of deception avoidance, individuals may only be as truth-biased as circumstances permit. This may indicate that while one individual facing minimal risk of reproductive costs generates perceptions of honesty (Type II errors), the same set of circumstances may inflict enough costs on another to result in the individual perceiving deception (Type I errors). Study 1 supported this proposition by showing that the same process that generated truth-biased responses in the majority of participants generated lie-biased responses in the group that was at the greatest risk of reproductive costs. Low mate value primed single women, in evaluating the truth of biographical information about potential mates, indicated that the average message was "more likely dishonest than honest". This finding may provide evidence that the truth-bias is cost sensitive and situationally appraised, and that being placed under extremely costly conditions may cause an individual to abandon the truth-bias and the assumption of honesty.

In conclusion, the present series of studies indicated that fluctuations in perceptual errors produced by potential costs and cognitive heuristics may be embedded in the assessment of communications between humans. Therefore, in order to reliably predict and comprehend patterns in deception detection, consideration of the influence that personal and situational factors have on perceptions of deception may be necessary. While the human ability to detect deception directly may be far from perfect, the dynamic and strategic reliance on perceptual errors may limit the number of circumstances where overt detection is required to escape costly deception.

Final Summary of Studies Conducted

The current series of studies investigated whether implicit adjustments to an individual's perceptions of veracity were strategically applied to communications as a method to avoid deception. It was consistently found that perceptions of deception and

preferences to avoid deception increased as potential reproductive costs increased. Despite decades of research focusing on the truth-bias, the present research studies provided an error management approach to clarify why evaluations of communications often result in biased perceptions and how the production of perceptual errors may limit accuracy rates. It is suggested that future research be conducted utilising alternative forms of deception (outside the context of mating) to establish if the avoidance behaviours found in the present series of studies generalise across the diversity of types of deception employed in everyday life. Nevertheless, as they stand, the results contribute to theoretical approaches regarding the truth-biased nature of human processing and supply a novel cognitive approach to deception avoidance by revealing the dynamic nature of perceptions of veracity.

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Appendices

Appendix A: Study 1 Ethical Approval

This administrative form has been removed

Appendix B: Study 1 Information Sheet

Social Interpretation Study

You are invited to take part in a research project investigating people's interpretation of statements made by others in various social situations. The study is being conducted by Mike Larson and the results of this study will contribute to his Ph.D. Dissertation at James Cook University.

If you agree to be involved in the study (and are 18+), you will be invited to complete a questionnaire, which should take approximately 30 minutes of your time. The questionnaire asks about your past romantic/sexual relationships and preferences, and your thoughts about people in general. After completing the questionnaire you will be asked to complete a sentence construction task where you will reassemble scrambled sentences. Finally, you will give your opinion of statements made by individuals in varying social and interpersonal situations as described in short vignettes. Some questions are of a personal nature. The questionnaire can be completed in DA004-025 or at an appointment arranged elsewhere.

Taking part in this study is entirely voluntary. You can discontinue the study, or refuse to answer certain questions at any time without explanation or prejudice. You may also withdraw any unprocessed data from the study.

If you know of others that might be interested in this study, can you please pass on this information sheet to them so they may contact me to volunteer for the study.

Your responses and identifiable information will be strictly confidential. The data from the study may possibly be used in theses, conferences, and journal articles. However, you will not be identified in any way in these publications, nor will be possible to trace your personal responses. Should you feel the need for counseling, for any reason, please contact Lifeline (131114) or, if a JCU student, the university Counseling Centre (4781-4711) for assistance.

If you have any questions about the study, please contact Principal Investigator: **Mike Larson** or
Supervisor: **Michele Surbey**

Principal Investigator:
Mike Larson
Department of Psychology
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Supervisor:
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If you have any concerns regarding the ethical conduct of the study, please contact Tina Langford, Ethics Officer, Research Office, James Cook University, Townsville, Qld, 4811. Phone: 4781 4342, Tina.Langford@jcu.edu.au

Appendix C: Study 1 Informed Consent Form

PRINCIPAL INVESTIGATOR	**Mike Larson**
PROJECT TITLE:	**Social Interpretation Study**
SCHOOL	**Department of Psychology**

You are invited to take part in a research project investigating people's interpretation of statements made by others in various social situations. The study is being conducted by Mike Larson and the results of this study will contribute to his Ph.D. Dissertation at James Cook University.

If you agree to be involved in the study (and are 18+), you will be invited to complete a questionnaire, which should take approximately 30 minutes of your time. The questionnaire asks about your past romantic/sexual relationships and preferences, and your thoughts about people in general. After completing the questionnaire you will be asked to complete a sentence construction task where you will reassemble scrambled sentences. Finally you will give your opinion of statements made by individuals in varying social and interpersonal situations as described in short vignettes. Some questions are of a personal nature. The questionnaire can be completed in DA004-025 or at an appointment arranged elsewhere.

I acknowledge that:

- any risks and possible effects of participating have been explained to my satisfaction;
- taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
- that any information I give will be kept strictly confidential and that no names will be used to identify me with this study without my approval.

I consent to complete a questionnaire	☐	**Yes**	☐	**No**
I consent to complete a sentence construction task	☐	**Yes**	☐	**No**

Name: *(printed)*	
Signature:	**Date:**

Appendix D: Study 1 Methodology

Study 1: Word priming task

The Following list of words was employed in the Study 1 word-priming task. Each of the words below was the basis of a scrambled sentence related to High MV, Low MV, or a distracter sentence. Distracter words were used in both high and low MV priming tasks.

High mate value priming words	**Low mate value priming words**	**Distracter words**
3 Word priming condition	3 Word priming condition	3 Word priming
Rich	Ugly	Door
Attractive	Mean	Pillow
Secure	Unemployed	Dog
Gets compliments	Broke	Ball
Dates	Unattractive	
4 Word priming condition	4 Word priming condition	4 Word priming condition
Good parent	Sick	Trees
Beautiful	Poor	Calculator
Funny	Doesn't get Compliments	Water
Physically Fit	Unhealthy	Laptop
Kind	Bad	
5 Word priming condition	5 Word priming condition	5 Word priming
Healthy	Lazy	Store
Humorous	Unintelligent	Snow
Wealthy	Unworthy	Fish
Intelligent	Weak	Doorbell
Confident	Insecure	

Scrambled sentence examples

High mate value scrambled sentences

- 3 word – gets compliments Sam = Sam gets compliments
- 4 word – are swimmers fit physically = Swimmers are physically fit
- 5 word – on she's healthy a diet = she's on a healthy diet

Low mate value scrambled sentences

- 3 word – unemployed many were = many were unemployed
- 4 word – is being unhealthy overweight = being overweight is unhealthy
- 5 word – unintelligent solution they found an = they found an unintelligent solution

Distracter scrambled sentences

- 3 word – ball the throw = throw the ball
- 4 word – are green the trees = the trees are green
- 5 word – to the later drive store = drive to the store later

Appendix E: Study 2 Ethical Approval

This administrative form has been removed

Appendix F: Study 2 Information Sheet

Personal Association Study

You are invited to take part in a research project investigating the types of people individuals associate with various intrapersonal traits and situations. The study is being conducted by Mike Larson and the results of this study will contribute to his Ph.D. Dissertation at James Cook University.

If you agree to be involved in the study (and are 18+), you will be invited to complete a questionnaire, which should take approximately 30 minutes of your time. The questionnaire asks about your past romantic/sexual relationships and preferences, and your thoughts about people in general. After completing the questionnaire you will be asked to complete a photo matching task, where you will read a series of short statements from unidentified individuals. Each statement will have a series of photos where you will rate each photo to indicate the likelihood that the person depicted in the photo made the statement. Some questions are of a personal nature. The questionnaire can be completed in DA004-025 or at an appointment arranged elsewhere.

Taking part in this study is entirely voluntary. You can discontinue the study, or refuse to answer certain questions at any time without explanation or prejudice. You may also withdraw any unprocessed data from the study.

If you know of others that might be interested in this study, can you please pass on this information sheet to them so they may contact me to volunteer for the study.

Your responses and identifiable information will be strictly confidential. The data from the study may possibly be used in theses, conferences, and journal articles. However, you will not be identified in any way in these publications, nor will be possible to trace your personal responses. Should you feel the need for counselling, for any reason, please contact Lifeline (131114) or, if a JCU student, the university Counselling Centre (4781-4711) for assistance.

If you have any questions about the study, please contact Principal Investigator: **Mike Larson**

Principal Investigator:
Mike Larson
Department of Psychology
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Mobile: 4781-5071
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Supervisor:
Dr. Michele Surbey
Department of Psychology
James Cook University
Phone: 4781-5157
Email:
Michele.Surbey@jcu.edu.au

Appendix G: Study 2 Informed Consent Form

PRINCIPAL INVESTIGATOR	**Mike Larson**
PROJECT TITLE:	**Personal Association study**
SCHOOL	**Department of Psychology**

I understand the aims of this research study are to examine the types of people individuals associate with various intrapersonal traits and situations. I consent to participate in this project, the details of which have been explained to me, and I have been provided with an information sheet.

I understand that my participation will involve a questionnaire that will ask about my past romantic/sexual relationships and preferences, and my thoughts about people in general. After completing the questionnaire I will complete a photo matching task, where I be asked to read a series of short statements from unidentified individuals. Each statement will have a series of photos where I will rate each photo to indicate the likelihood that the person depicted in the photo made the statement. I understand that some questions are of a personal nature and I agree that the researcher may use the results as described in the information sheet.

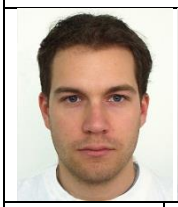
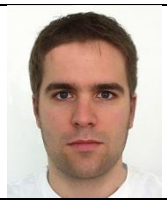
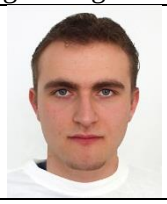
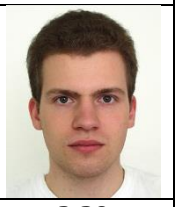
I acknowledge that:

- any risks and possible effects of participating have been explained to my satisfaction;
- taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
- that any information I give will be kept strictly confidential and that no names will be used to identify me with this study without my approval;

I consent to complete a questionnaire		**Yes**		**No**
I consent to complete a photo matching task		**Yes**		**No**

Name: *(printed)*	
Signature:	**Date:**

Appendix H: Study 2 Photos

Attractive women's average rating = 4.44 (*N* = 63)					
					
4.14	4.35	4.19	4.08	6.68	5.17
Unattractive women's average rating = 2.59 (*N = 63)*					
					
2.49	2.54	2.71	2.48	2.73	2.56
Attractive men's average rating = 4.38 (*N = 53)*					
					
4.06	3.81	3.96	4.26	4.57	5.60
Unattractive men's average rating = 2.70 (*N = 53)*					
					
2.83	2.51	2.60	2.68	2.89	3.38

Photos were created and pre-rated by Braun, Gruendl, Marberger, and Scherber (2001). Photos were rated on a seven-point Likert scale from 1 (very unattractive) to 7 (very attractive).

Appendix I: Study 2 Sample Methodology

PAS V2.1.2

Question 9.

Please use the boxes below each of the 8 photos to indicate the likelihood that the individual in each photo is "Person X" from the conversation (ex. 10% likely, 50% likely). The percentages do not have to add up to 100% (blank answers = 0%)

___

When Beth asked if Person X has ever sexually cheated on a partner, Person X said "never".

The statement made was actually a **Lie**

Appendix J: Study 3 Ethical Approval

This administrative form has been removed

Appendix K: Study 3 Information Sheet

Relationship Study

You are invited to take part in a research project investigating people's thoughts about themselves and their relationships along with their assessment of different kinds of lies. The study is being conducted by Mike Larson and the results of this study will contribute to his Ph.D. Dissertation at James Cook University.

If you agree to be involved in the study (and are 18+), you will be invited to complete a questionnaire, which should take approximately 30 minutes of your time. The questionnaire asks about your past romantic/sexual relationships and preferences, and your thoughts about people in general. Then you will complete a task where you will allocate available mate 'dollars' to indicate your preference for avoiding certain types of lies Some questions are of a personal nature. The questionnaire can be completed in DA004-025 or at an appointment arranged elsewhere.

Taking part in this study is completely voluntary and you can stop taking part in the study at any time without explanation or prejudice. You may also withdraw any unprocessed data from the study.

If you know of others that might be interested in this study, can you please pass on this information to them so they may contact me to volunteer for the study.

Your responses and contact details will be strictly confidential. The data from the study will be used in research publications and reports. You will not be identified in any way in these publications.

If you have any questions about the study, please contact Michael Larson**.**

Principal Investigator:
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Supervisor:
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Department of Psychology
James Cook University
Phone: 4781-5157
Email: Michele.Surbey@jcu.edu.au

Appendix L: Study 3 Informed Consent Form

PRINCIPAL INVESTIGATOR	**Michael Larson**
PROJECT TITLE:	**Relationship Study**
SCHOOL	**Department of Psychology**

I understand the aim of this research study is to examine people's thoughts about themselves and their relationships along with their assessment of different kinds of lies. I consent to participate in this project, the details of which have been explained to me, and I have been provided with an information sheet.

I understand that my participation will take about 30 mins and will involve a questionnaire that will ask about my past romantic/sexual relationships and preferences, and my thoughts about people in general. Then I will complete a task where I will allocate available mate 'dollars' to indicate my preference for avoiding certain types of lies. I understand that some questions are of a personal nature and I agree that the researcher may use the results as described in the information sheet.

I acknowledge that:

- Any risks and possible effects of participating have been explained to my satisfaction;
- Taking part in this study is voluntary and I am aware that I can stop taking part in it at any time without explanation or prejudice and to withdraw any unprocessed data I have provided;
- That any information I give will be kept strictly confidential and that no names will be used to identify me with this study without my approval;

I consent to complete a questionnaire ☐ **Yes** ☐ **No**

Name: *(printed)*	
Signature:	**Date:**

Appendix M: Study 3 Sample Methodology

Study 3 Methodology: High Token Budget (30 tokens).

RS V.1

Task

Below is a list of various traits one might want to know about another person before starting a romantic/sexual relationship However, some individuals might trick or lie you about one or all of these traits to increase their chances of becoming your romantic/sexual partner

After each trait, you will see a Drop Down Menu with an option to select from 0 to 30 Lie Avoidance Tokens. Please click on the box and select how many tokens you would like to use to show your personal preference to avoid others attempting to trick or lie to you about each trait.

More tokens = Stronger preference to avoid.
Answers left blank = 0 tokens

Important: You have 30 tokens to distribute across the traits below, you can use as many or as few of your 30 tokens on a single item but do not select more than 30 tokens overall.

Please read through all answers before you begin.

Situation: Imagine you are talking with a member of the opposite sex in person and he / she is trying to secure a date with you.

Questions: I do not want to be tricked or lied to about their true…

	# out of 30 tokens
1. Potential or current parenting skills	
2. History of infidelity	
3. Intelligence	
4. Money earned or earning potential	
5. How similar they feel they are to you	
6. Physical attractiveness	
7. Amount of friends/popularity	
8. Weight	
9. Age	
10. Physical health	

Study 3 Methodology: Low Token Budget (10 tokens).

RS V.1

Task

Below is a list of various traits one might want to know about another person before starting a romantic/sexual relationship However, some individuals might trick or lie you about one or all of these traits to increase their chances of becoming your romantic/sexual partner

After each trait, you will see a Drop Down Menu with an option to select from 0 to 10 Lie Avoidance Tokens. Please click on the box and select how many tokens you would like to use to show your personal preference to avoid others attempting to trick or lie to you about each trait.

More tokens = Stronger preference to avoid.
Answers left blank = 0 tokens

Important: You have 10 tokens to distribute across the traits below, you can use as many or as few of your 10 tokens on a single item but do not select more than 10 tokens overall.

Please read through all answers before you begin.

Situation: Imagine you are talking with a member of the opposite sex in person and he / she is trying to secure a date with you.

Questions: I do not want to be tricked or lied to about their true…

	# out of 10 tokens
1. History of infidelity	
2. Physical attractiveness	
3. Intelligence	
4. Money earned or earning potential	
5. How similar they feel they are to you	
6. Potential or current parenting skills	
7. Amount of friends/popularity	
8. Age	
9. Weight	
10. Physical health	