

NO MORE MR. NICE GUY: EFFECTS OF SALIENT MOTIVES ON WOMEN'S MATE  
PREFERENCES

by

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### **No More Mr. Nice Guy: Effects of Salient Motives on Women's Mate Preferences**

Attitudes are a complex behavior. They can be incredibly resilient (Anderson & Kellam, 1992; Eagly & Chaiken, 1995), or seemingly flimsy (Wallace, Paulson, Lord & Bond, 2005). People express attitudes all the time: when they select restaurants to eat at, pick their friends, and even when they choose which brand of toilet paper to buy. Like any seemingly complex psychological phenomenon, attitudes, also termed the evaluation, operate in systematic ways despite sometimes being confusing to the casual observer (Lord & Lepper, 1999). One of the ways that we understand attitudes to work is that they are flexible and responsive to local conditions that exist separate from the object being evaluated (Schwarz, 2007). Simply put, attitudes can adapt, helping to produce behaviors that deal with problems as they arise. A consequence of this flexibility is that things that are evaluated as one way may not stay that way, and evaluative dimensions might shift depending on recent events, experiences or thoughts (Lord, Desforges, Fein, Pugh & Lepper, 1994; Sia, Lord, Blessum, Thomas & Lepper, 1999). In some situations, information that was once relevant may become irrelevant without the evaluator being aware of any changes in their thinking (e.g. La Pierre, 1934). In other situations, people may simply ignore or otherwise be unable to consider more than basic or superficial impressions when forming attitudes. These intricate effects on our evaluations are the broad topic of this proposal, which reviews research relevant to our adaptive attitudes and proposes novel experiments to determine, in the specific domain of mate preferences, when conflicting characteristics of attitude objects are or are not used in our evaluations.

#### **Traditional Models of Attitudes**

The traditional definition for attitudes was “a mental and neural state of readiness, organized through experience, exerting a directive and dynamic influence upon the individual's

response to all objects and situations with which it is related.” (Allport, 1935, pg. 803). In this original formulation, attitudes were modeled from experience and used to direct behavior towards objects covered by the attitude in question. Generally speaking, directed behavior could be broken down into either positive or negative, approach or avoid. Given that this definition emphasizes that attitudes direct behavior, it is implicit in the definition that understanding attitudes can allow us to predict behavior (e.g. Andrews & Kandel, 1979; Kahle & Berman, 1979). This supposed predictive power has made attitudes a popular topic of study, as evidenced by a significant body of literature (see Wallace, Paulson, Lord & Bond, 2005).

As is true with any area of research, attitude models have progressed past initial definitions and models. Contemporary attitude researchers contest specific definitions and posit their own definitions based on their research. For example, Eagly and Chaiken define attitudes as “a psychological tendency that is expressed by evaluating an entity with some degree of favor or disfavor” (1993, p. 1).” Although this definition is certainly derived from Allport’s conceptualization of attitudes and incorporates some aspects of his definition, it sheds others, such as a focus on “a state of readiness”. Furthermore, researchers debate what were once assumed to be inherent aspects of an attitude. One of the main reasons that attitudes have been considered as essential to social psychology lies in their assumed stability and generality (Allport, 1935; Eagly & Chaiken, 1993; Lord & Lepper, 1999). First, attitudes are supposed to be “general”. Attitudes are theorized to predict behavior for both specific attitude objects, and for entire taxonomies or groups, such as ethnic groups (e.g. Black, Latino, East Asian), categories like certain foods or entertainment, or other social groupings (e.g. mental patients, welfare recipients, politicians). Generality is key to the usefulness of attitudes because generality means that knowing a person’s attitudes about a group or category allows reliable predictions for how

that person may behave in discrete instances that involve some attitude object from said group or category. Second, attitudes are supposed to be stable. Traditionally, attitudes were supposed to remain mostly the same over the course of time and were not supposed to change easily. After all, attitudes would not be much use if they were to shift without much prompting; their predictive power would diminish immensely. While stability plays a key role in traditional models, attitude change is a substantial topic of research (Gawronski & Bodenhausen, 2006; McGuire, 1969; Maio & Haddock, 2014; Petty & Cacioppo, 1986), and research which shows that attitudes do change. Instead of meaning “unable or unlikely to change”, stability here means that an attitude will remain stable unless some sufficiently powerful force intervenes, like a persuasive argument or exposure to fresh, useful, and significant information (Petty & Krosnick, 2014; Tormala & Brinol, 2015). Accordingly, momentary factors such as an unrelated contextual cue or temporary feeling would not be predicted to seriously affect an attitude. However, disagreements about attitudes do not stop at definitions and there are serious challenges to the traditional model and the attitude qualities it assumes. For instance, data collected by Allport's contemporaries challenges the quality of attitude stability (e.g. LaPiere, 1934). This data and others eventually coalesced into a model that challenged the idea that attitudes are stable and that stability is necessary for attitudes to accurately predict behavior. This model is known as the construal model (Lord & Lepper, 1999; Lord, Hill, Holland, Yoke & Lu, 2015; Schwarz, 2007).

### **Construal Models of Attitudes**

Construal models of attitudes posit that attitudes are formed, at least in part, by the subset of an object's attributes that happen to come to mind at any given time and in any given context (Lord & Lepper, 1999; Schwarz, 2006; Schwarz & Bohner, 2001; Tourangeau, 1992; Tourangeau & Rasinski, 1988; Wilson & Hodges, 1992). If attitudes are subject to contextual

variation or are reliant on what factors come to mind at a given moment, this means that even when interacting with the same attitude object, a person's attitude might change from time to time without new information being learned or present. Research has thus far supported this model; attitudes do appear to be based on what attributes are rendered temporarily more accessible in a given moment (Lord, 2015; Schwarz, 2007; Schwarz & Sudman, 1992; Sia, Lord, Blessum, Ratcliff & Lepper, 1997; Smith & DeCoster, 1998; Wyer & Srull, 1989).

The construal models of attitudes are backed by empirical support. The key hypothesis in the construal model is that the cognitive associations or connections that become active when a person interacts with an attitude object differ from situation to situation, even when the attitude object is identical (Lord & Lepper, 1999; Schwarz & Bohner, 2001; Tourangeau, 1992).

Activated associations can vary by chance as human cognition is limited and strives for efficiency, and efficiency dictates that only a small subset of all possible associations can be used in any given evaluative response (Bellezza, 1984; Chandler & Schwarz, 2009; Cho, & Schwarz, 2010; Sia, Lord, Blessum, Ratcliff, & Lepper, 1997; Wilson & Hodges, 1992). Associations are also prone to the effects of recency. Specifically, activated associations can vary because certain associations may have been activated more recently than other associations (Wyer & Srull, 1989). In addition, the immediate context may very well influence which associations become active for an attitude object (Schwarz, 2007). Contextual influences and recency prime certain associations, making it more likely that they will become active when called upon versus other non-primed associations. For example, associations used to evaluate an attitude object might be primed by other, recent actions or even physical surroundings (Schwarz & Sudman, 1992), and subsequently applied to any judgment that affords a relevant opportunity (Loersch & Payne, 2012). Broadly these phenomena can be categorized as context-dependent evaluations (or

context effects) as context appears to influence activated associations and activated associations subsequently influence people's evaluations.

Numerous examples of context-dependent attitude formation exist in attitude literature. Research shows evidence of context effects in people's attitudes toward art (Gartus & Leder, 2014), mental patients (Desforges, Lord, Ramsey, Mason, Van Leeuwen, West & Lepper, 1991), the elderly (Brewer & Lui, 1984), ambiguous behaviors (Chandler & Schwarz, 2009), and people's clothing (Cho & Schwarz, 2010). This is only a small subset of studies showing context effects in evaluation. In some cases, the context effects may be prompted by factors of the environment, such as ambient darkness (Schaller, Park & Faulkner, 2003). In other cases, the context effects can be a result of how information is presented or interpreted, for instance with processing fluency (Reber, Schwarz & Winkielman, 2004). Some stimuli are harder to process than others, and as a result objects that are easily processed may be evaluated more positively or increase aesthetic pleasure versus objects that are harder to process. Immediate goals can also influence attitudes, such as a heightened desire to control prejudice (Maddux, Braden, Brewer & Petty, 2005). This research suggests that contexts, which are mutable and may change frequently, can affect one's attitudes, and that the changes we observe in a reported attitude are often the result of what attributes, associations, or thoughts comes to mind about the object of evaluation.

### **Evaluation in Human Mating**

One of the benefits of studying attitudes is that evaluation is involved in a large variety of human behavior. Whenever a person makes a judgment of positive or negative, that may very well serve as an attitude. In addition, one of the benefits of using the construal model is that it allows novel predictions for attitude research and for research in other areas, specifically those in which we expect to see functional shifts in behavior. Specifically, evolutionary hypotheses

outlined in both evolutionary biology and psychology often rely on functional shifts in behavior in response to contextual cues (Chisholm, 1993; Cotton, Small, & Pomiankowski, 2006; Griskevicius, Delton, Robertson & Tybur, 2011; Neuberg, Kenrick & Schaller, 2011; Park, Van Leeuwen & Chochorelou, 2013; Schaller & Park, 2011). Although there is less research on the functional aspect of attitudes and context effects, the phenomenon of attitudes changing due to context is adequately predicted by the construal model (Koriat, Adiv-Mashinsky, Undorf & Schwarz, 2018; Reber, Schwarz & Winkielman, 2004; Schwarz & Sudman, 2012; Song & Schwarz, 2008). By contrast, the traditional model of attitudes would have trouble reconciling the findings of different studies on human evolution given that it predicts attitudes are very stable, which could prevent functional shifts in behavior in response to contextual cues. The present research was designed not only to further provide support for a construal view of attitudes (i.e. showing that evolutionarily relevant evaluations are subject to the same evaluative process, including construal and activated associations), but to advance the model while integrating recent research in human evolutionary psychology, in particular the evaluations that occur when people are choosing potential mating partners.

Research in human mating psychology, whether directly tied to evaluation or other behaviors, has advanced greatly in the past three decades. Studies range from exploring and identifying universal mate preferences (Buss, 1989; Buss & Schmidt, 1993; Buss, Shackelford, Kirkpatrick & Larsen, 2001) to determining how bodily influences like ovulation, hormones, or our immune system may affect our mate choices (Cantu, Simpson, Griskevicius, Weisberg, Durante & Beal, 2014; Durante & Li, 2009; Gangestad, Garver-Apgar, Simpson & Cousins, 2007; Husak & Moore, 2008; Wedekind, Seebeck, Bettens & Paepke, 1995). Many studies have investigated how men and women differ in the mating arena, and how sexual selection, rather

than natural selection, played a key role in such developments. Studies have identified the factors that make specific types of men attractive to women, either as short-term dating partners or as long-term mates (Buss, 1998; Buss & Barnes, 1986; Buss & Schmitt, 1993; Shackelford, Schmitt & Buss, 2005; Wiederman, 1993). For example, women find resources to be a universally attractive quality in males, but particularly when it comes to selecting a long-term partner (Buss & Schackelford, 2005; Li, Bailey, Kenrick & Linsenmeier, 2002). By contrast, men place a greater emphasis on physical attractiveness and youth in those they would select as a long-term mate (Buss & Schmitt, 1993; Regan, Levin, Sprecher, Christopher & Gate, 2008). The present research narrows the focus to female choices for partners, specifically the evaluations that women make of potential mates and how such evaluations are affected by contextual factors. This topic is immensely relevant to the general human experience given that mating is a universal behavior, occurs naturally in most adults of reproductive age (and beyond), consumes a vast amount of energy and resources (e.g. Collins, Baer, & Weber, 2015; Haynes, 2017), and is seemingly relevant to the clear majority of humans. Elucidating the ways in which women evaluate potential partners, and how these evaluations work mechanistically and how they are influenced by contextual factors is valuable if we are to make accurate and stable predictions about mate choices based on the attitudes people form.

When it comes to women's mate choices, research shows that there is a stable set of traits that are often evaluated as highly desirable in men. For example, a man's ability to accrue resources is seen as an important trait in a potential long-term mate. In addition, women prefer kindness/trustworthiness (Buss & Schmitt, 1993), ambition (Buss, 1994a; 1994b; Kasser & Sharma, 1999), physical strength or masculinity (Little, DeBruine & Jones, 2010), cues to immune function (Rhodes, Proffitt, Grady, & Sumich, 1998; Wedekind, Seebeck, Bettens &

Paepke, 2006), and other traits. Some of these factors are not necessarily stable, however. For example, a job can be lost and muscles can fade. However, women often look for intrinsic or internal traits as well, things that a person is and will potentially always be. Ambition is one such trait. Kindness, or perhaps more comprehensively, warmth could be another (Botwin, Buss & Shakelford, 1997; Cottrell, Neuberg & Li, 2007; Lukaszewski & Roney, 2009; Pillsworth, 2008). These are characteristics of men that are personality traits rather than external factors likely to change (Rantanen et al., 2007). After all, although a young male might not yet have resources, they might have traits which predict future success and ability to raise a family, and women are likely to value such traits as well as a male's current resource holdings. However, it is a mistake to consider women's mate preferences as stuck in stone, or unlikely to change. As mentioned previously, a key tenant of evolutionary psychology is that behavior is functional. Strict adherence to one set or hierarchy of preferences in all environments and situations could produce negative outcomes which hinder survival and reproduction, so there are situations in which women's evaluations and choices may shift.

Women's mating psychology is flexible. The choices that women make are not only attuned to the current environment, but are potentially attuned to internal factors like ovulation as well (Gildersleeve, Haselton & Fales, 2014). Simply put, the type of men that women prefer as mates and the traits possessed by men that are considered desirable do shift based on contextual factors. For example, ambient sex ratio influences how women select mates and what they agree to in a relationship (Stone, Shackelford & Buss, 2007). When a sex ratio is skewed toward men (i.e. more men than women in a population), women become more "choosy" and evaluate potential mates more strictly because the sex ratio favors their choices over men's. Another factor that affects women's behavior is local resource scarcity. Specifically, when primed with

environmental resource scarcity, women begin to place a greater emphasis on ability to accrue resources and begin to invest more in products which enhance traits men often desire in long-term mates (Hill et al., 2012). Additionally, women who perceive the world to be dangerous find stronger and taller men more desirable, likely a function of self-protection for oneself and family (Cate, Bassett & Dabbs, 2003). In addition, women's preferences for masculine traits in men shift in response to measures of local health such that the worse health is in a population, the more women prefer masculine traits in men (DeBruine, Jones, Crawford, Welling, & Little, 2010); this response is thought to show that women's preferences are attuned to threats to their future offspring and pick partners to compensate (Gangestad & Scheyd, 2005; Jones et al., 2001; Thornhill & Gangestad, 1996). Women's behavior also shifts in response to their own fertility and the fertility of other women around them (Gildersleeve, Haselton & Fales, 2014; Li et al., 2002; Nikiforidis, Arsena & Durante, 2017; Puts, 2006). For example, at peak fertility women find the smell of their father more repugnant than when not at peak fertility (Lieberman et al., 2011). Research also suggests that females judge sexy, but likely uncommitted, men as better potential fathers near ovulation compared to other times during the cycle (Durante et al., 2012). Data from these studies and others show that women's mating psychology is subject to external and internal influences.

### **Motivation is Subject to Context**

External influences on behavior, in this case influences which could influence evaluation in multiple domains and in mate selection specifically, are numerous. Besides general context effects outlined in many previous studies on evaluation (e.g. Blessum, Lord & Sia, 1998; Gandarillas, Brinol, Petty & Diaz, 2018; Meier, Schnall, Schwarz & Bargh, 2012; Rocklage & Fazio, 2018), there are other discrete influences, or taxonomies of influences, that have been well

studied. One of these comes directly from an evolutionary perspective on human behavior, which is beneficial in understanding human behavior generally since natural selection has exerted pressure on humans as a species and produced very common, or even universal, behaviors. Some specific influences on our evaluations are defined by the Fundamental Motives Framework (Kenrick, Griskevicius, Neuberg & Schaller, 2010; Kenrick, Neuberg, Griskevicius, Becker & Schaller, 2010; Neel, Kenrick, White & Neuberg, 2016). The key premise of this framework is this: throughout human evolution, consistent obstacles, if not overcome, would have blocked successful reproduction and survival. Because of the persistent and ubiquitous nature of obstacles such as predators, human combatants, disease and starvation, natural selection has pressured human behavior to address and overcome these obstacles; specifically, the framework predicts that human motivations are intrinsically tied to evolutionarily relevant obstacles like basic survival, group affiliation, mating and even parenting. Essentially, humans universally possess distinct domain specific motivations designed to push humans to respond to key, motive-related threats, or opportunities (i.e. context) so that we do not miss or overlook them. One of the ways that human motivation has been categorized using this framework is in a hierarchy of needs similar to Maslow's original pyramid (Kenrick et al., 2010). Furthermore, the ways in which motives function are also incorporated into the framework. Motives are flexible and functional; in a neutral environment (i.e. an environment free of cues distinctly tied to a motive), individual motives are not likely to be active barring individual differences in chronic motive activation, and thus do not exert strong influences on behavior. However, when a cue to a threat exists and is detected in a given context, a motive is activated and influences behavior to deal with the cued threat. Essentially, motives are activated by environmental cues and motives influence behavior toward an adaptive end, i.e. to address a motive-related threat in the environment.

Evidence for the framework, including motive activation and functional, goal-directed shifts in behavior, has been shown across numerous studies using a variety of methodologies. For example, studies examining what can be classified as the “self-protection” motive have shown that numerous behaviors, including attitudes, decisions and even stereotypes are affected when self-protection is activated. One study showed that in the presence of ambient darkness (i.e. a dark room), a cue that would traditionally be tied to exposure in ancestral environments and is thought to activate self-protection motives (Grillon, Pellowski, Merikangas, & Davis, 1997), participants drew upon threat-connoting stereotypes regarding an outgroup member (in this case a Black male), but did not draw upon other, equally negative but unrelated to threat stereotypes (Schaller, Park & Faulkner, 2003). In addition, active self-protection motives in the form of threat to the body, or in some cases the threat of disease, increase erroneous perceptions of anger in faces (Maner et al. 2005), increase conformity to an ingroup (Griskevicius, Goldstein, Mortensen, Cialdini & Kenrick, 2006), and influence how people categorize targets (Maner, Miller, Moss, Leo & Plant, 2012).

Research has also identified how mating motives (i.e. the motive to find and attain mates) influence behavior, and how motives can influence behavior in a mating context. For example, activated mating motivations lead to participants categorizing opposite-sex targets based on attractiveness (Maner et. al, 2012), reduce loss aversion in men (Li, Kenrick, Griskevicius & Neuberg, 2012), lead men, but not women, to focus more on the faces of attractive opposite-sex others (Duncan et al., 2007), lead male participants to perceive more sexual arousal in the faces of women (Maner et al., 2005), and sex-ratio, a cue tied to the availability of potential mates in one's environment, can affect women's choices about whether to invest in a career to procure or whether to invest in a long-term mate (Durante, Griskevicius, Simpson, Cantu & Tybur, 2012).

Overall, there is a large body of evidence supporting the framework and the hypothesis that motives can be temporarily activated through different priming methods and that motives then influence other behaviors including attitudes, choices, and even cognition (Buss & Schmitt, 1993; Hill, Rodeheffer, Griskevicius, Durante & White, 2012; Kenrick, Griskevicius, Neuberg, Becker & Schaller, 2010; Kenrick, Griskevicius, Neuberg, & Schaller, 2010; Neuberg, Kenrick, Maner, & Schaller, 2005; Griskevicius et al., 2011a; Hill & Durante, 2011; Roney, 2003; Sundie et al., 2011). Of particular note for the present research, motives can influence what associations or stereotypes people draw upon when categorizing others, when making decisions, or when assessing future plans and that motives affect evaluations (Duncan & Schaller, 2009; Park, Faulkner, & Schaller, 2003; Park, Schaller, & Crandall, 2007). Furthermore, many of these effects involve the aspects of the environment, or of other people, people attend to or focus on. For example, active self-protection leads to greater attention to angry faces, particularly male or “disfigured” faces (Ackerman, Becker, Mortensen, Sasaki, Neuberg, & Kenrick, 2009; Fox, Russo, Bowles, & Dutton, 2001), active mating motives increase use of attractiveness in categorization versus other observable traits (Duncan et al., 2007), increase creativity (Griskevicius, Cialdini, & Kenrick, 2006), and affect encoding and memory (Becker, Kenrick, Guerin, & Maner, 2005). Evidence suggests that activated motives are capable of influencing attitudes, and are capable of directing people’s focus on some aspects of their environment to the neglect of other aspects.

### **Detecting Motive Influences on Associations**

Evaluation is subject to context, and cues that activate different fundamental motives are essentially context factors. In the present research, we propose that we can affect women’s evaluations of potential mates by priming an environmental threat and influencing motivation,

and that these threat primes will affect evaluation specifically by affecting what aspects of a potential mate women attend to and thus what associations about potential mates are activated when evaluation occurs. Previously discussed research showed that primes are capable of shifting what aspects or traits observers attend to in other people, a necessary component of our research. In order to test the idea that we will observe changes in the traits, and consequently the associations, that women draw upon when primed with a motive prime, we must have a method for detecting activated associations that might occur in response to a primed threat. One such method is the use of a lexical decision task.

Lexical decision tasks (Meyer & Schvaneveldt, 1971; Schvaneveldt & Meyer, 1973; Meyer, Schvaneveldt & Ruddy, 1975) are a specific kind of test originally designed to assess how we store and retrieve information. Participants are presented with words and non-words and are asked to designate whether a string of letters is a word or a non-word. Reaction time is particularly important in assessing a person's performance on the task; specifically, faster response times are thought to be an indicator of high association strength between one word or concept and another (Gaertner & McLaughlin, 1983; Meyer & Schvaneveldt, 1971). Initial research was done on semantic priming, such as priming a participant with a word like "doctor" and assessing the speed with which they responded to a word like "nurse" (Schneider & Shiffrin, 1977; Shiffrin & Schneider, 1977). Previous research using lexical decision tasks has shown that priming, whether with single words, drawings, unknown but foreign sounding words or even odors, can affect performance in the form of lower latency in responding to related or unrelated words on the task (Bargh, Chaiken, Govender & Pratto, 1992; Challis & Krane, 1988; Fazio, Jackson, Dunton & Williams, 1995; Fazio, Sanbonmatsu, Powell & Kardes, 1986; Giner-Sorolla, Garcia & Bargh, 1999; Hermans, Baeyens & Eelen, 1998; Wittenbrink, Judd & Park, 1997).

Furthermore, one explanation used to understand these effects is that primes activate a node in memory which is closer to certain associations or words than to others, and that this closeness increases the speed with which people respond to words tied to that active node or close associations (Posner & Snyder, 2004). Based on this research, it should be possible to use a lexical decision task to assess if a motive prime produces changes in evaluation because the prime unconsciously activated certain aspects of an environment (e.g. certain qualities or traits observed previously by women), making those aspects more likely to be used when evaluating that environment. For example, might a prime to disease threat lead women to assess two men based on their described dominance rather than some normally important trait which is unrelated to physical health in addition to responding faster to traits related to health rather than kindness in a lexical decision task?

### **The Present Experiments**

The experiments detailed here focused on external factors that may have influence women's mate preferences and evaluations rather than focus on internal factors in women that do the same. Over 5 experiments we examined how cueing different environmental threats tied to key human motivations would affect women's evaluations of potential mates who differed on threat-relevant traits. Key to these experiments was evaluation: how positively did women rate potential mates, and did these evaluations differ based on primed environmental threats. In later experiments, this was further elaborated on by examining how threat primes may have affected evaluations through activated associations, a process described in the construal model of attitudes (Lord & Lepper, 1999; Schwarz, 2007).

**Hypotheses.** We tested the following hypotheses over 5 experiments:

1. In Experiments 1 and 2, which together formed the basis for Holland's thesis (unpublished, 2015) we predicted that, at least in modern economically advanced countries, women would normally prefer likable (warm) but relatively incompetent or submissive men to dislikable (cold) but relatively competent or dominant men, but that environmental threats, for instance of scarce resources or rampant disease, might significantly reduce that preference.
2. In Experiments 3 and 4 we predicted that we would find conceptual replication of Experiments 1 and 2, respectively, when replacing the warmth dimension with a more neutral dimension, in this case extroversion, to remove the overpowering effect of warmth on evaluation.
3. In Experiments 3, 4 and 5 we predicted that environmental threats would affect women's mating evaluations by making a potential mate's threat-relevant shortcomings more cognitively accessible.
4. In Experiment 5, we predicted that two new primed environmental threats, specifically a threat to affiliation (ostracism) and a threat to self-protection, would predictably shift women's evaluations of a competent, introverted and incompetent, extroverted man compared to a control condition. Specifically, we predicted that women would prefer the competent, but introverted man when primed with self-protection threat and would prefer the extroverted, but incompetent, man when primed with ostracism. Furthermore, we predicted that these shifts would each be predicted by activated associations related to the mate's threat-relevant shortcomings (i.e. introverted when primed with ostracism, and incompetent when primed with self-protection).

Based on motives research and attitudes, we wanted to test the idea that cued environmental threats specifically tied to human survival and reproduction would bring different attributes of two men to mind when women evaluated them as potential partners.

### **Experiment 1**

Our first experiment examined how an evolutionarily relevant, fundamental motivation affected women's evaluations regarding two potential romantic partners who varied on partner-relevant attributes. Our hypothesis was that female participants who were shown cues signaling scarce resources would have more positive attitudes toward a cold, but competent man versus a warm, but incompetent man compared to participants who were not primed with resource scarcity.

#### **Partner Preference**

In order to understand our prediction that resource scarcity will have an impact on mate preference for these two men, we will review where these attributes came from. We adapted the dimensions of warmth and competence from a framework by Cuddy, Fiske and Glick (2008). Warmth describes other people's intents and informs people's tendencies to harm or support you, while competence describes people's skills or abilities, and may inform others' abilities to carry out their intent. According to research in interpersonal perception, these two dimensions capture a large majority (i.e. 82%) of terms people use to describe groups and individual group members (Wojciszke et al., 1998). These two dimensions also appear to be used by people from a wide range of countries and ethnicities (Cuddy et al., 2009; Ybarra et al., 2008), showing that they are universal as well as very important. While both dimensions are present in people's concept of others and groups (Fiske, Cuddy, Glick & Xu, 2002), there is evidence that the warmth dimension is more critical. For example, warmth has primacy in deciding people's judgments,

whereas competence appears to help moderate, but not override completely, a response based on warmth (Cuddy, Fiske & Glick, 2008; Wojciszke et al., 1998; Ybarra et al., 2001). This primacy is the reason that we expected preferences for warmth to be reduced, but not erased by a resource scarcity prime.

Groups vary naturally on warmth and competence. Some may be perceived as warm and competent (e.g. such as Christians according to American respondents), and others may be perceived as cold and incompetent (e.g. the homeless). People can also be perceived as a mix, rating high on warmth and low on competence (e.g. the elderly) or high on competence but low in warmth (e.g. lawyers). In fact, such ambivalent combinations are not uncommon (Cuddy, Fiske & Glick, 2007; Cuddy, Norton & Fiske, 2005; Fiske et al., 2002; Fiske & Cuddy, 2006). This ambivalence was ideal to use as a test of tradeoffs in mate preferences. We could assume that people would prefer a highly competent and warm partner overall, but that warmth would be more important than competence. A preference for warmth is predicted by interpersonal perception research (see Cuddy, Fiske & Glick, 2008), but is additionally supported by mate preference research showing that in long-term mates especially, people look for traits like trustworthiness or kindness, which are very similar to descriptions of warmth (Buss, 1989; Buss, Shackelford, Kirkpatrick & Larsen, 2001; Shackelford, Schmitt & Buss, 2005).

Despite people's preferences, they often have to select some traits over others (Waynforth, 2001). People are limited in their time, energy, and ability to attract mates, so it is often the case that people trade off certain preferences for others (Li, Balley, Kenrick & Linsenmeier, 2002; Li & Kenrick, 2006). For example, women looking for long term mates might make a trade off where they choose a moderately attractive man over very attractive man for the moderately attractive man's ability to gather resources and support a family (Li et al.,

2002). Preferences and plausible tradeoffs are a large topic of research (see Buss 1989). Similarly, women might select a warm, but incompetent man over a cold, but competent one, trading warmth for competence. Would such tradeoffs be sensitive to context? Depending on local conditions, competence may become more important and warmth may have to be put on the backburner, for example, in times of resource scarcity. After all, a nice mate who cannot provide in harsh times may be more problematic than a mate who is not great to be around, but can provide.

### **Method**

**Participants.** Unmarried TCU college women ( $n = 149$ ) participated in this experiment for course credit. Participants were screened for relationship status. Only women who were single at the time of a prescreen survey were allowed to participate. Using an online Qualtrics survey, participants were asked to report their relationship status in addition to many other variables.

**Procedure.** Participants were recruited using SONA software and were scheduled to participate at least 24 hours prior to the experiment. Participants were brought into a lab space in groups and seated at individual computers separated by high partitions. The experimenter instructed participants onto a Qualtrics website survey containing all measures and procedures used in this experiment. The experiment used a 2 (Priming) x 2 (Mating Target Traits) design. First, all those participating were asked to provide consent, and then completed basic demographic questions such as age, sex, and year in school.

**Resource scarcity prime.** Participants saw instructions for a "Stimulus Pretest." We manipulated the motivation of participants, or in other words, primed women with a key environmental threat that was hypothesized to influence mate choice. We manipulated resource

scarcity by having participants read either an article about a downtrodden economy with few jobs or a control article (see Hill et al., 2012). Under the pretext of testing stimulus materials for a future study, participants were randomly assigned to one of two conditions: resource scarcity ( $n = 64$ ) or control ( $n = 65$ ). Using the same manipulation as Hill et al. (2012, Study 2), women in the resource scarcity condition read a fictitious news article saying that the world and U.S. economy had entered a severe depression similar to the Great Depression, with no end in sight. Women in the control condition read an article of similar length and format about current architecture. The resource scarcity article reliably elicited thoughts that fewer people have a good job, a steady income, or a lot of money (Hill; et al., p. 278) and makes women more strongly value a marriage partner's financial standing and stability (p. 281).

**Mating Targets.** Participants were next asked to move on to the main study, which was described as an analysis of online dating profiles. They saw instructions regarding a "Preliminary Date Quality" section, explaining that we would like participants to provide some feedback on basic dating profiles taken from local online websites. Participants read about two men they believed to be singles in their area: one man had attributes suggesting he was cold, but competent and one man had attributes suggesting he was warm, but incompetent. Each dimension was communicated by 5 bolded attributes each, totaling 10 attributes in each man's profile. The men were shown separately and in random order for at least 1 minute each. Participants were instructed to read the profiles carefully, and note any bolded words because they would be asked to remember them later.

Participants read two profiles presented in random order. Profile 1, of the cold/competent man, read: John/Robert is 24 years old. People who know him say that he is a **capable** and **efficient** person. Because he is **talented**, he can also come across as **strict** and **demanding**.

Although he is **proficient** and **skillful** in many ways, he has also been described as **stern**, **quarrelsome**, and even **heartless**.

Profile 2, of the warm/incompetent man, read: Robert/John is 24 years old. People who know him say that he is an **amiable** and **agreeable** person. Because he is **considerate**, he can also come across as **unskilled** and **helpless**. Although he is **kindly** and **trustworthy** in many ways, he has also been described as **clumsy**, **passive** and even **aimless**. The likeability of each trait, as well as averages for each trait dimension and each profile can be found in Table 1.

According to Anderson's (1968) ratings, the competent/cold man's competent attributes had mean likability of 4.61 and his cold attributes had mean likability of 1.81. The warm/incompetent man's warm traits had mean likability of 4.85 and his incompetent attributes had mean likability of 1.80. The two men each had five positive attributes that were approximately equal in how likable they were and five negative attributes that were approximately equal in how unlikable they were. Furthermore, these attributes have been used in other studies on the warmth and competence dimensions (Cuddy, et al., 2007). Instead of a photo, both profiles were accompanied by the same black and white silhouette and the first names attached to each profile were counterbalanced.

Incompetent-Warm		Likeability
Incompetent	Unskilled	2.24 (.83)
	Helpless	1.36 (1.12)
	Clumsy	1.99 (.92)
	Passive	2.23 (.97)
	Aimless	1.22 (1.16)
	Incompetence Total	1.81 (.83)
Warm	Amiable	4.46 (1.02)
	Agreeable	4.34 (.95)
	Considerate	5.27 (.76)
	Kindly	4.79 (1.06)
	Trustworthy	5.39 (.62)

*Table 1 cont.*

		Warm Total	4.85 (.89)
Competent-Cold			
Competent	Capable	4.71 (.63)	
	Efficient	4.82 (.94)	
	Talented	4.78 (.84)	
	Proficient	4.38 (.70)	
	Skillful	4.38 (.80)	
	Competent Total	4.61 (.78)	
Cold	Strict	2.66 (1.30)	
	Demanding	2.03 (.94)	
	Stern	2.57 (1.10)	
	Quarrelsome	1.01 (.72)	
	Heartless	.78 (.92)	
	Cold Total	1.81 (1.01)	

**Dependent measures.** After being shown both profiles, participants were asked how much they would want to date each man, on scales from 0 = *not at all* to 10 = *very much*. They were also asked if they had to choose dating one or the other, which man would they choose. (The two photos and profiles were shown again on the screen with this question). Next, participants were asked how much they would want a long-term relationship with each man, on scales from 0 = *not at all* to 10 = *very much*. They were also asked if they had to choose between these two men as potential long-term partners, which man they would choose.

**Priming manipulation check.** Following the presentation of the dependent measures, participants were asked how worried they were about finding a job after college, how bad they perceived the economy to be, and how anxious the article made them feel, all on scales from 0 = *not at all* to 10 = *very much*. Participants should express more worries about finding a job after college, and about a bad economy compared to participants in the control condition given that the resource scarcity prime communicates these two messages.

**Individual difference measures.** Following this manipulation check, participants completed the Sociosexual Orientation Inventory (SOI), which measures an individual's

propensity for casual sex (Penke, 2011), and the Mate Value Scale (Landolt et al., 1995), which asks participants about their own perceived mate value, with questions such as, “Members of the opposite sex find me attractive”. These scales were included to test whether the predicted willingness to sacrifice partner warmth for competence might be more pronounced among women who had greater propensity for casual sex (Simpson & Gangestad, 1992) and perceived themselves to be relatively low in mate value (Buss & Shackelford, 2008).

**Suspicion check and debriefing.** Participants were then asked what they believed to be the purpose of the pretesting materials (i.e. the primes) and the dating preferences, whether the two were connected, and if so, how they were connected. No participant accurately guessed the experimental hypothesis. Following this final check, participants were debriefed and released.

## Results

Separate 2 (Priming: resource scarcity vs. architecture) X 2 (Mating Target: cold-competent vs. warm-incompetent) mixed model ANOVAs, with the mating target factor within-subjects, were performed to assess the effect of the resource scarcity prime on women's preferences for warm/incompetent versus cold/competent men as short- and long-term relationship partners and potential moderators of these effects.

**Manipulation check.** Using an independent samples t-test, we examined the effect of the resource scarcity prime on our two manipulation check items. Results showed that despite the results we got for partner preferences, it appeared that the resource scarcity prime did not have any effect on the two manipulation check items. Participants did not express greater worries about finding a job we not significantly heightened in the resource scarcity condition ( $M = 6.14$ ,  $SD = 2.36$ ) versus the control condition ( $M = 5.69$ ,  $SD = 2.09$ ),  $t(127) = -1.14$ ,  $p = .26$ , nor did participants primed with resource scarcity feel the economy was worse ( $M = 4.98$ ,  $SD = 1.40$ )

compared to those in the control condition ( $M = 4.80$ ,  $SD = 1.42$ ),  $t(127) = -.74$ ,  $p = .46$ . While means were differing in the hypothesized direction, there were no significant differences based on what prime a participant received, and we concluded that at least based on these two items, the prime did not appear to have a noticeable influence.

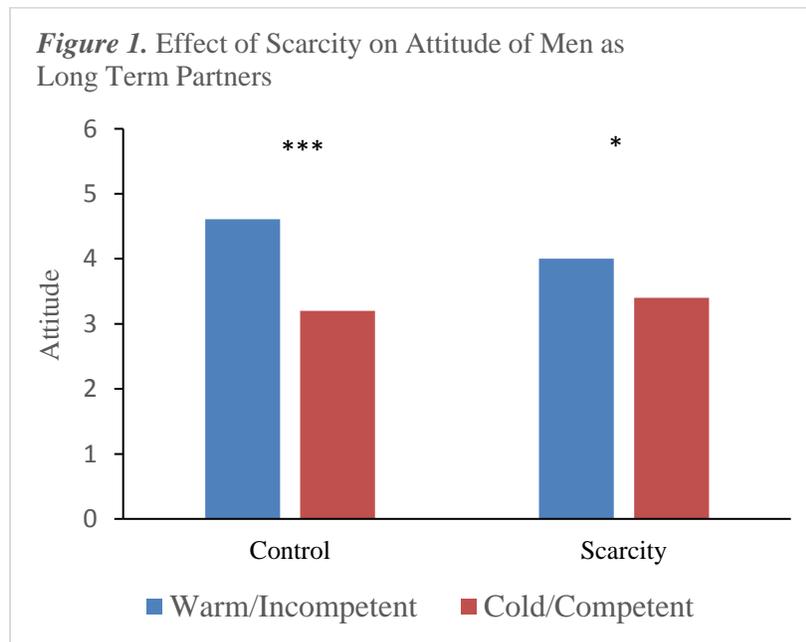
**Partner preferences.** Each participant rated each profile on how much they would like to date that man and on how much they would like to be in a long-term relationship with that man.

**Short-term relationship.** As shown in the top two rows of Table 1, a 2 (Priming: Scarcity, Control—between subjects) X 2 (Mating Target Traits: Warm/Incompetent, Cold/Competent—within subjects) mixed model analysis of variance (ANOVA) of short-term dating preferences yielded only a main effect of target traits. Women preferred to date the warm/incompetent man ( $M = 5.11$ ,  $SD = 2.01$ ) over the cold/competent man ( $M = 4.03$ ,  $SD = 1.95$ ),  $F(1, 147) = 24.06$ ,  $p < .001$ ,  $d = .80$ . Priming did not interact with target traits,  $F(1, 147) = 2.32$ ,  $p = .13$ , *ns*. Given that the two targets were equal in abstract likability of their attributes (by Anderson's 1968 ratings), this finding implies that overall importance of a set of such attributes might vary depending on the target of person perception (Jackson, MacCoun & Kerr, 1987).

**Long-term relationship.** As shown in the middle two rows of Table 2, a Priming X Target Traits ANOVA of long-term relationship preferences yielded both a main effect of target traits and a priming by target traits interaction. Women preferred the warm/incompetent man ( $M = 4.31$ ,  $SD = 2.11$ ) over the cold/competent man ( $M = 3.32$ ,  $SD = 1.99$ ) for a long-term relationship,  $F(1, 147) = 26.78$ ,  $p < .001$ ,  $d = .85$ . This main effect was qualified by a two-way interaction,  $F(1, 147) = 4.88$ ,  $p < .03$ ,  $d = .36$ , in which preference for the warm/competent man was less for women primed with resource scarcity (difference = .57) than for women in the control condition (difference = 1.42).

**Table 2. Mean and Standard Deviation of Women's Wanting a Short- and Long-Term Relationship with Each of Two Men (on scale from 0 = not at all to 10 = very much).**

Relationship	Target Man	Prime Condition	
		Control	Scarcity
Short Term	Warm/Incompetent	5.33 (1.97)	4.89 (2.01)
	Cold/Competent	3.92 (1.96)	4.15 (1.94)
Long Term	Warm/Incompetent	4.62 (2.17)	4.00 (2.01)
	Cold/Competent	3.20 (1.96)	3.43 (2.02)
Overall	Warm/Incompetent	4.97 (1.94)	4.44 (1.89)
	Cold/Competent	3.56 (1.87)	3.79 (1.82)



## Discussion

Results showed that while our primes had no effect on women's preferences for the warm, incompetent man when asked about their evaluations of each man as a potential date (i.e. short-term partner), a resource scarcity prime did significantly affect their preferences when evaluating each man as a potential long-term partner. We found a significant interaction between our motivational context manipulation and preferences for the two different men who differed on traits relevant to both mate selection and the environmental threat. For attitudes about each man

as a long-term partner, women in the resource scarcity condition had less positive attitudes about the warm, but incompetent man, and women in the scarcity condition selected the cold person significantly more and the warm person significantly less than women in the control condition (see Figure 1). We took away from this that, at least for long term relationships, women primed with resource scarcity expressed less of a preference for the warm, but incompetent person. This experiment showed that a cued environmental threat tied to motivation may have served as a context factor that affected women's attitudes toward the motive-relevant object of a potential romantic partner. Women evaluated a man whose traits were not suited to combat the environmental threat less positively than women in a neutral situation. The data from Experiment 1 supported the main hypothesis that women's evaluations of mates are tuned to the presence of environmental threats and that such threats produce evaluations that appear functional. In essence, evaluations lead to an adequate response to the threat, in this case pushing choices away from an incompetent, and thus potentially resource-less, man.

One limitation to the results of Experiment 1 was that they alone could not be considered conclusive evidence for the general idea that temporary environmental threats tied to motives produce changes in evaluations of potential partners. Another problem was that, at least for the items that served as a manipulation check, it appeared that the resource scarcity prime did not have a strong influence on participants. However, this is not necessarily conclusive evidence that the prime failed to prime resource scarcity in participants, simply that at that point in the experiment, participants views of their job prospects and the economy were not moved. It is possible that the prime wore off by the time participants responded to the manipulation check items, or it is possible that resource scarcity can be primed such that it influences some behavior and does not influence other behaviors like judgments of job prospects, although this seemed

unlikely given that the resource scarcity prime directly communicated that jobs were scarce for recent college graduates. More general and conclusive evidence would involve a different threat, especially one that would make a dimension other than competence key to mitigating the environmental threat and thus key for the evaluative response of women. Experiment 2 was conducted to further support our hypotheses and to extend our findings to a new threat.

### **Experiment 2**

In Experiment 2 we examined the effect of a different but very important environmental threat, disease threat, on women's attitudes toward a warm, but weaker (i.e. submissive) partner versus a cold, but stronger (i.e. dominant) partner. We predicted that when primed with disease threat, participants' preference for a warm, but weaker man would be reduced significantly, mirroring the effect we observed in Experiment 1. In addition, we predicted that women would infer that the cold, but dominant man was stronger, higher in testosterone, and higher in immune cell count, which would help elucidate just why dominance mattered when selecting a mate under disease ridden conditions.

### **Method**

**Participants** Unmarried TCU college women ( $n = 158$ ) participated for course credit. Participants were screened for relationship status in a prescreen survey. Using an online Qualtrics survey, participants were asked to report their relationship status in addition to many other variables. Experiment 2 utilized a 2 (Priming) between-subjects x 2 (Mating Target Traits) within-subjects design.

**Disease threat prime.** Participants were primed with disease threat in a method like Experiment 1, except instead of a news article detailing a resource scarce environment, women read an article about diseases like Zika spreading through Texas and attacking young adults ( $n =$

53), or read an article about traffic in Fort Worth and Mexico ( $n = 53$ ). The article on Zika specifically detailed a likely spread of the disease through Texas and the southern United States and emphasized that young adults of ages 18 – 26 were becoming particularly vulnerable. The article on traffic detailed increasingly large traffic jams spilling across the infrastructure of Mexico and the Southern United States. Once again, participants were asked to read the articles for at least 1 minute before moving on to the next part of the experiment.

**Mating targets.** Next, participants were shown two dating profiles like those used in Experiment 1, with two notable exceptions. First, the profiles were framed as 10 different statements taken from friends and online individuals who were supposedly familiar with the man in question (e.g. “I’ve known John a long time, and his **aimlessness** makes it hard to do anything with him”). Second, the attributes of each man were drawn from Kiesler’s (1983) interpersonal circle instead of Fiske, Glick & Cuddy’s (2008) warmth and competence dimensions. The warmth dimension in the interpersonal circle was more or less unchanged, but the competence dimension was replaced with a submissive-dominant dimension that was thought to connote strength or weakness. Again, the submissive-dominant dimension was added because strength and health, potentially inferred via the submissive-dominant dimension, was more relevant to diseases which are fought with the body and which are taxing on health (Buss & Gangestad, 1993). Participants were shown these profiles, in random order, and were asked to pay attention to any words that happened to be bolded. The likeability of each trait, and the average likeability for each dimensions and individual profile can be found in Table 3. Each profile was shown for at least 1 minute. Profile 1 read:

*We have spent time gathering data on John based on his online presence. John’s online profile includes the following comments by his social media friends who know him well:*

“he was very **helpful** to me when I needed help moving apartments”

“when all of us get together, John is the most **agreeable** with other people's plans”

“when I saw John petting that lost kitten, you could see how **gentle** he was”

“it isn't just with his family that John displays his **loving** personality”

“John never fails to be polite and **courteous**, even when other people act like jerks”

“John is so **bumbling** I bet he has trouble tying his own shoelaces”

“John lacks even a hint of confidence and is totally **unassured**”

“I know some people question themselves, but John takes the cake for being **self-doubting**”

“John's approach to life is to sit back, be **passive**, and let things happen to him”

“his walk, his talk, and his social interactions are all very **awkward**”

*Profile 2: We have spent time gathering data on Robert based on his online presence.*

*Roberts's online profile includes the following comments by his social media friends who know him well:*

“Whenever I see Robert, he always seems very **assured** in talking about himself and his plans.”

“more than most of the people I know, Robert is **self-reliant** and takes care of his own business”

“Robert can come across as **stern**, especially when he's got his mind on other things”

“Robert is a stickler for the rules and comes off as **strict**”

“All I can say is that Robert is pretty **inflexible**; when his mind is made up, it's made up”

“Having known Robert a while, I can say he ends up in **leading** positions over following ones.”

“Robert is able to focus a group because of his **commanding** personality”

“Not one to be brushed aside too easily, Robert is definitely a **self-assertive** person.”

“I don't know anyone so direct as Robert; he can really be **impolite**”

“Robert can be quite **quarrelsome**, even with friends and family.”

**Table 3. Likeability of Traits Ascribed to Mating Targets**

Submissive-Warm <sup>1</sup>		Likeability
Submissive	Bumbling (Clumsy)	1.99 (.92)
	Unassured (Nonconfident)	2.19 (1.04)
	Self-Doubting (Hesitant)	2.90 (.76)
	Passive	2.23 (.97)
	Awkward (Ungraceful)	2.28 (.87)
	Submissive Total	2.32 (.91)
Warm	Helpful	4.92 (.74)
	Agreeable	4.34 (.95)
	Gentle	5.03 (1.00)
	Loving	5.52 (.79)
	Courteous	4.94 (.94)
	Warm Total	4.95 (0.48)
Dominant-Cold		
Dominant	Assured	4.11 (.72)
	Self-Reliant	4.62 (.96)
	Leading (Superior)	3.06 (1.45)
	Commanding (Authoritative)	2.74 (1.81)
	Self-Assertive	4.18 (1.21)
	Dominant Total	3.74 (1.28)
Cold	Strict	2.66 (1.30)
	Stern	2.57 (1.10)
	Inflexible (Uncompromising)	1.53 (1.26)
	Quarrelsome	1.01 (.72)
	Impolite	1.03 (.72)
	Cold Total	1.76 (1.05)

1. Words in parentheses are close synonyms with likeability ratings in Anderson (1968) or Dumas et al. (2002) which stand in for the word not in parentheses.

**Dependent measures.** Participants indicated their attitudes in the same way as Experiment 1. After being shown both profiles, participants were asked how much they would want to date each man, on scales from 0 = *not at all* to 10 = *very much*. They were also asked if

they had to choose dating one or the other, which man would they choose. The two photos and profiles were shown again on the screen with this question. Next, participants were asked how much they would want a long-term relationship with each man, on scales from 0 = *not at all* to 10 = *very much*. They were also asked if they had to choose between these two men as potential long-term partners, which man they would choose.

**Priming manipulation check.** Following the dependent measures task, participants were asked how worried they were about becoming sick within the next 3 months, how bad they perceived disease control in the US to be, and how anxious the article made them feel, all on scales from 0 = *not at all* to 10 = *very much*. Participants primed with disease threat should indicate an enhanced worry regarding becoming sick if primed with disease threat compared to the control condition. In addition, participants were asked to infer each mating target's bench press weight, testosterone levels, and immune cell levels. Each variable was given an average level for a 24-year-old male as an anchor, and were presented on sliding scales as many of the values ranged from the 100s to low 1000s.

**Perceived vulnerability to disease.** The threat/motive primed in this study is often used in tandem with a measure known as the Perceived Vulnerability to Disease scale (PVD; Duncan, Schaller & Park, 2009). The PVD is a 15-item scale that has participants rate their agreement with items like, "If something is going around, I will catch it" on a scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). The PVD is broken down into two subscales, the Germ Aversion subscale and the Perceived Infectability subscale. Perceived infectability, which details how vulnerable a person feels to disease and how worried they are about becoming ill, is more relevant to the prime than Germ Aversion, which details simply how disgusted participants are around things perceived to carry germs. In other words, since the present research was focused

on heightened fears of contracting disease rather than assessment of disgust, the Perceived Infectability subscale was relevant while the Germ Aversion subscale was not (see Duncan, Schaller & Park, 2009). People vary in their tendency to worry about disease and infectability specifically, so this factor could have affected how well a disease prime may have worked, or if it would work at all. Because TCU students were primarily young people in decent health, this measure may have also have uncovered effects of disease threat that would be otherwise hidden.

**Suspicion check and debriefing.** Participants were then asked what they believed to be the purpose of the pretesting materials and the dating preferences, whether the two were connected, and if so, how they were connected. No participant accurately guessed the experimental hypothesis. Following this final check, participants were debriefed and released.

## Results

**Manipulation checks.** Participants completed a set of manipulation checks designed to assess the potential effect of the disease threat prime and to determine whether the profiles communicated the qualities, and inferences, about each man that we intended.

**Priming manipulation check.** Results of an independent samples t-test examining manipulation checks of the effect of our disease threat prime showed that participants were significantly more worried about getting sick in the near future in the disease threat condition ( $M = 4.87, SD = 2.24$ ) compared to those in the control condition ( $M = 3.66, SD = 2.27$ ),  $t(104) = 2.76, p < .01$ , and participants reported that disease control in the US was significantly worse when comparing the disease threat condition ( $M = 5.36, SD = 1.96$ ) to the control condition ( $M = 3.83, SD = 2.42$ ),  $t(104) = -3.58, p < .01$ . Based on these results, it appeared that the prime had the intended effect of heightening women's worries regarding disease.

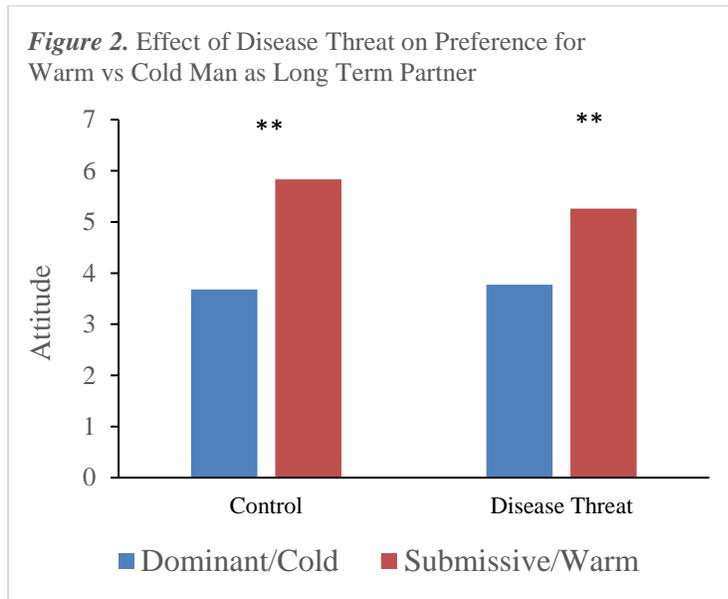
**Target manipulation check.** We examined if participants inferred differences in strength and health between the two men presented in the dating profiles. Results of a paired-samples t-test showed that participants deemed the dominant and cold man as: able to bench-press more weight ( $M = 159.28$ ,  $SD = 27.99$ ) than the submissive and warm man ( $M = 114.25$ ,  $SD = 24.28$ ),  $t(157) = -15.10$ ,  $p < .001$ , higher in testosterone ( $M = 792.32$ ,  $SD = 125.69$ ) than the submissive, warm man ( $M = 589.90$ ,  $SD = 99.75$ ),  $t(157) = -14.54$ ,  $p < .001$ , and higher in levels of health immune cells ( $M = 875.03$ ,  $SD = 92.85$ ) than the submissive, warm man ( $M = 829.55$ ,  $SD = 121.39$ ),  $t(157) = -3.56$ ,  $p < .001$ . Overall, it appears that participants viewed the dominant man as stronger and healthier, as was intended.

**Main effects in dependent measures.** Similar to Experiment 1, we first analyzed participants' evaluations of the two different men (cold/dominant vs warm/submissive) as both short and long-term partners and the effect of the disease prime by using a 2 (Mating Target Traits: warm v. cold) x 2 (Priming: control v. disease) mixed model ANOVA.

**Short-term relationship evaluation.** Analyses yielded no significant simple main effects of the disease prime on women's evaluations of the men as potential dates, all  $ps > .20$ . There was a significant within-subjects effect of the target traits,  $F(1,104) = 23.23$ ,  $p < .001$ , with the warm, but submissive, man ( $M = 5.60$ ,  $SD = 2.12$ ) being liked significantly more than the cold, but dominant, man ( $M = 4.35$ ,  $SD = 1.77$ ) regardless of condition. There was not a significant interaction of target traits and priming,  $F(1, 104) = 1.25$ ,  $p = .26$ . See Table 4 for means and standard deviations.

**Long-term relationship evaluation.** Using the same 2 (Target Traits) x 2 (Priming) mixed-model ANOVA, we examined women's attitudes of each man as a long-term partner. Again, there was no simple main effect of priming on their evaluations,  $ps > .25$ . There was a

significant main effect of target traits,  $F(1, 104) = 43.71, p < .001$ , where again we see that women, regardless of prime condition, preferred the warm, but submissive man ( $M = 5.55, SD = 2.55$ ) compared to the cold, but dominant, man ( $M = 3.73, SD = 1.84$ ). There was no interaction of target traits and priming,  $F(1, 104) = 1.44, p = .23$ , see Figure 2.



**Table 4. Mean and Standard Deviation of Women's Wanting a Short- and Long-Term Relationship with Each of Two Men (on scale from 0 = not at all to 10 = very much).**

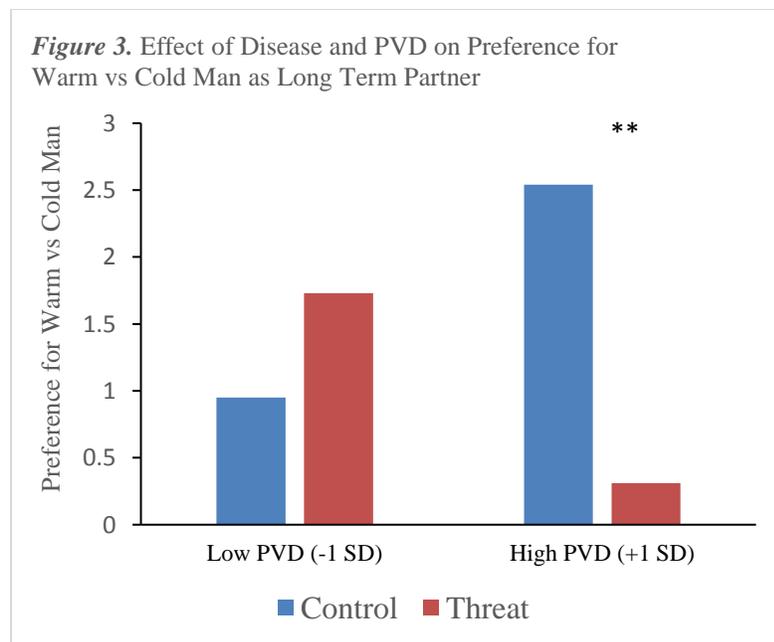
Relationship	Target Man	Prime Condition	
		Control	Scarcity
Short Term	Warm/Submissive	5.87 (2.15)	5.34 (2.08)
	Cold/Dominant	4.32 (1.73)	4.38 (1.82)
Long Term	Warm/Submissive	5.83 (2.41)	5.26 (2.67)
	Cold/Dominant	3.68 (1.71)	3.77 (1.96)
Overall	Warm/Submissive	5.84 (2.12)	5.30 (2.32)
	Cold/Dominant	4.00 (1.58)	4.08 (1.80)

**Moderation by PVD.** We analyzed women's perceived vulnerability to disease and its role in women's attitudes toward our two men and how these may have varied by prime condition. We performed a series of regressions to determine if PVD, or more specifically the Perceived Infectability subscale of the PVD (PVD-PI) would moderate the effects of the disease prime on women's attitudes

regarding short and long-term partners. In order to do this, we collapsed women's evaluations of the cold and the warm man into a difference score (warm – cold), meaning positive values show a preference for the warm over the cold man, and negative values showing a preference for the cold over the warm man.

***PVD-PI and short-term relationship evaluation.*** We analyzed women's evaluations of the men as potential dates using linear regression, and the results showed that there were no significant main effects of PVD,  $b = .09$ ,  $S.E. = .42$ ,  $t = .22$ ,  $p = .83$ , condition,  $b = -.62$ ,  $S.E. = .53$ ,  $t = -1.18$ ,  $p = .24$ , nor an interaction between the two,  $b = -.35$ ,  $S.E. = .59$ ,  $t = -.58$ ,  $p = .56$ .

***PVD-PI and long-term relationship evaluation.*** Next, we analyzed women's evaluations of men as potential long-term partners. The results of a series of linear regressions showed that, for long term partners, there was not a significant main effect of condition,  $b = -.76$ ,  $S.E. = .54$ ,  $t = -1.41$ ,  $p = .16$ , but there was a significant main effect of PVD-PI,  $b = .88$ ,  $S.E. = .43$ ,  $t = 2.07$ ,  $p = .04$ , and a significant interaction between PVD and prime condition,  $b = -1.733$ ,  $S.E. = .61$ ,  $t = -2.86$ ,  $p < .005$ . In order to interpret this interaction, we visualized the data from long-term partner evaluations in Figure 3.



Based on the results of the series of linear regressions we performed on prime condition, PVD-PI, and women's evaluations, we saw that, while there was no effect of PVD-PI when

women were evaluating men as short-term partners, there was an effect of PVD-PI when women evaluated men as long-term partners. To understand how women at different levels of PVD-PI were affected by our prime, we conducted a regression analysis of the effect of the prime at +1 and -1 *SD* of PVD-PI. Those at +1 *SD* of PVD-PI would be considered “higher” in PVD-PI, while those at -1 *SD* of PVD-PI would be considered “lower” in PVD-PI. Results showed that while women at -1 *SD* of PVD-PI were not affected by our prime,  $b = .90$ ,  $S.E. = .76$ ,  $t = 1.17$ ,  $p = .25$ , those at +1 *SD* of PVD-PI were affected by our prime,  $b = -2.21$ ,  $S.E. = .77$ ,  $t = -2.89$ ,  $p < .005$ . This showed that when women were higher in PVD-PI, their evaluations of men as long-term partners were affected by our primes. Figure 2 shows that when women were low in PVD-PI, they generally maintained a preference for the warm, submissive man over the cold, dominant man and that this did not noticeably differ when primed with disease threat. However, those women higher in PVD-PI showed this preference for the warm man when in a control condition, but women primed with disease threat showed a significant attenuation of this preference, reducing almost to no preference.

## Discussion

The results from this experiment showed that there was a significant effect of disease threat on participants' attitudes toward each man as a long-term partner, but this effect was dependent on participants' PVD scores. For those high in PVD, there was a significant reduction in preference for the warm, but weak man when primed with disease threat. This effect was not present in women low in PVD (see Figure 2). Taken together, these results suggested that, as in Experiment 1, an environmental threat relevant to mate choice affected women's attitudes toward two men who varied on threat-relevant dimensions of strength. As in Experiment 1, women in a neutral environment generally preferred a warm person, even if they were

submissive, over a cold person despite their dominance. However, when selecting long-term mates, women primed with an article suggesting disease was on the rise and in their future, looked at the warm, submissive man less positively, putting him even with the cold but dominant man. Again, the threat appears to have only affected evaluations for a long-term mate. However, unlike Experiment 1, an individual difference (i.e. PVD) was key in guiding women's evaluations in the presence of a threat tied to that individual different. Taken together, these results suggested that women worried about disease may be susceptible to a shift in their mating preferences given external threat cues to disease, but only when assessing potential long-term mates. These external cues to disease did not affect women while looking for short-term mates.

Broadly speaking, these findings continued to support our primary hypothesis that women primed with an environmental threat evaluate potential long-term mates differently than those not primed. Furthermore, the threat prime seemed to motivate lower evaluations of potential mates who were deficient in a trait tied to survival or reproduction in the presence of that threat as opposed to higher evaluations of a potential mate who is proficient in a trait tied to survival in the presence of that threat. One limitation to these findings is that we did not identify a mechanism for the effect of a threat prime on differences in evaluations. Construal models suggest that one mechanism should be some form of changes in activated associations during evaluation (see ART Model, Lord & Lepper, 1999). For example, a disease prime might increase the accessibility of a potential mates' traits that fall on the submissive-dominance dimension, thus leading women to evaluate the two men based more on dominance-submissiveness than on the warm-cold dimension which women focus on more in the control/neutral condition.

Experiments 3 - 5 were designed with this in mind, i.e. to propose and test a potential mediator in

the form of cognitive accessibility of traits in the dating profiles. Furthermore, they attempted to conceptually replicate the findings of Experiments 1 and 2.

### **Experiment 3**

Experiment 3 was designed to assess a potential mediator for the effects of a threat prime on women's evaluations of potential partners who differ on threat relevant traits. Specifically, we wanted to examine if the accessibility of certain traits or trait dimensions over others could explain the effect of a threat prime on evaluation. Experiment 3 tested the effect of resource scarcity on women's attitudes toward two potential partners who differed on two dimensions relevant to mate selection, and to provide evidence of a cognitive mediator in the form of increased accessibility of the traits directly related to the primed threat. A key change made to Experiment 3 over Experiment 1 was the replacement of the warm-cold dimension with the hypothetically more neutral dimension of extroversion-introversion. This change was made to bring the evaluations of the two men closer together under neutral (i.e. control) conditions. In other words, warmth was removed as because regardless of condition, warmth was always highly evaluated as positive and replaced by a dimension more neutral (i.e. extremes of the dimension both having positive and negative traits).

### **Method**

**Participants.** Participants were  $n = 168$  single TCU women who participate for course credit. A prescreen questionnaire was used to determine relationship status prior to allowing participants to join in the study. Participants were asked to self-report their relationship status. All study materials were given in a computer lab using Qualtrics survey software.

## Procedure

Experiment 3 utilized a 2 (Priming) between-subjects x 2 (Mating Target Traits) within-subjects design similar to Experiments 1 and 2. However, an additional dependent variable in the form of a lexical decision task was added in-between the prime and the evaluation dependent measures.

**Resource scarcity prime.** After consenting to participate, participants were randomly divided into two groups: scarcity ( $n = 70$ ) or control ( $n = 69$ ). As a cover story, participants were told that they were participating in a task designed to test stimulus materials to be used sometime in the future. These materials explicitly mentioned that the aforementioned task was unrelated to the main part of the study. In the scarcity condition, participants read an article designed to illicit resource scarcity. The participants were led to believe that the article was from a legitimate news source such as the New York Times (Hill et al., 2012). The article was modeled on another news article used previous research on resource scarcity; however, instead of detailing a terrible job market, this modified article detailed the student loan debt crisis, how it would hinder graduate's financial prospects, and how it threatened to plunge the U.S. into a recession similar to the 2007 recession. In the control condition, participants read a similar form of article, except the content detailed increasingly difficult academics at the college level in Texas schools like TCU, which was alarming but not designed to prime any motive. Each article was presented for 2 minutes, after which a timer automatically moved the page forward to the next part of the study.

**Mating targets.** Under the cover story that the present study was interested in how people consume information about other people that is presented in an online format, participants read two profiles detailing two different single men. Each man differed on two fundamental dimensions of social perception: extroversion and competence. One profile had bolded attributes

communicating that one man named Blake was introverted, but competent and the other profile detailing a man named Jacob was extroverted, but incompetent. The competence attributes were derived from fundamental dimensions of interpersonal perceptions (Cuddy, et al., 2007), while the extroversion attributes were derived from descriptions of this Big 5 personality trait in previous research (see Goldberg, 1990). Different than in our previous research, we changed “warmth” to extroversion-introversion because we found generally that people overwhelmingly preferred the warm man to the cold man regardless of manipulations. We decided to pick a well-known dimension to substitute for warmth, but one which potentially carried more neutral appraisals at both ends of the dimension but which people may still evaluate as positive or negative. Participants were told to read each profile for at least 30 seconds before being allowed to move on to the next section. Likeability ratings for each individual trait, as well as the average likeability for a dimension can be found in Table 5. Profile 1, of the introverted/competent man read,

*“Blake is a young man, **out of college for 1 year**. We have spent time gathering data on Blake based on his online presence. Blake’s online profile includes the following comments by his social media friends who know him well:*

“Blake is up to most tasks and **capable** of taking care of business.”

“Blake tends to stay home and be **reclusive**.”

“Under his supervision, even social events are well planned and **efficient**”

“When it comes to personal matters, Blake is a **private** person”

“Blake shows a natural ability for a variety of things, it’s no surprise he’s considered **talented**”

“his closed demeanor is a hallmark of his **reserved** personality”

"I've seen Blake's quality of work myself and I can tell you he's quite **proficient**"

"he is an embodiment of "think before you speak", a **reflective** kind of guy"

"the time and practice he's put in shows how **skillful** he is"

"Blake is **reserved**, so he doesn't tend to let lose even in hectic situations"

Profile 2, of the extroverted/incompetent man read,

*"Jacob is a young man, **out of college for 1 year**. We have spent time gathering data on Jacob based on his online presence. Jacob's online profile includes the following comments by his social media friends who know him well:*

"Even a rookie could tell how **inept** he is"

"Jacob is quite outgoing and **sociable** and enjoys spending time around people"

"Knowing Jacob is to know a person so physically **awkward** that tying his own shoes is a feat."

"Due to Jacob's **talkative** nature, conversation comes easily when you're with him"

"Jacob is so **bumbling**, I've never seen him organized or able to complete anything on time"

"Not one for making plans, he prefers a **spontaneous** life"

"We keep the good china locked away because of how **clumsy** Jacob can be"

"Jacob is pretty **gregarious** so he enjoys a good conversation when others are around."

"Despite being a people person, Jacob is **hesitant** when it comes to any productive or serious matters."

"Jacob's **outgoing** nature makes him a natural at meeting new people"

**Table 5. Likeability of Traits Ascribed to Mating Targets**

Incompetent-Extroverted <sup>1</sup>		Likeability
Incompetent	Awkward	2.24 (.83)
	Bumbling (Clumsy)	1.99 (.92)

*Table 5 cont.*

	Clumsy	1.99 (.92)
	Hesitant	2.90 (.76)
	Inept (Unskilled)	2.24 (.83)
	Submissive Total	2.27 (.85)
Extroverted	Sociable	4.29 (.85)
	Talkative	3.52 (1.32)
	Spontaneous	4.89 (1.02)
	Gregarious (Talkative)	3.52 (1.32)
	Outgoing	4.15 (1.46)
	Warm Total	4.07 (1.21)
	Competent-Introverted	
Competent	Capable	4.71 (.63)
	Efficient	4.82 (.94)
	Talented	4.78 (.84)
	Proficient	4.38 (.70)
	Skillful	4.38 (.80)
	Dominant Total	4.61 (.78)
Introverted	Reclusive (Withdrawn)	2.31 (1.32)
	Private (Independent)	4.55 (1.32)
	Reserved	3.48 (1.00)
	Reflective	3.94 (1.16)
	Quiet	3.11 (.91)
	Cold Total	3.48 (1.15)

1. Words in parentheses are close synonyms with likeability ratings in Anderson (1968) or Dumas et al. (2002) which stand in for the word not in parentheses.

**Lexical decision task.** Following the supposed stimulus pretest, participants were told that one of the main goals of the present study was to investigate how quickly people can respond to information presented quickly. Participants were given an individually unique ID number and were asked to complete a lexical decision task (see Meyer, Schvaneveldt & Ruddy, 1975). Each ID number was requested in the Qualtrics file and in the Inquisit file to match participant's data across the two separate platforms. In this task, participants' main goal was to respond to a set of words and non-words (e.g. destp) and answer "word" or "non-word" by pressing the indicated keyboard key ("I" for word and "E" for non-word). Participants were told that we were interested in both accuracy and speed to emphasize the quick nature of the task. All

materials for the task were presented using Inquisit 3.0 software (2009). The task used a total of 30 non-words and 30 words, not including a small set of practice items designed to acquaint the participants with the nature of the task. Of the 30 words, 10 were neutral words, meaning words that the participants had read somewhere in the dating profiles only once but which were unrelated to the dimensions used. The last 20 words were broken down into these 4 categories each possessing 5 words: competence, incompetence, extroversion and introversion. These words had appeared in the dating profiles as well. Upon completion of the LDT, Inquisit was automatically closed and participants continued with the Qualtrics survey.

**Dependent measures.** Following the lexical decision task, all participants completed a battery of items designed to assess their attitudes towards each man as a short-term partner, a long-term partner, and which person they would rather choose between the two for both short and long-term partners. Because there was a longer period between our prime and when participants were asked to evaluate the two dating profiles compared to previous studies, we very quickly presented the two profiles once again on a separate page before the evaluation items were presented. This was done simply to remind participants of which man had which attributes and participants were moved on from this separate page after X seconds. The attitude questions used Likert scales ranging from 1 (*not at all*) to 10 (*a lot*) while the choice questions simply ask participants to choose either Blake or Jacob. An example item might be, "How much would you want a long-term relationship with Blake/Jacob."

**Priming manipulation check.** Following the presentation of the dependent measures, participants were asked how worried they were about finding a job after college, how bad they perceived the economy to be, and how anxious the article made them feel, all on scales from 0 = *not at all* to 10 = *very much*. Participants were predicted to express more worries about finding a

job after college, and about a bad economy compared to participants in the control condition given that the resource scarcity prime communicates these two messages.

**Individual difference measures.** A final section was presented to participants. This section measured theoretically relevant individual differences (presented in random order), specifically childhood socioeconomic status (Childhood SES; Griskevicius, Tybur, Delton & Robertson, 2011), the Self-Perceived Mate Value Scale (SPMV; Landolt et al., 1995), and the Sociosexual Orientation Inventory (SOI; Penke, 2011).

When reporting childhood SES, participants were instructed to think back to their childhood, specifically about their lives before they were 12 years old. They were given 7 items, one example item is, "My parents had significant financial struggles when I was growing up," ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Reliability for this 7-item scale was  $a = .85$ .

The Self-Perceived Mate Value Scale is a 5-item scale that asked participants to respond to items measuring aspects of the self-related to mating using a 5-point Likert scale. For example, participants were asked to report how difficult they predict it would be for them to find a mate who is interested in them. This measure served as a moderator in Experiment 1 and so was measured here as it might serve as a significant moderator given the similarity between Experiment 1 and this experiment. Reliability for this scale was  $a = 0.69$ .

The SOI is a 9-item scale that assesses one's propensity for more casual, short term sexual behavior versus more committed, long term sexual behavior. The scale is split into 3 subscales: attitudes, desires, and behaviors. The attitude subscale assesses attitudes about sex, and casual sex, and includes items like, "It is okay to have sex without love," which range from 1 (*strongly disagree*) to 9 (*strongly agree*). The desire subscale assesses sexual desire, and includes

items like, “x”, again ranging from 1 (*strongly disagree*) to 9 (*strongly agree*). The behavior subscale assesses a person's actual past behavior, and includes items like, “How many different people have you had sex with?.” Following completion of these individual difference measures, participants were debriefed and released. Reliability for this scale was  $\alpha = 0.87$ .

## Results

For the following analyses we examined both only participants who reported being single ( $n = 138$ ) and only participants that reported being single or in a short-term relationship ( $n = 139$ ). The inclusion of those who reported being in a short-term relationship did not affect the analyses in any noticeable way, either by making an analysis significant where it was not before, or making a once significant analysis become non-significant, and so all reported analyses include both single women and women who reported being in a short-term relationship.

**Manipulation checks.** Participants completed a set of manipulation checks designed to assess the potential effect of the resource scarcity prime and to determine whether the profiles communicated the qualities, and inferences, that we intended.

**Priming manipulation check.** Results of an independent samples t-test examining manipulation checks of the effect of our resource scarcity prime showed that participants were not significantly more worried about finding a job when comparing those in the control condition ( $M = 6.41, SD = 2.34$ ) to those in the resource scarcity condition ( $M = 6.19, SD = 2.64$ ),  $t(126) = .50, p = .62$ , were not significantly more worried about their student loans (i.e. the topic of the resource scarcity prime) when comparing the resource scarcity condition ( $M = 4.81, SD = 3.17$ ) to the control condition ( $M = 4.08, SD = 3.05$ ),  $t(127) = -1.34, p = .18$ , and did not significantly perceive their financial prospects as worse when comparing the resource scarcity condition ( $M = 6.58, SD = 2.54$ ) to the control condition ( $M = 6.51, SD = 2.79$ ),  $t(127) = -.15, p = .88$ . Based on

these results, it appeared that the prime either did not have the intended effect or the effect wore off by the time manipulation check items were presented.

**Target manipulation check.** We examined participants responses to items assessing the financial prospects of the two men in the dating profiles to determine if, regardless of a resource scarcity prime, participants received the intended perception of each man based on their traits. Results of a paired-samples t-test showed that in general, participants deemed Blake, the competent but introverted man ( $M = 8.10$ ,  $SD = 1.77$ ), as being significantly more likely to be promoted in a job compared to Jacob, the incompetent but extroverted man ( $M = 4.90$ ,  $SD = 2.10$ ),  $t(128) = 11.45$ ,  $p < .001$ . In addition, the competent man was deemed as a better potential provider ( $M = 7.68$ ,  $SD = 1.60$ ) than the incompetent man ( $M = 5.68$ ,  $SD = 1.76$ ),  $t(123) = 8.51$ ,  $p < .02$ .

Taken together, these results suggest that while the prime did not have the predicted effect on participants, the profiles communicated the correct impression and that participants were able to infer potential success from basic, common traits.

**Analysis of scarcity and evaluation.** The first set of analyses involved investigating the effect, if any, of our primes on participants' evaluations of the two dating profiles. The first step was investigating the main effect of the Resource Scarcity prime on evaluations, the effect of the words contained in the profile (i.e. competent but introverted vs incompetent but extroverted), and a possible interaction between the prime and the profile traits.

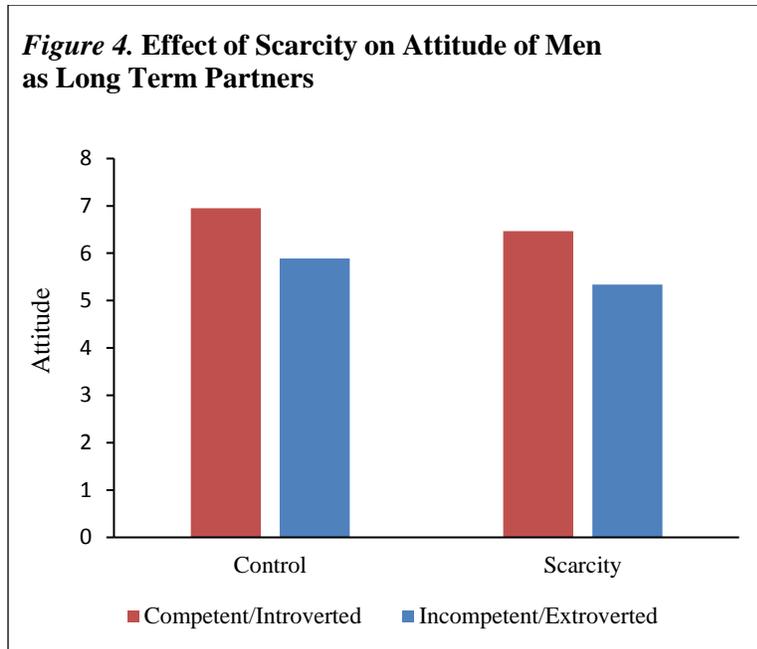
**Short-term relationship evaluation.** A 2 between-subjects (Priming: Control vs. Resource Scarcity) by 2 within-subjects (Mating Target Traits) mixed model analysis of variance (ANOVA) was conducted using women's evaluations of the man in each profile as a date (short-term relationship) and as a long-term companion (long-term relationship). Results showed that

for a short-term relationship there was not a significant main within-subjects effect of target traits,  $F(1,127) < 1$ , and there was not an interaction between target traits and priming,  $F(1,127) = 1.56, p = .21$ , means and standard deviations can be found in Table 6. Women did not rate the incompetent, but extroverted man Jacob positively or negatively for a date compared to the competent, introverted man Blake, and this was not changed by a resource scarcity prime.

**Long-term relationship evaluation.** Results showed that for a long-term relationship there was a significant effect of target traits,  $F(1, 126) = 17.34, p < .001$ , with women generally rating the competent, but introverted man Blake more positively ( $M = 6.71, SD = 1.90$ ) than the incompetent, but extroverted man Jacob ( $M = 5.63, SD = 1.71$ ) when it came to a long-term relationship, see Figure 4. There was not an interaction between priming and target traits,  $F < 1$ . Taken together, these results do not support the hypothesis that, for a long-term relationship, women primed with resource scarcity would evaluate the competent man more positively compared to those in the control condition.

**Table 6. Mean and Standard Deviation of Women's Wanting a Short- and Long-Term Relationship with Each of Two Men (on scale from 0 = not at all to 10 = very much).**

Relationship	Target Man	Prime Condition	
		Control	Scarcity
Short Term	Extroverted/Incompetent	5.97 (1.84)	6.00 (1.77)
	Introverted/Competent	6.32 (1.83)	5.78 (2.17)
Long Term	Extroverted/Incompetent	5.89 (1.74)	5.34 (1.65)
	Introverted/Competent	6.95 (1.62)	6.47 (2.13)
Overall	Extroverted/Incompetent	5.95 (1.65)	5.65 (1.56)
	Introverted/Competent	6.67 (1.45)	6.11 (1.89)



**Examining possible moderation.** Experiment 3 measured a small group of individual difference variables that could act as potential moderators of the relationship between a resource scarcity prime and women's evaluations of men with different, motive relevant traits. We conducted a series of linear regressions using self-perceived mate value as a potential moderator. The evaluation items were collapsed into a difference score representing each type of relationship: short-term and long-term relationships. Difference scores were calculated by subtracting women's evaluation of the incompetent, extroverted man from the competent, introverted man, producing a variable where positive values indicate an absolute preference for the incompetent man, and negative values indicated an absolute preference for the competent man.

Self-perceived mate value (SPMV) was entered as a mean-centered moderator in a linear regression using each evaluation difference score as an outcome variable and priming as a categorical predictor where the control condition was set to 0. All results compare the resource scarcity condition to the control condition. Results showed that for a short-term relationship,

priming nor SPMV were significant predictors of women's evaluations, nor was there a significant interaction. Results for these and the following non-significant inferential statistics can be found in Table 7. Results showed for the long-term relationship, priming was not a significant predictor, SPMV was not a significant predictor, and there was not a significant interaction. These results rule out SPMV as a moderator of the relationship between priming and women's evaluations.

Next, one's childhood socioeconomic status (Child SES) was entered as a moderator into a series of linear regressions. The same process was repeated using sociosexual orientation (SOI). Child SES and condition were not significant predictors of women's evaluations for short-term and long-term relationships, and there was not a significant interaction between the two predictors. SOI and condition were not significant predictors of women's evaluations for short-term and long-term relationships and there was not a significant interaction, see Table 7. Overall, these results show that neither Child SES nor SOI were significant moderators of this relationship. Generally speaking, this failed to uncover a significant relationship between the resource scarcity prime and women's evaluations, regardless of whether women were evaluating a profile for a short-term or a long-term relationship. These results failed to support the hypothesis that women primed with resource scarcity would evaluate the competent man more positively compared to women who were placed in a control condition. None of the moderators tested uncovered data supporting this hypothesis.

**Table 7. Results of Linear Regression Examining Potential Moderator Variables Influencing Condition's Relationship On Women's Evaluations of a Potential Short-term and Long-term Mate**

Outcome <sup>1</sup>	Moderator <sup>2</sup>	Predictor <sup>3</sup>	<i>b</i> ( <i>SE</i> )	<i>t</i>	<i>p</i>
Short-Term Relationship	SPMV	Condition	.61 (.48)	1.28	.20
		SPMV	.15 (.23)	.64	.52
		Interaction	.11 (.45)	.23	.82
	Child SES	Condition	.61 (.47)	1.29	.20
		Child SES	.33 (.24)	1.37	.17

*Table 7 cont.*

		Interaction	-.08 (.49)	-.16	.87
	SOI	Condition	.58 (.47)	1.23	.22
		SOI	.41 (.22)	1.84	.07
		Interaction	.67 (.45)	1.49	.14
Long-term Relationship	SPMV	Condition	-.13 (.53)	-.24	.81
		SPMV	-.24 (.25)	-.95	.35
		Interaction	-.49 (.50)	-.98	.33
	Child SES	Condition	-.07 (.53)	-.12	.90
		Child SES	.14 (.27)	.50	.62
		Interaction	.07 (.55)	.13	.90
	SOI	Condition	-.09 (.53)	-.16	.87
		SOI	.06 (.25)	.25	.80
		Interaction	-.41 (.50)	-.82	.41

1. Evaluation outcome variables were difference scores computed where  $Y = \text{Incompetent Man} - \text{Competent Man}$

2. Moderators were mean-centered prior to analysis.

3. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Priming and a potential mediator.** Experiment 3 was conducted in part to explore a potential mediator that might explain the effect of a resource scarcity prime on women's evaluations of potential partners that varied based on motive relevant traits. Despite the fact that initial attempts to show a direct relationship between a resource scarcity prime (i.e. the *c* path) returned non-significant results, there might be an effect of priming on our proposed mediator(s) and a relationship between the mediator and our outcome variable of women's evaluations, so we continued our analysis further. For the *a* path, we explored the effect of priming on the results of a lexical decision task, which included both reaction time and accuracy when determining words from nonwords.

The Lexical Decision Task (LDT) produced numerous individual variables that could be used as outcome variables. The LDT included 5 words for each trait highlighted on the profiles participants evaluated. The reaction times and accuracies (i.e. how many words were correctly defined as words) for the individual words were averaged into an aggregate variable representing each trait type, producing 4 individual reaction time variables, and 4 individual accuracy

variables: competent, incompetent, extroverted and introverted. In addition, we calculated both an average reaction time and a total number correct for the neutral word category, which could serve as a baseline or control variable. Means and standard deviations can be found in Table 8.

**Priming and LDT performance.** The first set of analyses involved a series of independent samples t-tests to examine the effect of priming on participant's average reaction times for competent, incompetent, extroverted and introverted words. Results showed no significant differences in average reaction time to each of 4 categories of traits examined. Next, we examined accuracy to determine if participants answered more or less accurately depending on condition. Again, results showed there were no significant differences based on condition. Inferential statistics and means can be found in Table 8.

**Table 8. Independent Samples t-test Examining the Effect of Resource Scarcity on Lexical Decision Task Performance.**

Outcome Variable <sup>1</sup>	Condition	<i>M</i> ( <i>SD</i> )	<i>t</i> ( <i>df</i> ) <sup>2</sup>	<i>p</i>
Competence Reaction Time	Control	737.25 (159.39)		
	Resource Scarcity	725.55 (142.65)	.39 (101)	.70
Incompetence Reaction Time	Control	631.45 (132.31)		
	Resource Scarcity	619.43 (109.78)	.50 (101)	.62
Extroversion Reaction Time	Control	653.16 (145.79)		
	Resource Scarcity	643.64 (135.58)	.34 (101)	.73
Introversion Reaction Time	Control	647.19 (139.95)		
	Resource Scarcity	619.63 (94.00)	1.16 (101)	.25
Competence Accuracy	Control	4.39 (.89)		
	Resource Scarcity	4.39 (1.08)	.04 (100)	.97
Incompetence Accuracy	Control	4.72 (.60)		
	Resource Scarcity	4.55 (.89)	1.11 (100)	.27
Extroversion Accuracy	Control	4.59 (.72)		
	Resource Scarcity	4.57 (.84)	.09 (100)	.93
Introversion Accuracy	Control	4.50 (.95)		
	Resource Scarcity	4.57 (.89)	-.39 (101)	.70

1. Reaction time is measured in milliseconds, and accuracy is measured in words correctly answered out of 5 possible words.

2. t-test results compare the difference between the control condition and resource scarcity condition for each outcome variable.

*Priming, mating target traits, and LDT performance.* Next, we conducted a 4 (Mating Target Traits) within-subjects factor X 2 (Priming) between-subjects factor mixed-model ANOVA to examine possible interactions that occurred in the reaction times of each individual participant. Results showed a main effect of traits on reaction times,  $F(3, 303) = 43.10, p < .001$ , but no interaction with priming,  $F(3, 303) < 1$ . Essentially, participants' reaction times did not significantly differ based on target trait but not on priming. Pairwise comparisons showed that participants reacted the slowest to competence words ( $M = 731.68, SD = 151.03$ ), which differed significantly from every other trait. Participants' average reaction time for incompetence words was the fastest ( $M = 625.73, SD = 121.67$ ) and significantly differed from both competence and extraversion, but did not significantly differ from introversion.

We conducted the same analysis using accuracy for the 4 traits as the outcome variables. Results showed a marginally significant main effect of trait type on accuracy,  $F(3, 300) = 2.46, p = .06$ , but a non-significant interaction of target traits with the scarcity prime,  $F < 1$ . Pairwise comparisons showed that participants were significantly less accurate in discerning competence words from non-words ( $M = 4.39, SD = .98$ ) compared to incompetence words ( $M = 4.63, SD = .76$ ). We examined participant's accuracy for neutral words as it may serve as a control for participant's general ability on the LDT; however, using this as a covariate in this analysis showed neutral word accuracy was not a significant covariate,  $F < 1$ , and it was dropped from further analyses.

Based on these results, we were unable to conclude whether or not there was a direct relationship between the resource scarcity prime and participant's reaction times and scores on a lexical decision task containing the 4 trait categories participants were exposed to in the dating profiles. This did not support our hypothesis that reaction times, or perhaps accuracy, could serve

as a mediator between priming and participant's evaluations. Even when accounting for participant's performance on neutral words, we found no significant interaction relationships.

**Moderation, condition and cognitive performance.** Although the potential moderators proved non-significant for the direct relationship between priming and participant's evaluations, they might moderate the relationship between priming and performance on the LDT. In order to determine if there was moderation of this relationship, perhaps signifying a moderated-mediation model was required instead of simple mediation, SPMV, Child SES and SOI were all entered, one at a time only, as moderators in a set of linear regressions using average reaction times and accuracies for each trait type as the outcome variables. Due to missing data, the sample size for these analyses were all at least  $n = 100$ . Because linear regression can only predict one outcome variable at a time, each trait reaction time and accuracy was entered individually, producing 8 analyses per moderator, a total of 24 analyses. The results of these can be found collectively in Tables 9, 10 and 11.

**Table 9. Results of Linear Regression Examining SPMV Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Competence Reaction Time	Condition	13.69 (87.19)	.15	.88
	SPMV	-4.09 (16.81)	-.24	.80
	Interaction	-13.92 (25.26)	-.55	.58
Incompetence Reaction Time	Condition	38.88 (55.44)	.70	.49
	SPMV	2.42 (10.69)	.22	.82
	Interaction	25.60 (29.83)	.85	.39
Extroversion Reaction Time	Condition	-7.81 (82.54)	-.10	.93
	SPMV	-10.52 (15.91)	-.66	.51
	Interaction	-6.06 (23.91)	-.25	.80
Introversion Reaction Time	Condition	-83.15 (67.16)	-1.23	.22
	SPMV	-10.25 (12.95)	-.79	.43
	Interaction	13.20 (19.45)	.67	.49
Competence Accuracy	Condition	-.90 (.63)	-1.41	.16
	SPMV	-.02 (.12)	-.15	.87
	Interaction	.28 (.19)	1.54	.12
Incompetence Accuracy	Condition	-.61 (.50)	-1.24	.22

**Table 9 cont.**

	SPMV	-.001 (.10)	-.01	.99
	Interaction	.14 (.14)	1.00	.31
Extroversion Accuracy	Condition	-.88 (.51)	-1.72	.09
	SPMV	-.13 (.09)	-1.27	.21
	Interaction	.27 (.14)	1.80	.08
Introversion Accuracy	Condition	-1.30 (.52)	-2.53	.01
	SPMV	-.13 (.09)	-1.33	.18
	Interaction	.39 (.14)	2.63	.01

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Table 10. Results of Linear Regression Examining Child SES Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Competence Reaction Time	Condition	-33.65 (26.85)	-1.25	.21
	Child SES	-9.11 (14.71)	-.62	.53
	Interaction	25.60 (29.83)	.85	.39
Incompetence Reaction Time	Condition	-25.27 (21.50)	-1.17	.24
	Child SES	.54 (11.77)	.05	.96
	Interaction	22.03 (23.89)	.92	.36
Extroversion Reaction Time	Condition	-29.92 (24.98)	-1.18	.23
	Child SES	-2.54 (13.63)	-.19	.85
	Interaction	30.71 (27.66)	1.11	.27
Introversion Reaction Time	Condition	-42.31 (20.79)	-2.04	.05
	Child SES	-12.98 (11.38)	-1.14	.25
	Interaction	-3.55 (23.10)	-.15	.88
Competence Accuracy	Condition	.02 (.19)	.15	.89
	Child SES	.02 (.19)	-1.65	.10
	Interaction	-.39 (.21)	-1.87	.06
Incompetence Accuracy	Condition	-.14 (.15)	-.96	.33
	Child SES	.08 (.09)	.99	.32
	Interaction	.09 (.17)	.52	.60
Extroversion Accuracy	Condition	.03 (.15)	.21	.83
	Child SES	-.06 (.08)	-.72	.47
	Interaction	-.07 (.17)	-.45	.65
Introversion Accuracy	Condition	-.01 (.16)	-.09	.93
	Child SES	.07 (.09)	.78	.44
	Interaction	.19 (.18)	1.04	.30

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Table 11. Results of Linear Regression Examining SOI Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Competence Reaction Time	Condition	84.84 (82.04)	1.03	.30
	SOI	7.52 (17.02)	.44	.66
	Interaction	-37.04 (25.07)	-1.48	.14
Incompetence Reaction Time	Condition	-2.65 (65.57)	-.04	.97
	SOI	-8.29 (13.61)	-.60	.54
	Interaction	-7.47 (20.03)	-.37	.71
Extroversion Reaction Time	Condition	17.69 (78.21)	.22	.82
	SOI	-7.69 (16.23)	-.47	.64
	Interaction	-13.42 (23.89)	-.56	.58
Introversion Reaction Time	Condition	17.70 (63.61)	.27	.78
	SOI	11.61 (13.20)	.87	.38
	Interaction	-18.33 (19.43)	-.94	.34
Competence Accuracy	Condition	.03 (.19)	.17	.86
	SOI	.24 (.09)	2.76	.007
	Interaction	.08 (.18)	.44	.65
Incompetence Accuracy	Condition	-.16 (.15)	-1.02	.31
	SOI	-.01 (.07)	-.12	.90
	Interaction	-.16 (.14)	-1.17	.25
Extroversion Accuracy	Condition	.01 (.16)	.06	.95
	SOI	.10 (.07)	1.29	.20
	Interaction	.02 (.15)	.14	.88
Introversion Accuracy	Condition	-.02 (.16)	-.11	.90
	SOI	-.02 (.07)	-.32	.75
	Interaction	-.24 (.15)	-1.63	.10

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

SPMV was examined first as a potential moderator. All analyses returned non-significant results, including when average reaction time for each trait served as the outcome variable and when accuracy was the outcome variable. There were no significant main effects of SPMV or priming, and there were no significant interactions between the two variables except in one instance. Participant's accuracy on introversion words was moderated by SPMV as indicated by a significant interaction between priming and SPMV,  $b = .39$ ,  $S.E. = .15$ ,  $t = 2.63$ ,  $p = .01$ . However, results showed that at +/- 1 *SD* of SPMV, there was no significant difference in

accuracy when the resource scarcity condition was compared to the control condition,  $ps > .05$ . Collectively, this suggested that regardless of whether examining participant's average reaction time or accuracy, there was no moderation by SPMV, see Table 6.

Results returned when using Child SES (Table 7) and SOI (Table 8) showed the same outcomes with two exceptions. For participant's accuracy in determining competence words from non-words, SOI was a significant predictor of accuracy,  $b = .25$ ,  $S.E. = .09$ ,  $t = 2.76$ ,  $p = .007$ . Increases in SOI predicted greater accuracy. The second exception involved participant's average reaction time to introversion words while using Child SES as a moderator,  $b = -42.31$ ,  $S.E. = 20.79$ ,  $t = -2.04$ ,  $p = .05$ . Participants in the resource scarcity condition were faster than those in the control condition. However, given that every other analysis failed to show this difference, and that Child SES was a non-significant predictor in this model, this finding was not meaningful. Taken all together, these results suggested that there was no significant relationship between the resource scarcity prime and participant's performance on the LDT even when considering these three potential moderators. There was no support for a possible  $a$  path and as such pursuing a mediation model was unwarranted.

## **Discussion**

Experiment 3 was designed to conceptually replicate the effects found in Experiment 1 and extend our understanding of these effects by testing a potential mediator in the form of changes in cognitive accessibility of traits relevant to a primed motive, in this case resource scarcity. We hypothesized that women primed with resource scarcity would evaluate a man with clear traits indicating competence more positively compared to women not primed. Furthermore, we hypothesized that the effect of the resource scarcity prime was mediated through changes in cognition such as trait accessibility as measured via a lexical decision task. Neither of these

hypotheses was supported by the results we obtained. Women's evaluations were unaffected by the resource scarcity prime, and performance on the lexical decision task appeared unchanged.

After reviewing our results, there were potential reasons why we failed to find supporting evidence for our hypotheses. Experiment 3 did contain changes from Experiment 1, primarily the removal of the warm-cold interpersonal dimension, the addition of the lexical decision task, and a slight modification of the dating profiles. Because these were all relevant to the results obtained in Experiments 4 and 5, they are discussed in detail in the general discussion.

### **Experiment 4**

Building on the results from Experiment 2 and our hypotheses from Experiment 3, Experiment 4 was designed to conceptually replicate the effects of disease threat on women's attitudes toward two men who differ on key interpersonal, and relevant, dimensions, and to investigate a possible relationship between cognitive processes as measured via the results of a lexical decision task on these effects.

#### **Method**

**Participants.** Single TCU women ( $n = 146$ ) participated for course credit. Participants were screened prior to the start of the experiment using prescreen data. Those who participated in Experiment 3 were not allowed to participate in Experiment 4.

**Procedure.** The procedure for Experiment 4 was similar to Experiment 3, with a few important distinctions. The experiment utilized a 2 (Priming) between-subjects x 2 (Mating Target Traits) within-subjects design with a mediator dependent variable (LDT) placed directly after the main dependent measures in the form of evaluations.

**Disease prime.** Under the cover story that we were interested in how people consume information in online versus paper format, participants were split into one of two conditions:

disease threat ( $n = 66$ ) or control ( $n = 69$ ). In the disease threat condition, participants read a fabricated article about a Zika virus cousin named Zeta targeting young adults—a story designed to elicit fears about disease. This article was made to look real and supposedly taken from a legitimate news source. In the control condition, participants read about traffic in Texas and Mexico becoming a problem for local citizens. This article was designed to be a little unpleasant but be motive neutral. Participants were given 2 minutes to read their article, after which they were asked to move on to the next section.

**Mating targets.** Participants were then shown 2 dating profiles under the cover story, “We are interested in testing a new system of analysis, specifically how we can analyze people based on their online presence.” Participants were told that they were expected to read over 2 of 18 potential profiles (another cover story as there were only 2 profiles) and to remember the profiles they read as best they can. Both profiles differed on a new set of interpersonal dimensions (Kiesler, 1983), with one profile containing bolded attributes that show a man who is reserved (i.e. introverted), but dominant and the other profile containing bolded attributes that show a man who is extroverted, but submissive. The likeability for each trait and for each dimension can be found in Table 12. Participants had at least 1 minute to read each profile, and were instructed to pay close attention to any words that happen to be bolded. The profile of the introverted, but dominant man read:

*We have spent time gathering data on Blake based on his online presence. Blake's online profile includes the following comments by his social media friends who know him well:*

“Blake believes he is up to most tasks and is **assured** of his ability.”

"Blake tends to stay home and prefers to be alone, making him quite **reclusive**"

“In most group situations, Blake assumes a **leading** position early on”

"Because he dislikes sharing emotions or any personal matters, I say Blake is a **private** person"

"Blake takes care of his own problems, so it's no surprise he's considered **self-reliant**"

"his tendency to not show strong emotions or energy is a hallmark of his **reserved** personality"

"I've seen Blake work in groups myself and I can tell you he's quite **commanding**"

"Blake is **reflective**, preferring to look inward rather than toward others."

"In discussions, Blake is **self-assertive** and is never one to be talked over"

"Blake is **quite** because he doesn't like to talk very much"

The profile of the extroverted, but submissive man read:

"Even an awkward person could tell how **bumbling** he is"

"Jacob is quite outgoing and **sociable** and enjoys spending time around people"

"Jacob's approach to life is to sit back, be **passive**, and let things happen to him"

"Due to Jacob's **talkative** nature, I never worry about starting a fun conversation when he's around"

"Jacob is so **unassured** of himself, I bet he has trouble believing he can tie his own shoelaces"

"Jacob prefers to live in the moment; he's quite the **spontaneous** guy"

"We don't ask Jacob to make any decisions. His **self-doubting** tends to get in the way."

"Always up for some activity, Jacob is definitely **energetic**"

"I've never seen him take anything but **subordinate** positions in groups"

"Being with Jacob tells you that he is **enthusiastic** about things in front of him"

**Table 12. Likeability of Traits Ascribed to Mating Targets**

Submissive-Extroverted <sup>1</sup>		Likeability
Submissive	Passive	2.23 (.97)
	Bumbling (Clumsy)	1.99 (.92)
	Unassured (Nonconfident)	1.96 (.87)
	Self-Doubting (Hesitant)	2.90 (.76)
	Subordinate (Submissive)	2.51 (1.09)
	Submissive Total	2.32 (.82)
Extroverted	Sociable	4.29 (.85)
	Talkative	3.52 (1.32)
	Spontaneous	4.89 (1.02)
	Energetic	4.57 (.81)
	Enthusiastic	4.89 (.72)
	Warm Total	4.43 (.96)
Competent-Introverted		
Dominant	Assured	4.11 (.72)
	Self-Reliant	4.62 (.96)
	Leading (Superior)	3.06 (1.45)
	Commanding (Authoritative)	2.74 (1.81)
	Self-Assertive	4.18 (1.21)
	Dominant Total	3.74 (1.28)
Introverted	Reclusive (Withdrawn)	2.31 (1.32)
	Private (Independent)	4.55 (1.32)
	Reserved	3.48 (1.00)
	Reflective	3.94 (1.16)
	Quiet	3.11 (.91)
	Cold Total	3.48 (1.15)

1. Words in parentheses are close synonyms with likeability ratings in Anderson (1968) or Dumas et al. (2002) which stand in for the word not in parentheses.

**Dependent measures.** Following the completion of both profiles, participants were asked to complete several questions about the profiles they just saw. Participants were asked to evaluate both men for a date and a long-term relationship on a scale from 0 = *not at all* to 10 = *very much*. This part of Experiment 4 was identical to Experiment 3. Please see Experiment 3 for further details.

**Lexical decision task.** Participants completed a lexical decision task (LDT) identical to that presented in Experiment 3. The only difference between the two tasks was in one of the

dimensions used for the “words” category, and where the LDT was given to participants. Instead of 5 competence words and 5 incompetence words, the task used 5 dominance words and 5 submissiveness words. In addition, instead of taking place before participants evaluated both men, the LDT took place *after* the evaluation had already occurred. This was moved to create less distance between the prime and the evaluations.

**Priming manipulation check.** Following the recognition task, participants were asked how worried they were about becoming sick within the next 3 months, how bad they perceived disease control in the US to be, and how anxious the article made them feel, all on scales from 0 = *not at all* to 10 = *very much*. Participants primed with disease threat should have indicated an enhanced worry regarding becoming sick if primed with disease threat compared to the control condition.

**Individual differences.** Participants next completed scales designed to assess theoretically relevant individual differences. This section included the SOI and Childhood SES ( $a = .85$ ). These measures were identical to those used in Experiment 3. However, one additional measure was assessed: the Perceived Vulnerability to Disease scale (PVD; Duncan et al., 2009). This 15-item scale assessed a person's chronic disease worries by presenting items like, “If there is something going around, I will likely catch it.”, to which participants respond on a 7-point Likert scale, 1 being (*strongly disagree*) to 7 (*strongly agree*). Reliability for the overall PVD was  $a = .75$ . It contains 2 subscales: perceived vulnerability to disease (PI) and germ aversion (GA). Perceived vulnerability of disease was instrumental in moderation in Experiment 2 ( $a = .89$ ), so it was the focus rather than the germ aversion subscale ( $a = .67$ ). Following these measures, participants were debriefed and released.

**Suspicion check and debriefing.** Participants were then asked what they believed to be the purpose of the pretesting materials and the dating preferences, whether the two were connected, and if so, how they were connected. No participant accurately guessed the experimental hypothesis. Following this final check, participants were debriefed and released.

## Results

**Participants.** For the following analyses we examined both only participants who reported being single ( $n = 124$ ) and only participants that reported being single or in a short-term relationship ( $n = 135$ ). The inclusion of those who reported being in a short-term relationship did not affect the analyses in any noticeable way, either by making an analysis significant where it was not before, or making a once significant analysis become non-significant, and so all reported analyses include both single women and women who reported being in a short-term relationship.

**Manipulation checks.** Participants completed a set of manipulation checks designed to assess the potential effect of the disease threat prime and to determine whether the profiles communicated the qualities, and inferences, about each man that we intended.

**Priming manipulation check.** Results of an independent samples t-test examining manipulation checks of the effect of our disease threat prime showed that participants were not significantly more worried about getting sick in the near future when comparing those in the control condition ( $M = 4.37, SD = 2.44$ ) to those in the disease threat condition ( $M = 3.84, SD = 2.10$ ),  $t(130) = 1.32, p = .19$ , and did not significantly report that disease control in the US was worse when comparing the disease threat condition ( $M = 4.14, SD = 2.11$ ) to the control condition ( $M = 4.50, SD = 1.73$ ),  $t(130) = 1.07, p = .29$ . Based on these results, it appeared that the prime either did not have the intended effect or the effect wore off by the time manipulation check items were presented.

***Mating target manipulation check.*** We examined participants responses to items assessing the health and strength of the two men in the dating profiles to determine if, regardless of a disease threat prime, participants received the intended perception of each man based on their traits. Results of a paired-samples t-test showed that in general, participants deemed Blake, the dominant but introverted man ( $M = 842.03$ ,  $SD = 141.19$ ), as not having a significantly higher level of health immune cells compared to Jacob, the submissive but extroverted man ( $M = 835.35$ ,  $SD = 151.82$ ),  $t(120) = -.51$ ,  $p = .61$ . Participants did not deem the dominant man as significantly stronger as measured by bench-press weight ( $M = 134.00$ ,  $SD = 32.03$ ) compared to the submissive man ( $M = 136.37$ ,  $SD = 34.74$ ),  $t(120) = .57$ ,  $p = .57$ . In addition, participants did not deem the dominant man as significantly higher in testosterone ( $M = 702.69$ ,  $SD = 155.47$ ) compared to the submissive man ( $M = 710.33$ ,  $SD = 188.34$ ),  $t(119) = .43$ ,  $p = .67$ . Taken together, these results suggest that the prime did not have the predicted effect on participants and the profiles did not appear to communicate the correct impression or participants were not able to infer health and strength from them.

***Analysis of disease threat and evaluation.*** For Experiment 4, we conducted analyses using the same set of steps as we did in Experiment 3. The first set of analyses involved investigating the effect, if any, of our primes on participants' evaluations of our two mating targets. The first step was investigating the main effect of our disease threat prime on evaluations, the effect of the words contained in the profile (i.e. dominant but introverted vs submissive but extroverted), and a possible interaction between the prime and the profiles.

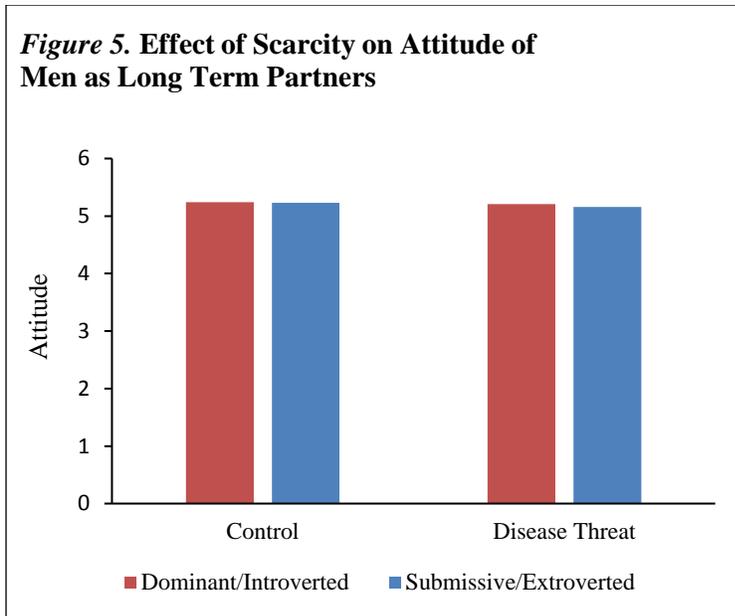
***Short-term relationship.*** A 2 between-subjects (Priming) by 2 within-subjects (Mating Target Traits) mixed model analysis of variance (ANOVA) was conducted using women's evaluations of the man each profile as a date (short-term relationship) and as a long-term

companion (long-term relationship). Results showed that for a short-term relationship ( $M = 5.24$ ,  $SD = 2.22$ ), there was a main within-subjects effect of target traits  $F(1,133) = 6.81$ ,  $p = .01$ , but there was not an interaction between target traits and priming,  $F(1,133) < 1$ . Women rated the submissive, but extroverted man Jacob more positively for a date ( $M = 5.83$ ,  $SD = 1.86$ ) compared to the dominant, introverted man Blake ( $M = 5.16$ ,  $SD = 2.09$ ), but this was not affected by priming. Full means and standard deviations can be found in Table 13.

**Long-term relationship.** Results showed that for a long-term relationship ( $M = 5.07$ ,  $SD = 2.09$ ) there was not a significant difference based on target traits,  $F(1,133) < 1$ , nor was there an interaction between target traits and priming,  $F(1,133) < 1$ , see Figure 5. Essentially, regardless of priming condition or the type of man contained in each profile, women rated both men equally for a long-term relationship. Overall, these analyses failed to support our hypothesis: there were no interactions between target traits and priming. Women did not prefer the dominant, but introverted man when primed with Disease Threat.

**Table 13. Mean and Standard Deviation of Women's Wanting a Short- and Long-Term Relationship with Each of Two Men (on scale from 0 = not at all to 10 = very much).**

Relationship	Target Man	Prime Condition	
		Control	Scarcity
Short Term	Extroverted/Submissive	6.13 (1.93)	5.79 (1.69)
	Introverted/Dominant	4.98 (2.18)	5.18 (2.08)
Long Term	Extroverted/Submissive	5.23 (2.28)	5.16 (1.94)
	Introverted/Dominant	5.24 (2.37)	5.21 (2.26)
Overall	Extroverted/Submissive	5.68 (1.99)	5.48 (1.66)
	Introverted/Dominant	5.11 (2.14)	5.20 (2.00)



**Examining possible moderation.** Initial results did not support our hypotheses, so we examined a number of potential moderating individual differences to further probe a possible interaction between our disease threat prime and target traits. For all the following, we used linear regression and the Process model (Hayes, 2013). Because linear regression can examine only one outcome variable at a time, we collapsed the two evaluation items for each type of relationship (short-term, long-term) into a difference score calculated by subtracting the evaluation for the dominant, introverted man from the evaluation for the submissive, extroverted man producing two new outcome variables where a positive score indicates an absolute preference for the submissive, extroverted man and a negative score indicates an absolute preference for the dominant, introverted man.

**Perceived Vulnerability to Disease.** The first moderating variable we examined was the effect of Perceived Vulnerability to Disease, specifically Perceived Infectibility (PVD-PI), on the relationship between priming and women's evaluations of the two profiles. The same procedure used in Experiment 2 was used here. PVD-PI, mean centered, was entered as a moderator, and priming was entered as a categorical predictor with the neutral prime condition set to 0. The

sample size for the following analyses is  $n = 133$  due to missing data. Results showed that for a short-term relationship, there was not a significant main effect of PI,  $b = -.10$ ,  $S.E. = .24$ ,  $p = .69$ , or priming,  $b = -.43$ ,  $S.E. = .52$ ,  $p = .42$ , and there was not a significant interaction,  $b = .01$ ,  $S.E. = .37$ ,  $p = .97$ . For a long-term relationship, there was not a significant main effect of PI,  $b = .04$ ,  $S.E. = .23$ ,  $t = .16$ ,  $p = .47$ , of priming,  $b = -.29$ ,  $S.E. = .50$ ,  $t = -.59$ ,  $p = .55$ , and there was not a significant interaction,  $b = -.18$ ,  $S.E. = .35$ ,  $t = -.51$ ,  $p = .61$ . Taken together, this showed that there was *not* a moderating effect of a participant's PI and their evaluations. Women both high and low in PI evaluated these men the same. This failed to replicate the findings of Experiment 2 and failed to support our hypothesis that women high in PI (+1 *SD*) preferred the dominant man to the submissive man compared to those in the control prime condition and those low in PI (-1 *SD*).

**Childhood SES and Sociosexual Orientation.** Next, we explored Childhood SES and Sociosexual Orientation (SOI) as potential moderators in separate analyses. A priori there was not a reason we would examine 2 moderators at once (i.e. a three-way interaction). Neither variable provide a significant predictor of women's evaluations, for neither short nor long-term relationships. The regression results can be found in Table 14.

**Table 14. Results of Linear Regression Examining Potential Moderator Variables Influencing Condition's Relationship On Women's Evaluations of a Potential Short-term and Long-term Mate**

Outcome <sup>1</sup>	Moderator <sup>2</sup>	Predictor <sup>3</sup>	$b$ ( $S.E.$ )	$t$	$p$
Short-Term Relationship	PVD-PI	Condition	-.43 (.52)	-.82	.41
		PVD-PI	-.10 (.24)	-.39	.69
		Interaction	.01 (.37)	.03	.97
	Child SES	Condition	-.36 (.51)	-.71	.47
		Child SES	-.02 (.30)	-.07	.94
		Interaction	-.51 (.43)	-1.17	.24
	SOI	Condition	-.22 (.52)	-.42	.66
		SOI	.32 (.24)	1.33	.18
		Interaction	-.23 (.49)	-.47	.63
Long-term Relationship	PVD-PI	Condition	-.29 (.49)	-.59	.55
		PVD-PI	.04 (.35)	.16	.87

*Table 14 cont.*

	Interaction	-.18 (.35)	-.51	.61
Child SES	Condition	-.28 (.49)	-.56	.58
	Child SES	-.17 (.28)	-.59	.55
	Interaction	.27 (.42)	.66	.51
SOI	Condition	-.36 (.49)	-.71	.47
	SOI	-.05 (.22)	-.23	.81
	Interaction	.20 (.47)	.49	.65

1. Evaluation outcome variables were difference scores computed where  $Y = \text{Incompetent Man} - \text{Competent Man}$

2. Moderators were mean-centered prior to analysis.

3. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Priming and a potential mediator.** Experiment 4 was conducted in part to explore a potential mediator that might explain the effect of a disease threat prime on women's evaluations of potential partners that varied based on motive relevant traits. Despite the fact that initial attempts to show a direct relationship between a disease threat prime (i.e. the *c* path) returned non-significant results, there might be an effect of the prime on our proposed mediator(s) and a relationship between the mediator and our outcome variable of women's evaluations, so we continued our analysis further. For the *a* path, we explored the effect of priming on the results of a lexical decision task, which included both reaction time and accuracy when determining words from nonwords.

The lexical decision task (LDT) produced numerous individual variables that could be used as outcome variables. The LDT included 5 words for each trait highlighted on the profiles participants evaluated. The reaction times and accuracies (i.e. how many words were correctly defined as words) for the individual words were averaged into an aggregate variable representing each trait type, producing 4 individual reaction time variables, and 4 individual accuracy variables: dominant, submissive, extroverted and introverted. In addition, we calculated both an average reaction time and a total number correct for the neutral word category, which could serve as a baseline or control variable. Means and standard deviations can be found in Table 15.

**Priming and LDT performance.** The first set of analyses involved a series of independent samples t-tests to examine the effect of priming on participant's average reaction times to dominant, submissive, extroverted and introverted words. Results showed the reaction times did not differ based on priming for any target trait. Next, we examined accuracy to determine if participants answered more or less accurately depending on condition. Again, results showed there were no significant differences based on priming. Inferential statistics and means can be found in Table 15.

**Table 15. Independent Samples t-test Examining the Effect of Disease Threat on Lexical Decision Task Performance.**

Outcome Variable <sup>1</sup>	Condition	<i>M</i> ( <i>SD</i> )	<i>t</i> (df)	<i>p</i>
Dominance Reaction Time	Control	574.45 (102.99)		
	Disease Threat	589.11 (104.83)	-.69 (95)	.49
Submissiveness Reaction Time	Control	583.89 (103.82)		
	Disease Threat	601.18 (152.21)	-.66 (95)	.51
Extroversion Reaction Time	Control	592.00 (108.80)		
	Disease Threat	592.39 (103.56)	-.02 (95)	.99
Introversion Reaction Time	Control	574.09 (87.48)		
	Disease Threat	579.89 (97.29)	-.31 (95)	.76
Dominance Accuracy	Control	4.69 (.58)		
	Disease Threat	4.83 (.44)	-1.33 (95)	.19
Submissiveness Accuracy	Control	4.53 (1.19)		
	Disease Threat	4.46 (.94)	.33 (95)	.74
Extroversion Accuracy	Control	4.61 (.64)		
	Disease Threat	4.76 (.52)	-1.29 (95)	.20
Introversion Accuracy	Control	4.63 (.63)		
	Disease Threat	4.78 (.59)	-1.24 (95)	.22

1. Reaction time is measured in milliseconds, and accuracy is measured in words correctly answered out of 5 possible words.

**Priming, mating target traits, and LDT performance.** Next, we conducted a 4 (Target Traits) within-subjects factor X 2 (Priming) between-subjects factor mixed-model ANOVA to examine possible interactions that occurred in the reaction times of each individual participant. Results showed that there was no main effect of trait on reaction times,  $F(3, 285) = 1.31, p = .27$ , nor an interaction with priming,  $F(3, 285) < 1$ . Essentially, participants' reaction times did not

significantly differ based on target trait or priming. We conducted the same analysis using accuracy for the 4 traits as the outcome variable, and results showed that while there was a significant difference based on trait,  $F(3,285) = 2.93, p = .03$ , there was not a significant interaction with condition. Pairwise comparisons showed that, regardless of priming, there were only 2 target traits for which accuracy differed significantly from one another: dominance words ( $M = 4.75, SD = .52$ ) were significantly remembered correctly when compared to submissiveness words ( $M = 4.49, SD = 1.07$ ). It was possible that by considering participant's reaction times and accuracy for neutral words (i.e. words seen in the profiles but not related to the 4 traits), we might see effects that otherwise were hidden. However, even after using the neutral words as a covariate, analyses remain unchanged despite the fact that neutral word accuracy proved to be a significant covariate,  $F(1, 94) = 12.28, p = .001$ .

Based on these results, it can be concluded that there was not a direct relationship between the disease threat prime and participant's reaction times and scores on a lexical decision task containing the 4 trait categories participants were exposed to in the dating profiles. This did not support our hypothesis that reaction times, or perhaps accuracy, could serve as a mediator between priming and participant's evaluations. Even when accounting for participant's performance on neutral words, we found no significant relationships.

**Moderating variables, priming and LDT performance.** Although the potential moderators proved non-significant for the direct relationship between priming and participant's evaluations, they might moderate the relationship between the primes and performance on the LDT. In order to determine if there was indeed moderation of this relationship, perhaps signifying a moderated-mediation model is required instead of simple mediation, PVD-PI, Childhood SES and SOI were all entered, one at a time only, as moderators in a set of linear

regressions using average reaction times and accuracies for each target trait as the outcome variables. Due to missing data, the sample size for these analyses were all  $n = 97$ . Because linear regression could only predict one outcome variable at a time, each trait reaction time and accuracy was entered individually, producing 8 analyses per moderator for a total of 24 analyses. The results of these can be found collectively in Table 16.

**Table 16. Results of Linear Regression Examining PVD-PI Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Dominance Reaction Time	Condition	-37.88 (60.30)	-.62	.53
	PVD-PI	-6.53 (8.97)	-.72	.47
	Interaction	14.09 (14.22)	.99	.32
Submissiveness Reaction Time	Condition	-72.99 (75.10)	-.97	.33
	PVD-PI	-1.45 (11.17)	-.13	.89
	Interaction	23.94 (17.71)	1.35	.18
Extroversion Reaction Time	Condition	22.98 (63.13)	.36	.72
	PVD-PI	8.16 (9.38)	.86	.39
	Interaction	-4.88 (14.89)	-.33	.74
Introversion Reaction Time	Condition	-38.50 (53.41)	-.72	.47
	PVD-PI	4.12 (7.94)	.51	.60
	Interaction	12.59 (12.59)	1.00	.32
Dominance Accuracy	Condition	-.37 (.30)	-1.25	.21
	PVD-PI	-.10 (.04)	-2.29	.02
	Interaction	.12 (.07)	1.72	.09
Submissiveness Accuracy	Condition	-.27 (.63)	-.42	.67
	PVD-PI	-.06 (.09)	-.67	.50
	Interaction	.04 (.15)	.29	.77
Extroversion Accuracy	Condition	-.12 (.33)	-.36	.72
	PVD-PI	-.11 (.05)	-2.29	.03
	Interaction	.06 (.08)	.71	.48
Introversion Accuracy	Condition	.20 (.36)	.56	.57
	PVD-PI	.004 (.05)	.06	.95
	Interaction	-.01 (.08)	-.14	.88

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

**PVD-PI.** First, PVD-PI was examined as a potential moderator. Average reaction times for each trait were examined first. Results showed there were no significant main effects of

priming, PVD-PI nor significant interactions with priming for any traits. Thus, regardless of a person's perceived infectibility, there were no differences in reaction time. For accuracy, there were no significant effects for the introversion trait and the submissive trait. However, there was a significant main effect of PVD-PI on extroversion trait accuracy,  $b = -.11$ ,  $S.E. = .05$ ,  $t = -2.29$ ,  $p = .03$ , and significant main effect of PVD-PI on the dominance trait,  $b = -.10$ ,  $S.E. = .04$ ,  $t = -2.3$ ,  $p = .02$ . Taken together, this meant that accuracy decreased as PVD-PI increased, and overall for every trait, there was no moderating effect of PVD-PI on accuracy for any trait. These results showed that PVD-PI was not a moderator, regardless of whether reaction time or accuracy was used as the outcome variable.

**Childhood SES.** Childhood SES was examined as a potential moderator for the same set of variables. Again, no consistent pattern of significant results appeared for this potential moderator, with all main effects and interactions being non-significant. There was one exception: when examining Childhood SES and reaction time for the submissive traits, there was a significant interaction,  $b = -56.21$ ,  $S.E. = 20.69$ ,  $t = -2.72$ ,  $p = .008$ . Examining the effect of a disease threat prime at low ( $-1 SD$ ) and high ( $+1 SD$ ) Childhood SESs revealed that those in the disease prime condition who were higher on the SES variable had faster response times to submissiveness words compared to the control condition. Because a higher Childhood SES score means *poorer* rather than wealthier, this suggests that participants who were lower in SES as children and were primed with disease threat were responding significantly faster to submissiveness words, see Table 17.

**Table 17. Results of Linear Regression Examining Child SES Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	$b$ ( $S.E.$ )	$t$	$p$
Dominance Reaction Time	Condition	14.03 (21.30)	.66	.51
	Child SES	12.24 (11.81)	1.03	.30
	Interaction	-12.74 (17.35)	-.73	.46

**Table 17 cont.**

Submissiveness Reaction Time	Condition	22.44 (25.39)	.88	.37
	Child SES	12.19 (14.07)	.87	.38
	Interaction	-56.21 (20.68)	-2.71	.01
Extroversion Reaction Time	Condition	-.03 (21.93)	-.001	.99
	Child SES	2.17 (12.16)	.18	.86
	Interaction	.05 (17.87)	.003	.99
Introversion Reaction Time	Condition	7.20 (18.95)	.38	.71
	Child SES	-2.14 (10.50)	-.20	.83
	Interaction	-7.48 (15.44)	-.48	.62
Dominance Accuracy	Condition	.14 (.11)	1.33	.19
	Child SES	.04 (.05)	.70	.48
	Interaction	-.07 (.09)	-.85	.40
Submissiveness Accuracy	Condition	-.06 (.22)	-.26	.79
	Child SES	.03 (.12)	.31	.76
	Interaction	-.16 (.18)	-.90	.37
Extroversion Accuracy	Condition	.14 (.12)	1.20	.24
	Child SES	.03 (.07)	.50	.62
	Interaction	.02 (.10)	.22	.83
Introversion Accuracy	Condition	.14 (.12)	1.17	.24
	Child SES	.16 (.06)	2.46	.02
	Interaction	-.15 (.10)	-1.55	.12

1. Moderators were mean-centered prior to analysis.  
2. Condition was entered as a 2-level categorical variable where the control condition = 0.

**SOI.** Lastly, SOI was examined as a potential moderator. In this case, there were no significant findings, see Table 18. Taken together with the previous analyses, this suggested that there was no significant pattern of results for the lexical decision task when looking at our priming variable. The disease threat prime appeared to have had no influence on participant's reaction times or their accuracy. Furthermore, of the individual differences we measured, there did not appear to be any moderating variables influencing this relationship. There was no *a* path and as such pursuing a mediation model was unnecessary.

**Table 18. Results of Linear Regression Examining SOI Influencing Condition's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Dominance Reaction Time	Condition	13.01 (21.77)	.60	.55
	SOI	-9.03 (9.83)	-.91	.36
	Interaction	7.14 (20.17)	.35	.72
Submissiveness Reaction Time	Condition	20.52 (26.97)	.76	.45
	SOI	5.69 (12.18)	.47	.64
	Interaction	40.27 (25.00)	1.61	.11
Extroversion Reaction Time	Condition	-1.55 (22.44)	-.06	.95
	SOI	-7.34 (10.13)	-.73	.47
	Interaction	.01 (20.80)	.00	.99
Introversion Reaction Time	Condition	12.19 (19.30)	.63	.53
	SOI	9.10 (8.71)	1.05	.30
	Interaction	14.28 (17.88)	.80	.43
Dominance Accuracy	Condition	.12 (.11)	1.10	.27
	SOI	-.03 (.05)	-.61	.55
	Interaction	-.16 (.10)	-1.59	.12
Submissiveness Accuracy	Condition	-.03 (.23)	-.14	.88
	SOI	.02 (.10)	.20	.84
	Interaction	.03 (.20)	.13	.89
Extroversion Accuracy	Condition	.15 (.12)	1.25	.21
	SOI	.02 (.06)	.33	.74
	Interaction	-.003 (.12)	-.02	.98
Introversion Accuracy	Condition	.15 (.11)	1.38	.17
	SOI	-.15 (.04)	-3.15	<.01
	Interaction	-.11 (.10)	-1.12	.26

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

## Discussion

Much like Experiment 3, Experiment 4 attempted to build on some of our previous findings while also conceptually replicating them as well. We hypothesized that disease threat, a relevant motive to human survival and reproduction (Schaller & Park, 2011) would affect women's evaluations of two potential mates based on differences in a trait dimension relevant to disease threat: dominance. We found previously that people interpolated strength and health from dominance, and strength and health are key in assessing pathogen resistance and immune

function (i.e. relevant to disease threat and mate selection). Furthermore, we attempted to extend our understanding by investigating a cognitive mediator, essentially providing a mechanistic way in which an unconscious prime affected evaluations. Overall, we failed to find support for our hypotheses. Analyses returned null results in the most important areas, such as the effect of a disease prime on evaluations or the effect of priming on a lexical decision task. These results are consistent with our findings in Experiment 3, but not with Experiments 1 and 2. Based on the results from Experiment 3 and 4, there are shared reasons why we may have obtained null results, which are discussed in detail in the general discussion.

### **Experiment 5**

Experiment 3 was designed to build on the hypothesized results of Experiments 1 and 2 while simultaneously exploring a new scenario: two motive prime groups were employed instead of just one. Because Experiments 3 and 4 returned null results, this experiment continued forward on the basis that our Experiment 1 and 2 returned evidence for our hypotheses. Prior to this experiment, we had only examined the effects of one motive prime on participants evaluations. However, cues to multiple motives may exist in the world simultaneously or at different points in time and thus may produce competing effects or different evaluations, respectively. In addition, it is possible certain dimensions are more important for one motive and less important for another, and as such may produce opposing evaluative preference. This experiment was designed with this in mind by taking two motives where we predicted one motive prime would produce greater liking for one man compared to the control group, and the other motive prime would produce greater liking for the other man. In essence, we investigated functional shifts in attitudes due to motivation primes. We chose to use the dimensions from Experiment 3, but decided to test 2 new motive primes which we also hypothesized would

produce these opposing effects: Ostracism (i.e. affiliation motives) and Safety Threat (self-protection motives). Specifically, we hypothesized that, compared to those in the control group, women primed with ostracism would prefer an extroverted, but incompetent man over an introverted, but competent, man whereas women primed with Safety Threat would prefer a competent, though introverted man over an incompetent, though extroverted man. Another way to say this is that we hypothesized extroversion-introversion would factor in more to women's evaluations under a social motive prime while competence-incompetence would factor in more to women's evaluations under a physical safety prime.

### **Method**

**Participants.** Single or short-term paired female TCU students ( $n = 178$ ) participated for course credit. Participants were screened for sex and relationship status via a prescreen survey presented using Qualtrics software. Participants self-reported their current relationship status.

**Procedure.** The procedure for Experiment 5 was mostly identical to Experiment 4, with two important changes. First, this study had 3 conditions instead of 2 and these primes were designed as mental imagery tasks as opposed to simple news stories. Second, the dating profiles that these women read used the same attributes from Experiment 3 but they were formatted in the more descriptive method employed for the profiles of Experiment 4. Third, the individual differences measured involved measures not employed previously and as such are described below. All other aspects of the procedure were identical to Experiment 4. This experiment utilized a 3 (Priming) between-subjects x 2 (Mating Target Traits) within-subjects design.

**Priming.** Under the cover story that we were working with other researchers in Texas and were interested in testing some new materials, participants were split into one of three conditions: safety threat ( $n = 51$ ), ostracism ( $n = 49$ ) or control ( $n = 47$ ). In the safety threat

condition, participants were asked to remember a time in their life in which they had felt physically threatened or unsafe. In the ostracism condition, participants were asked to imagine a time in their life in which they felt ostracized by a group of friends or close others. In the control condition, participants were asked to imagine a time in their life where they felt bored or otherwise unengaged. In each condition, participants were asked to imagine, for at least 2 minutes, their given scenario and were asked to try and relive it with an emphasis on the emotions that they were feeling at the time. Next, participants were asked to spend 2 minutes writing down what they imagined and how it made them feel. After participants finished writing, they were asked to try and remember what they imagined and how they felt for the rest of the experiment.

**Mating targets.** Participants were then shown 2 dating profiles under the cover story, “We are interested in testing a new system of analysis, specifically how we can analyze people based on their online presence.” Participants were told that they were expected to read over 2 of 18 potential profiles (another cover story as there were only 2 profiles) and to remember the profiles they read as best they can. The profiles used were identical to those used in Experiment 3.

**Dependent measures.** Following the completion of both profiles, participants were asked to complete several questions about the profiles they just saw. Participants were asked to evaluate both men for a date and a long-term relationship on a scale from 0 = *not at all* to 10 = *very much*. This part of Experiment 4 was identical to Experiment 3. Please see Experiment 3 for further details.

**Lexical decision task.** Participants completed a lexical decision task (LDT) identical to that presented in Experiment 3. The only difference between the two tasks was in one of the

dimensions used for the “words” category, and where the LDT was given to participants. Instead of 5 competence words and 5 incompetence words, the task used 5 dominance words and 5 submissiveness words. In addition, instead of taking place before participants evaluated both men, the LDT took place *after* the evaluation had already occurred. This was moved to create less distance between the prime and the evaluations.

**Priming manipulation check.** Following the lexical decision task, participants were asked how unsafe they currently felt, how alone or isolated they currently felt, and how anxious the imagery task made them feel, all on scales from 0 = *not at all* to 10 = *very much*. Participants primed with safety threat should have indicated an enhanced feeling of being unsafe, participants primed with ostracism should have indicated an enhanced feeling of being alone or isolated, and participants primed with a neutral condition should have indicated low levels of both given that they were in a safe room with other participants.

**Individual difference measures.** The motives primed in Experiment 5 necessitated examination of different individual differences to ensure we investigated relevant potential moderators. As such we examined one individual difference relevant to each new motive primed: Belief in a Dangerous World questionnaire relevant to the safety threat prime, and the brief Social Desirability Scale relevant to the affiliation/ostracism prime. In addition, participants completed the revised version of the Vividness of Visual Imagery Questionnaire (VVIQ, Campos, 2011), a set of 32 items designed to assess how vividly an individual's mental imagery was during the experiment.

The Belief in a Dangerous World questionnaire (Altemeyer, 1988) is a 12-item questionnaire designed to measure how dangerous a participant feels the world is becoming, or

is, in general. Participants respond on a 7-point Likert scale ranging from 1 (*strongly disagree*) to 7 (*strongly agree*). Reliability for this scale was  $a = .80$ .

The shortened version of the Social Desirability Scale (Crowne & Marlowe, 1960; Reynolds, 1982) is a 13-item scale designed to assess how much a person cares about how others think of them or how much they care about how desirable others consider them. The scale employs true/false answers. Each question has a “true” or a “false” answer attached to it, and if participants responses correspond to this attached answer, the item is scored as a 1, and if not they are scored a 0. The participant's scores were added up, where a higher score indicates greater social desirability and a lower score indicates less social desirability. Reliability for this scale was  $a = .72$ .

The revised version of the VVIQ is a 32-item questionnaire broken up into small 5-item sections. Each section begins with a description of something in the world, like a rainbow or a train. Each item attached to this description asks the participants to imagine some specific aspect of the environment, and to imagine it as clearly as they are able within their minds. Then, participants respond to each item, rating how vivid their imagery was on a scale from 1 (*not at all clear*) to 5 (*as clear as if I were seeing it with my eyes*). The VVIQ was measured to determine how vivid a participant's mental imagery was during the experiment as this could prove relevant to the effectiveness of the motive primes given the priming materials involved imaging things that were not in the experiment physically.

## **Results**

For the following analyses we examined both only participants who reported being single or in a short-term relationship ( $ns = 147$ ). The inclusion of those who reported being in a short-term relationship did not affect the analyses in any noticeable way, either by making an analysis

significant where it was not before, or making a once significant analysis become non-significant, and so all reported analyses include both single women and women who reported being in a short-term relationship.

**Manipulation checks.** Participants completed a set of manipulation checks designed to assess the potential effects of the safety threat and ostracism primes and to determine whether the profiles communicated the qualities, and inferences, about each man that we intended.

**Priming manipulation check.** Results of an independent samples t-test examining manipulation checks of the effect of our primes showed that participants were not significantly more worried about their personal safety when comparing those in the control condition ( $M = 1.26, SD = .61$ ) to those in the safety threat condition ( $M = 1.44, SD = 1.16$ ),  $t(95) = -.97, p = .33$ , and participants in the ostracism condition were not significantly more worried about being alone and ostracized ( $M = 2.81, SD = 2.37$ ) compared to those in the control condition ( $M = 2.38, SD = 2.17$ ),  $t(93) = -.92, p = .36$ . Based on these results, it appeared that the primes either did not have the intended effects or the effects wore off by the time manipulation check items were presented.

**Mating target manipulation check.** We examined participants responses to items assessing the strength and social availability of the two men in the dating profiles to determine if, regardless of either prime, participants received the intended perception of each man based on their traits. Results of a paired-samples t-test showed that in general, participants deemed Blake, the competent but introverted man as being a marginally significantly worse companion ( $M = 6.62, SD = 2.18$ ) compared to Jacob, the submissive but extroverted man ( $M = 7.06, SD = 1.62$ ),  $t(145) = -1.73, p = .09$ . In addition, participants saw the incompetent, extroverted man as higher in testosterone ( $M = 748.41, SD = 126.96$ ) than the competent, introverted man ( $M = 701.56, SD = 131.71$ ),  $t(145) = 3.40, p < .001$ , higher in bench press strength ( $M = 145.38, SD = 36.42$ ) than

the competent, introverted man ( $M = 131.84$ ,  $SD = 28.39$ ),  $t(145) = 3.15$ ,  $p < .01$ , and rated as significantly more capable of defending themselves in a fight ( $M = 6.41$ ,  $SD = 2.05$ ) compared to the competent, extroverted man ( $M = 4.72$ ,  $SD = 1.99$ ),  $t(144) = -5.95$ ,  $p < .001$ . Participants did not deem the competent man as significantly stronger as measured by bench-press weight ( $M = 134.00$ ,  $SD = 32.03$ ) compared to the incompetent man ( $M = 136.37$ ,  $SD = 34.74$ ),  $t(120) = .57$ ,  $p = .57$ . Overall, it does not seem participants drew the expected inferences about these two men. We predicted that the extroverted man would be deemed as a better companion, which was what the results showed; however, participants deemed the incompetent, extroverted man as stronger in bench press, better able to defend themselves, and higher in testosterone, all of which we predicted would be attributed more to the competent, introverted man. Taken together, these results suggest that the primes did not have the predicted effect on participants and the profiles did not generally communicate the correct impression even if one inference was like our predictions

**Analysis of priming and evaluation.** For Experiment 5, we conducted analyses using the same set of steps as we did in Experiment 3. The first set of analyses involved investigating the effect, if any, of our primes on participants' evaluations of our two dating profiles. Unlike the first two experiments, this experiment involved a 3 level between-subjects factor (Priming: Control, Ostracism, Safety) by a 2 level within-subjects factor (Mating Target Traits) design. To analyze the potential effect of priming on participant's evaluations, we conducted a 3 x 2 mixed model ANOVA using women's evaluations of each man as the outcome variable.

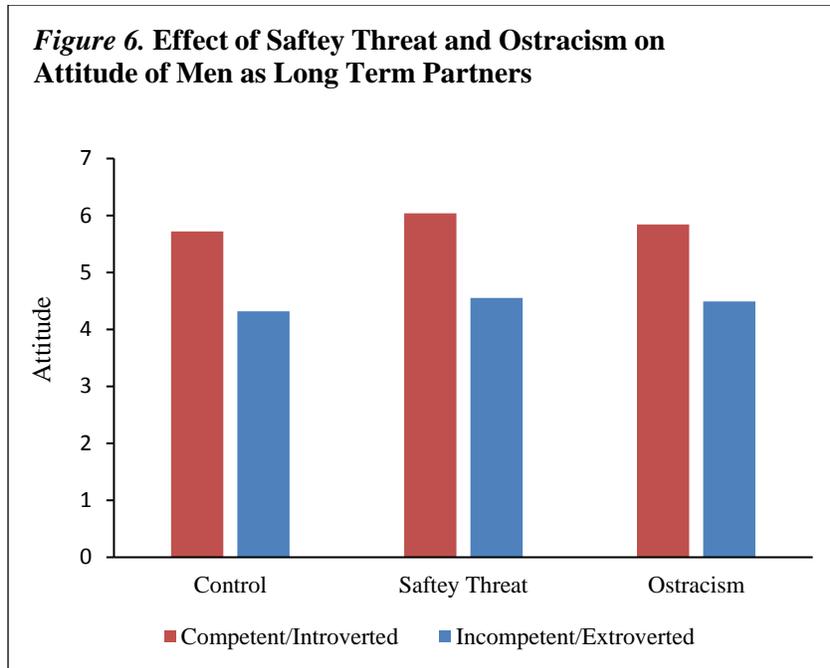
**Short-term relationship.** Results indicated a significant main effect of Profile Traits on participants' evaluations of the two men in each profile as potential short-term partners,  $F(1, 144) = 4.70$ ,  $p = .03$ ; however, there was not a significant interaction between the priming

variable and Profile traits,  $F < 1$ . In this case, participant's evaluations of the competent, introverted man ( $M = 5.71$ ,  $SD = 2.21$ ) were significantly higher than their evaluations of the incompetent, extroverted man ( $M = 5.11$ ,  $SD = 1.88$ ).

**Long-term relationship.** Results were similar when examining participant's evaluations of each man as long-term partners, with target traits having a significant main effect,  $F(1, 144) = 28.81$ ,  $p < .001$ ; however, there was not a significant interaction of target traits with priming,  $F < 1$ , see Figure 6. Again, participant's evaluations of the competent man ( $M = 5.87$ ,  $SD = 2.28$ ) were significantly higher than their evaluations of the incompetent man ( $M = 4.46$ ,  $SD = 1.96$ ). Full means and standard deviations can be found in Table 19. These results failed to support the hypothesis that those primed with ostracism should have prefer the extroverted man to the introverted man, those primed with safety threat should have preferred the competent man to the incompetent man, and those in the control condition should have shown little if any preference.

**Table 19. Means and Standard Deviation of Women's Wanting a Short- and Long-Term Relationship with Each of Two Men (on scale from 0 = not at all to 10 = very much).**

Relationship	Target Man	Prime Condition		
		Control	Safety	Ostracism
Short Term	Extroverted/Incompetent	5.09 (2.15)	5.16 (1.82)	5.08 (1.88)
	Introverted/Competent	5.60 (2.55)	5.84 (1.88)	5.69 (2.21)
Long Term	Extroverted/Incompetent	4.32 (2.22)	4.55 (1.82)	4.49 (1.96)
	Introverted/Competent	5.72 (2.37)	6.04 (2.21)	5.84 (2.31)
Overall	Extroverted/Incompetent	4.66 (2.19)	4.86 (1.82)	4.79 (1.92)
	Introverted/Competent	5.66 (2.46)	5.94 (2.05)	5.77 (2.26)



**Examining possible moderation of priming.** Initial results did not support the hypotheses of Experiment 5, so we examined potential moderating individual differences to further probe a possible interaction between our primes and Profile Traits. For all the following, we used linear regression and the Process model (Hayes, 2013). Because linear regression can examine only one outcome variable at a time, we collapsed the two evaluation items for each type of relationship (short-term, long-term) into a difference score calculated by subtracting the evaluation for the competent, introverted man from the evaluation for the incompetent, extroverted man producing two new outcome variables where a positive score indicates an absolute preference for the incompetent, extroverted man and a negative score indicates an absolute preference for the competent, introverted man.

**Vividness of visual imagery.** The first potential moderator explored was participant's scores on the Vividness of Visual Imagery Questionnaire (VVIQ) which is an indication of how clearly and vividly a person can imagine something inside their mind. Different than Experiments 3 and 4, this experiment required the priming variable be entered as a dummy coded

multicategory predictor as it had 3 levels instead of 2 levels. For all of the following, the control condition was coded as 0. This signifies that all analyses are in reference to the control condition. VVIQ was entered as a mean-centered predictor as well. Results showed that for evaluations of the two men as potential short-term partners, VVIQ alone was a significant predictor of evaluation,  $b = .07$ ,  $S.E. = .03$ ,  $t = 2.15$ ,  $p = .03$ . No other predictors nor interactions were significant, see Table 16. The significant main effect showed that for each increase in VVIQ scores, participants evaluated the incompetent man more positively compared to the competent man. The moderation analysis using evaluations of the two men as potential long-term partners as the outcome variable showed no significant main effects or interactions, suggesting that VVIQ was not an important variable in determining participant's evaluations, regardless of condition.

***Belief in a dangerous world.*** Next, we examined a moderator that could influence participant's evaluations in the threat condition more so than the control or ostracism conditions: Belief in a Dangerous World (BDW) scale scores. However, to capture complex interactions we conducted analyses using the BDW composite score for each participant in the same way as VVIQ scores. Regardless of whether evaluations for dating partners, or evaluations for long-term partners was used as the outcome variable, results were overall insignificant, see Table 20. BDW was not a significant predictor of evaluations, and did not interact with condition to produce different evaluations in the ostracism condition or in the threat condition. These results suggested BDW was not a moderator.

***Social desirability.*** Last, a moderator thought to be more potentially influential in evaluation in the ostracism condition rather than the control or threat conditions was the Social Desirability Scale (SDS). When examining evaluations of each man as a short-term partner, results showed that SDS scores were a significant predictor,  $b = .44$ ,  $S.E. = .20$ ,  $t = 2.21$ ,  $p = .03$ ,

with increases in SDS predicting an increasing preference for the extroverted man. In addition, there was a significant interaction of SDS with the threat condition,  $b = -.68$ ,  $S.E. = .25$ ,  $t = -2.71$ ,  $p = .008$ , and a marginally significant reaction with the ostracism condition,  $b = -.45$ ,  $S.E. = .25$ ,  $t = -1.82$ ,  $p = .07$ . Probing the SDS-threat interaction showed that at  $-1 SD$  of SDS, participants in the threat condition preferred the incompetent man to the competent man significantly more,  $b = 2.00$ ,  $SE = 1.02$ ,  $t = 1.96$ ,  $p = .05$ . However, the 95% confidence interval of this effect contained 0  $[-.02, 4.01]$ , so a more conservative approach would deem this effect non-significant. Probing the SDS-threat at  $+1 SD$  of SDS showed a similar result, where participants higher in SDS preferred the competent man significantly more, though the 95% confidence interval for this effect also contained 0  $[-3.86, .01]$ . Overall, results suggested that SDS was not moderating the effect of condition on participant's evaluations, see Table 20. Taken together with the previous moderation analyses, it did not appear that these three moderators had an influence on participant's evaluations regardless of whether participants rated a man for a date or for a long-term relationship.

**Table 20. Results of Linear Regression Examining Potential Moderator Variables Influencing Condition's Relationship On Women's Evaluations of a Potential Short-term and Long-term Mate**

Outcome <sup>1</sup>	Moderator <sup>2</sup>	Predictor <sup>3</sup>	$b$ ( $S.E.$ )	$t$	$p$
Short-Term Relationship	VVIQ	Safety Threat	7.84 (4.74)	1.66	.10
		Ostracism	4.06 (4.54)	.89	.37
		VVIQ	.06 (.03)	2.13	.03
		Safety x VVIQ	-.06 (.03)	-1.61	.11
		Ostracism x VVIQ	-.03 (.03)	-.89	.38
		BDW	Safety Threat	.07 (.74)	.10
	Ostracism	.04 (.77)	.04	.96	
	BDW	1.00 (.77)	1.30	.20	
	Safety x BDW	-.91 (.97)	-.94	.34	
	Ostracism x BDW	-1.27 (1.01)	-1.26	.21	
	SDS	Safety Threat	.10 (.69)	.15	.87
	Ostracism	.33 (.74)	.45	.65	

*Table 20 cont.*

		SDS	.44 (.20)	2.21	.03
		Safety x SDS	-.68 (.25)	-2.71	.001
		Ostracism x SDS	-.45 (.24)	-1.82	.07
Long-term Relationship	VVIQ	Safety Threat	.08 (.69)	.13	.90
		Ostracism	.10 (.77)	.13	.90
		VVIQ	.05 (.03)	1.39	.16
		Safety x VVIQ	-.05 (.03)	-1.37	.17
		Ostracism x	-.02 (.04)	-.48	.63
		VVIQ			
	BDW	Safety Threat	-.15 (.70)	-.22	.83
		Ostracism	.18 (.75)	.24	.80
		BDW	.71 (.70)	1.00	.31
		Safety x BDW	.07 (.83)	.09	.93
		Ostracism x	-1.35 (.92)	-1.46	.15
		BDW			
	SDS	Safety Threat	.03 (.65)	.03	.97
		Ostracism	.48 (.72)	.67	.49
SDS		.34 (.19)	1.74	.08	
Safety x SDS		-.46 (.25)	-1.90	.06	
Ostracism x SDS		-.24 (.25)	-1.01	.31	

1. Evaluation outcome variables were difference scores computed where  $Y = \text{Incompetent Man} - \text{Competent Man}$

2. Moderators were mean-centered prior to analysis.

3. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Priming and LDT performance.** Experiment 5 was conducted in part to explore a potential mediator that might explain the effects of a motive primes, whether ostracism or safety threat, on women's evaluations of potential partners that varied based on motive relevant traits. Despite the fact that initial attempts to show a direct relationship between the ostracism and safety threat primes (i.e. the *c* path) returned non-significant results, there might have been an effect of priming on our proposed mediator(s) and a relationship between the mediator and our outcome variable of women's evaluations, so we continued the analysis further. For the *a* path, we explored the effect of priming on the results of a Lexical Decision Task, which included both reaction time and accuracy when determining words from nonwords. The lexical decision task (LDT) produced numerous individual variables that could be used as outcome variables. The

traits used, and variables calculated, are identical to those in Experiment 3. Means and standard deviations can be found in Table 21.

The first set of analyses involved a series of univariate ANOVAs to examine the effect of priming on participant's average reaction times for competence, incompetence, extroverted and introverted words. Results showed the reaction times did not differ based on priming for any trait. Pairwise comparisons showed that there were no significant differences when examining each individual trait average reaction time in the ostracism condition vs the control condition, the ostracism vs the safety threat condition, and the safety threat condition vs the control condition. Running the same analysis using the accuracy for each trait rather than reaction time, results proved similar: there were no significant differences based on priming condition. One exception showed that for extroversion traits, those in the ostracism condition ( $M = 4.66$ ,  $SD = .61$ ) were more accurate than those in the safety threat condition ( $M = 4.33$ ,  $SD = .68$ ),  $p = .04$ . Using participants average reaction time and accuracy for neutral words, respectively, as covariates did not change the outcome of these analyses. While one's accuracy proved a significant covariate of accuracy for each of the 4 traits,  $F(1,124) = 36.08$ ,  $ps < .001$ , reaction time did not. Inferential statistics and means can be found in Table 21. Taken all together, these results did not support the proposed relationship between the threat prime or ostracism prime and the cognitive performance variables of reaction time and accuracy as measured via the LDT. As such, a simple *a* path had no support.

**Table 21. Univariate ANOVA Examining the Effect of Disease Threat on Lexical Decision Task Performance.**

Outcome Variable <sup>1</sup>	Condition	<i>M</i> ( <i>SD</i> )	<i>F</i> ( <i>df</i> )	<i>p</i>
Competence Reaction Time	Control	592.69 (124.82)	.51 (2,128)	.60
	Safety Threat	599.73 (93.73)		
	Ostracism	577.23 (97.00)		
Incompetence Reaction Time	Control	644.92 (102.66)	.82 (2,128)	.44
	Safety Threat	651.76 (100.56)		

*Table 21 cont.*

Extroversion Reaction Time	Ostracism	626.28 (82.69)	2.18 (2,128)	.12
	Control	621.76 (98.10)		
	Safety Threat	617.43 (86.31)		
Introversion Reaction Time	Ostracism	585.59 (78.87)	1.50 (2,128)	.23
	Control	576.12 (88.80)		
	Safety Threat	597.39 (87.25)		
Competence Accuracy	Ostracism	565.79 (81.90)	1.33 (2,125)	.27
	Control	4.62 (1.04)		
	Safety Threat	4.86 (.35)		
Incompetence Accuracy	Ostracism	4.76 (.70)	1.07 (2,125)	.35
	Control	4.52 (.83)		
	Safety Threat	4.48 (.67)		
Extroversion Accuracy	Ostracism	4.68 (.52)	2.11 (2,125)	.13
	Control	4.50 (.89)		
	Safety Threat	4.33 (.69)		
Introversion Accuracy	Ostracism	4.66 (.61)	.70 (2,125)	.50
	Control	4.79 (.84)		
	Safety Threat	4.90 (.30)		
	Ostracism	4.77 (.57)		

1. Reaction time is measured in milliseconds, and accuracy is measured in words correctly answered out of 5 possible words.

**Moderation, priming and LDT performance.** In a method similar to Experiment's 3 and 4, the possibility of moderators acting on the proposed relationship between priming and LDT performance was explored using linear regression. The moderators explored were the same moderators tested previously for the proposed relationship between priming and evaluations (i.e. the *c* path).

**Vividness of visual imagery.** VVIQ was explored as the first potential moderator. A series of linear regressions were conducted using the dummy coded priming condition variable (0 = control) and VVIQ mean-centered set as predictors. The outcome variables were participant's average reaction times when responding to one of the four traits (i.e. competence, incompetence, extroversion, and introversion) or the accuracy they achieved in determining word from non-word. For reaction time, there were no significant main effect, nor significant

interactions, except in the case of the incompetence trait. A significant interaction occurred between the ostracism prime and VVIQ,  $b = -2.77$ ,  $S.E. = .99$ ,  $t = -2.80$ ,  $p = .006$ . Probing this interaction showed that at +1 *SD* of VVIQ, participants in the ostracism condition were significantly *faster* when responding to incompetence words than those in the control condition,  $b = -72.98$ ,  $S.E. = 28.50$ ,  $t = -2.57$ ,  $p = .01$ . When examining accuracy, as opposite to reaction time, results showed there are no significant main effects, nor significant interactions, see Table 22.

**Table 22. Results of Linear Regressions Examining VVIQ Influencing Priming's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	$b$ ( $S.E.$ )	$t$	$p$
Competence Reaction Time	Safety Threat	4.31 (25.58)	.17	.87
	Ostracism	-6.10 (26.54)	-.23	.82
	VVIQ	.25 (1.18)	.21	.83
	Safety x VVIQ	-.11 (1.42)	-.07	.93
	Ostracism x VVIQ	-1.06 (1.31)	-.81	.42
Incompetence Reaction Time	Safety Threat	10.52 (23.62)	.44	.65
	Ostracism	-16.89 (21.46)	-.78	.43
	VVIQ	1.65 (.86)	1.91	.06
	Safety x VVIQ	-1.56 (1.16)	-1.35	.18
	Ostracism x VVIQ	-2.77 (.99)	-2.80	.01
Extroversion Reaction Time	Safety Threat	-9.24 (22.21)	-.42	.67
	Ostracism	-42.10 (21.91)	-1.92	.05
	VVIQ	.39 (.75)	.52	.60
	Safety x VVIQ	.15 (1.04)	.15	.88
	Ostracism x VVIQ	-1.08 (.94)	-1.15	.25
Introversion Reaction Time	Safety Threat	23.99 (20.57)	1.17	.25
	Ostracism	-6.21 (19.71)	-.31	.75
	VVIQ	.97 (.73)	1.33	.18
	Safety x VVIQ	-1.30 (1.00)	-1.30	.19
	Ostracism x VVIQ	-1.61 (.91)	-1.78	.08
Competence Accuracy	Safety Threat	.27 (.20)	1.30	.20
	Ostracism	.20 (.22)	.87	.38
	VVIQ	-.00 (.01)	-.15	.87
	Safety x VVIQ	.00 (.01)	.03	.97
	Ostracism x VVIQ	.00 (.01)	.02	.98
Incompetence Accuracy	Safety Threat	-.06 (.20)	-.33	.74
	Ostracism	.12 (.19)	.67	.50
	VVIQ	.01 (.01)	.82	.41

*Table 22 cont.*

	Safety x VVIQ	.00 (.01)	.00	1.00
	Ostracism x VVIQ	-.01 (.01)	-1.25	.21
Extroversion Accuracy	Safety Threat	-.16 (.20)	-.79	.43
	Ostracism	.23 (.20)	1.10	.27
	VVIQ	-.00 (.01)	-.30	.76
	Safety x VVIQ	.01 (.01)	1.24	.43
Introversion Accuracy	Ostracism x VVIQ	.01 (.01)	.79	.43
	Safety Threat	.16 (.19)	.86	.38
	Ostracism	.09 (.18)	.53	.60
	VVIQ	.01 (.01)	.77	.44
	Safety x VVIQ	-.01 (.01)	-.69	.48
	Ostracism x VVIQ	-.00 (.01)	-.25	.80

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

***Belief in a dangerous world and social desirability.*** BDW and SDS were both explored as potential moderators using the same analyses. BDW composite scores were entered as a mean-centered predictor. For both reaction time and accuracy, there were no significant interactions or significant main effects. Results showed that BDW did not moderate any relationships, see Table 23. SDS composite scores were entered as a mean-centered predictor next. Analyses showed no significant main effects or interactions when using reaction times as predictors, except when introversion word reaction times served as the outcome variable. When using accuracy as predictors, all traits produced non-significant results, see Table 24. Collectively, these moderation analyses suggest that none of these variables individually moderate the relationship, or lack thereof, between priming and LDT performance. Results did not support a moderated or unmoderated relationship between priming and LDT performance, and they did not support the hypothesis that our motive primes would influence accessibility or attention to traits that are relevant to the primed motive.

**Table 23. Results of Linear Regressions Examining BDW Influencing Priming's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Competence Reaction Time	Safety Threat	8.90 (25.38)	.35	.72
	Ostracism	-13.42 (25.11)	-.53	.59
	BDW	30.87 (34.84)	.89	.38
	Safety x BDW	-9.62 (39.97)	-.24	.81
	Ostracism x BDW	-53.96 (37.00)	-1.46	.14
Incompetence Reaction Time	Safety Threat	6.07 (23.59)	.25	.79
	Ostracism	-18.81 (21.25)	-.88	.38
	BDW	14.76 (25.93)	.56	.57
	Safety x BDW	-9.21 (35.14)	-.26	.79
	Ostracism x BDW	-11.55 (31.62)	-.36	.72
Extroversion Reaction Time	Safety Threat	-2.14 (20.76)	-.10	.92
	Ostracism	-34.20 (19.27)	-1.78	.08
	BDW	12.73 (19.47)	.65	.51
	Safety x BDW	-24.02 (31.00)	-.78	.44
	Ostracism x BDW	-4.30 (24.23)	-.17	.86
Introversion Reaction Time	Safety Threat	22.39 (19.41)	1.15	.25
	Ostracism	-7.15 (18.54)	-.39	.70
	BDW	17.71 (13.79)	1.28	.20
	Safety x BDW	-9.04 (25.11)	-.36	.72
	Ostracism x BDW	6.29 (23.17)	.27	.78
Competence Accuracy	Safety Threat	.26 (.19)	1.38	.17
	Ostracism	.21 (.19)	1.06	.29
	BDW	-.19 (.40)	-.49	.62
	Safety x BDW	.26 (.40)	.65	.52
	Ostracism x BDW	.26 (.40)	.64	.52
Incompetence Accuracy	Safety Threat	.00 (.18)	.01	.99
	Ostracism	.19 (.16)	1.19	.23
	BDW	.04 (.20)	.21	.83
	Safety x BDW	-.22 (.27)	-.81	.42
	Ostracism x BDW	-.04 (.22)	-.18	.86
Extroversion Accuracy	Safety Threat	-.17 (.19)	-.93	.35
	Ostracism	.15 (.17)	.87	.38
	BDW	.06 (.22)	.25	.80
	Safety x BDW	-.11 (.26)	-.42	.68
	Ostracism x BDW	.08 (.25)	.32	.75
Introversion Accuracy	Safety Threat	.13 (.16)	.88	.37
	Ostracism	.01 (.15)	.08	.93
	BDW	.04 (.27)	.16	.87
	Safety x BDW	-.07 (.29)	-.25	.80
	Ostracism x BDW	.12 (.28)	.41	.68

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

**Table 24. Results of Linear Regressions Examining SDS Influencing Priming's Effect On Performance on the Lexical Decision Task**

Outcome	Predictor <sup>1,2</sup>	<i>b</i> ( <i>S.E.</i> )	<i>t</i>	<i>p</i>
Competence Reaction Time	Safety Threat	13.65 (24.95)	.54	.58
	Ostracism	-8.95 (24.99)	-.35	.72
	SDS	7.98 (8.45)	.94	.34
	Safety x SDS	-6.32 (10.22)	-.62	.53
	Ostracism x SDS	-9.43 (9.77)	-.96	.33
Incompetence Reaction Time	Safety Threat	15.02 (22.74)	.66	.51
	Ostracism	-15.88 (21.06)	-.75	.45
	SDS	9.00 (6.52)	1.38	.17
	Safety x SDS	-.45 (8.31)	-.06	.96
	Ostracism x SDS	-5.56 (8.15)	-.68	.49
Extroversion Reaction Time	Safety Threat	4.17 (20.64)	.20	.84
	Ostracism	-30.33 (19.91)	-1.52	.13
	SDS	7.82 (6.09)	1.29	.20
	Safety x SDS	-4.05 (7.57)	-.53	.59
	Ostracism x SDS	-6.44 (7.42)	-.86	.39
Introversion Reaction Time	Safety Threat	26.71 (18.44)	1.45	.15
	Ostracism	-5.10 (17.99)	-.28	.78
	SDS	15.32 (5.25)	2.63	.01
	Safety x SDS	-15.75 (7.65)	-2.05	.04
	Ostracism x SDS	-17.37 (7.47)	-2.33	.02
Competence Accuracy	Safety Threat	.26 (.19)	1.38	.17
	Ostracism	.21 (.19)	1.06	.29
	SDS	-.19 (.40)	-.49	.62
	Safety x SDS	.26 (.40)	.65	.52
	Ostracism x SDS	.26 (.40)	.64	.52
Incompetence Accuracy	Safety Threat	.00 (.18)	.01	.99
	Ostracism	.19 (.16)	1.19	.23
	SDS	.04 (.20)	.21	.83
	Safety x SDS	-.22 (.27)	-.81	.42
	Ostracism x SDS	-.04 (.22)	-.18	.86
Extroversion Accuracy	Safety Threat	-.17 (.19)	-.93	.35
	Ostracism	.15 (.17)	.87	.38
	SDS	.06 (.22)	.25	.80
	Safety x SDS	-.11 (.26)	-.42	.68
	Ostracism x SDS	.08 (.25)	.32	.75
Introversion Accuracy	Safety Threat	.12 (.12)	.96	.34
	Ostracism	-.00 (.12)	-.04	.97
	SDS	-.02 (.04)	-.47	.63
	Safety x SDS	.04 (.04)	.84	.40
	Ostracism x SDS	.03 (.04)	.54	.59

1. Moderators were mean-centered prior to analysis.

2. Condition was entered as a 2-level categorical variable where the control condition = 0.

## **Discussion**

Experiment 5 was designed to investigate the same general principle as all previously discussed experiments: motive primes cause functional shifts in evaluations of a motive relevant attitude object. Furthermore, we investigated a proposed cognitive mediator for these effects. Unlike Experiments 3 and 4, this experiment investigated previously untested motive primes that also were hypothesized to produce very different evaluative outcomes. At the very least, we predicted that women primed with an affiliation motive (i.e. ostracism) would evaluate a man who was extroverted but incompetent more positively compared to the control group, while women primed with a self-protection motive would evaluate a competent, but introverted man more positively. We also hypothesized that women primed with ostracism would prefer the extroverted, but incompetent man to the introverted, but competent man, and women primed with self-protection would show opposite effects. Furthermore, we hypothesized that performance on a lexical decision task would serve as a mediator for all of these effects. Like Experiments 3 and 4, we obtained null results for all major analyses, meaning our results did not support these hypotheses.

### **General Discussion**

Research on fundamental motivations, as a framework, has been ongoing since Kenrick and colleagues provided a holistic, evidence-based overhaul to Maslow's "Hierarchy of Needs". A variety of motivations tied to survival and reproduction in our evolutionary past have been investigated, resulting in numerous findings. One such finding is that motivations are activated when the environment cues suggest there is an opportunity or threat present, and motivations are more or less dormant when such cues are absent. Furthermore, evidence shows that motivations can change our decisions and how we think about aspects of our environment, essentially

affecting cognitive processes. The main goal of the discussed set of experiments was to investigate fundamental motivations and their effects on evaluations to a relevant attitude object. Although previous studies have examined dependent variables that could be understood as attitude objects, fundamental motivations have not been examined using an established attitude framework to not only predict outcomes, but to uncover proximal explanations for motivation's effects on attitudes and to understand the process by which attitudes respond to temporarily salient environmental cues. Building on previous research, we carried out a set of experiments to conceptually replicate previous findings, examine an increasing number of different fundamental motivations regarding evaluation, and to propose and find support for a shared, general proximal mechanism that explains how primed motivations affect evaluations. However, in general, we were unable to provide evidence for our hypotheses. The motive primes we used did not appear to significantly affect evaluation in many situations except in two initial instances, and our proposed proximal mechanism remained unsupported. Given that we have found evidence for some of our more important hypotheses in past experiments, and research on motive priming generally support the hypothesis that motives produce functional shifts in behavior, one possibility for our results presented here is that changes made in the method and materials resulted in null results rather than the absence of a relationship between motive primes and attitudes.

Research on priming suggests that primes are effective when participants remain unaware that they are being primed, and when the task participants engage in is related to the information in the prime (Loersch & Payne, 2011; 2014). Furthermore, there are going to be numerous ways that different individuals will respond to the same prime, especially when such primes use current events or contemporary topics like recessions (Wilson, 2013). It is quite possible and

probable that primes can be affected by ongoing events in news media. Experiments 3 and 4 used news articles, citing widely discussed and consumed topics, as primes. In many cases this can prove to an experimenter's advantage. For example, in the original study by Hill and colleagues (2012), they used a news article on a lack of jobs during a time of recession in the United States. These situations can serve to make a prime much more powerful, by increasing face validity and corroborating other environmental cues. During Experiment 1, the United States was still in a period of recession (Klein, 2011), so news media and larger environmental cues corroborated the prime used. During Experiment 2, the Zika crisis was still widely discussed and provoked a great deal of anxiety among health organizations (Miles & Hirschler, 2016), again corroborating the prime used in that study. These factors changed for Experiments 3 and 4. Experiment 3 made use of a resource scarcity prime during a time where media widely discussed a robust and recovered US economy (Geewax, 2016). Even though the article emphasized an economic factor more relevant to college students, i.e. student loan debt, the fact that the U.S. economy was discussed often and in optimistic terms could very well have ameliorated the potential effect of the news article as a prime to resource scarcity, perhaps by associating the economy with positive concepts and emotions. Experiment 4 could be subject to the same phenomenon.

The disease prime used was a manufactured news article, made to look as if it was taken from a real news source, that discussed a "cousin" to the Zika virus that targeted and effectively sickened young adults of college age. Experiment 2 used the same prime; however, the Zika crisis was *happening* during that time and was widely discussed in news media in anticipation of the Olympics (Tavernise, 2016) with many predicting an outbreak in the U.S., especially in the hotter southern states where mosquitoes flourished. Much like other disease outbreaks discussed in the U.S., Zika soon dropped from media and was forgotten as the Olympics passed, summer

passed, and there was no Zika outbreak in the U.S. (Cohen, 2016). Similar patterns have been observed with the bird flu epidemic (Steenhuysen & Davis, 2015). Essentially, opportunistic usage of ongoing events in news media, such as outbreaks or economic activity, can serve to increase the effectiveness of a prime, but the opposite is true when the situation changes. This is one potential explanation for a lack of replication in Experiments 3, 4, and 5, and suggests that primes should be designed with longevity in mind as opposed to relying on very current events. If materials only work in a given time period, it will make replication more difficult as time passes and cast doubt on studies which make use of such primes when perhaps this should not be the case. There have been similar calls to make primes increasingly specific to avoid unreliable results (Molden, 2014; Wilson, 2013). However, this is only one possible dynamic at play, and is only relevant to the first two experiments.

One factor that may have generally produced null findings had to do with the way in which the dating profiles were changed from the first 2 experiments. Initially, the two dimensions of warm-cold and competent-incompetent were taken from the same theory on interpersonal relations (Cuddy, Fiske & Glick, 2007) and attributes representing the ends of each dimension were taken from the same paper on trait likability (Anderson, 1968). This is also true for Experiment 2 which used Kiesler's (1982) interpersonal circle. However, the warm-cold interpersonal dimension was changed to extroversion-introversion to remove the overwhelming effect of warmth on participant's evaluations we observed in our initial studies, ideally making the effect of a prime easier to observe by removing possible ceiling effects. Extroversion is a commonly understood personality trait, but unlike warmth, each end of introversion is less aversive than coldness as people do find introversion at least somewhat amenable in relationship situations (Guttman & Zohar, 1987; Hendrick & Brown, 1971), so the overall dimension

hypothetically would potentially skew liking much less noticeably toward one end (i.e. warmth). However, it is possible that by removing warmth and replacing it with extroversion, women's assessments of the men were drastically changed rather than lightly changed. One possibility is that the competence or incompetence traits were evaluated differently because they were colored differently by extroversion traits. For example, "bumbling" may be understood differently when combined with "energetic" rather than "trustworthy". Another possibility is that the likeability of introversion-extroversion changed how impressions were formed in terms of overall valence. Research on forming impressions has shown that the likeability of different traits may not be additive (Birnbau, 1974) and that negative traits affect impressions more than positive traits do (Hamilton & Zanna, 1972). If introversion was more likeable than coldness (Anderson, 1968), the effects on participants impressions may not have been a simple adjustment, but a large one. Since coldness was rated as overwhelmingly negative, replacing coldness with a much less negative set of traits would have lifted up the likeability of the introverted person more than expected while also dropping the extroverted person as extroversion is not as positive as warmth (Anderson, 1968; Dumas et al., 2002). Overall, this could produce more noise and obscure attempts to find the effects from Experiments 1 and 2 in the later experiments.

Furthermore, the profiles were slightly changed to be a list of quotes from close others rather than a simple list of bolded traits as was used in the first two experiments. By adding context and elaboration to each trait, we attempted to create a more specific image in participant's minds, making the traits less ambiguous, and making the men in the profiles seem much more real and convincing. By making the men seem more real and detailed, we hoped to get participants to focus more, take the task seriously because it seems more real, and evaluate something much closer to a real dating profile thus increasing face validity. Again, this may have

affected women's evaluations in ways we did not expect, perhaps by shifting the wholistic image participants gleaned from these profiles versus the older ones. Adding more information may have even shifted women's choices and evaluations perhaps by decreasing fluency of processing the profiles (Novemsky, Dhar, Schwarz & Simonson, 2007; Song & Schwarz, 2008). While using a list of traits may not mirror more actual dating profiles, it might very well have influenced the way participants understood the two hypothetical men. Furthermore, while warmth is overwhelmingly liked over coldness regardless of competence in past studies, the two traits were directly related to each other per Fiske, Cuddy & Glick's (2007) interpersonal theory and understanding competence in a way that is consistent with that theory might be reliant on assessments of warmth as well. Removing one dimension for a more neutral dimension should be reevaluated after further study.

### **Mediation**

A significant component of our experiments was the establishment of a mechanism that explains the effect of a motive prime on evaluations. In previous fundamental motivation research, this component was often left uninvestigated as the main goal was usually to establish initial evidence for a motive and its effect in a specific domain (e.g. mating and loss aversion) rather than a more complex model. Based in the ART model (Lord & Lepper, 1999), we predicted that motives may lead to greater elaboration compared to evaluations that take place when no such prime is present. We found no affirmative evidence for our proposed mediator, changes in cognitive accessibility of motive relevant traits. Interpretation of this result was complicated by the numerous methodological issues discussed previously. In each experiment there existed the possibility that a methodological issue related to the prime used was the primary reason why we only observed null results. Essentially, if a motive failed to be primed, somewhat

supported by data on manipulation checks, or was primed weakly, then there was no way to determine that participants would evaluate the two men differently based on their traits, and no way to determine if the cognitive mediator we proposed was correct or not. The mediator, or more specifically performance on the lexical decision task, was reliant on a motive being active based on our hypothesis and on research using fundamental motives. The LDT used, for the “words” category, words which were all seen once in the dating profiles. If there was no superseding effect on attention or accessibility of some words (i.e. traits) over others, then accuracy and speed should be the same for all categories of words, which is what we observed, or perhaps differ from individual to individual, but not between groups, which is also what we observed. Due to the problems discussed here, we could not conclusively rule out our proposed mediator or the way in which we attempted to measure that variable. A conservative approach to this problem would be to directly replicate the first two experiments and then add the LDT procedure to both with no other changes. Additional measured of cognitive accessibility of associations should also be considered.

### **Limitations**

Moving forward, research in this area needs to address key limitations, some which stem from the design problems inherent in the three experiments, and others which are more general and encompass even the first two experiments. One of the largest limitations is that the research excludes half of the human population, i.e. men. Theoretically, fundamental motivations and their activation should be shared by both sexes, especially motivations related to survival like self-protection and disease avoidance. Furthermore, both sexes should experience temporarily aroused motivations which influence evaluations. Indeed, previous research in this area suggests this very fact (Griskevicius & Kenrick, 2013; Li, Kenrick, Griskevicius & Neuberg, 2012).

Future research needs to incorporate men; ideally, an experiment would incorporate both sexes using a motivation and an attitude object where first you expect men and women to evaluate the same, and then perhaps move forward using a motive and attitude object where men and women would predictably respond differently. Mating is an area in which men and women pursue different preferences and strategies (Buss & Schmitt, 1993), so it is not unreasonable to design an experiment to test how men and women differ in their reaction, and evaluation, to a motive prime. Without this change, any findings will be ungeneralizable to men. Another, but related, facet is a lack of people of varying ages. Humans develop across the lifespan (Kaplan & Gangestad, 2005), and age is a very important variable in decision making (Kenrick & Keefe, 1992; Pawlowski, Dunbar, 1999), especially when considering evolutionary hypotheses. People of varying ages might very well respond differently to the same motive prime and the same attitude object. For example, speaking speculatively, as people age out of prime reproductive age, mating motives might affect evaluation differently, or perhaps simply less overall. Such hypotheses require more varied samples, likely requiring collecting data outside of a college environment.

The biggest limitation is simply interpreting null results. There are many reasons when using null hypothesis testing why analyses can return null results. Broadly speaking, it may be due to a Type II error: incorrectly assuming the null hypothesis when it should be rejected (Sheskin, 2004). Normality, or skewed samples, could have produced problems in analyzing data from each experiment. However, based on the central limit theorem (DasGupta, 2010), a sample size of at least 30 participants per cell for a between-subjects factor is sufficient to assume the sample is normally distributed even with a population that is not normally distributed. We observed 40 participants, or greater, per cell for the vast majority of analyses performed.

Following the central limit theorem, we could assume that our data was normally distributed. This does not rule out a Type II error.

Type II errors are a problem when statistical power is low. Experiments 1 and 2 achieved adequate power based on a priori analyses and each found a significant relationship which supported our hypotheses. Original power analyses for the last three experiments, given the effect sizes observed in the first two experiments, suggested sample sizes should be  $n = 200$  (G-power: Faul, Erdfelder, Buchner & Lang, 2009). The sample sizes were lower than  $n = 200$ , which could mean the observed null results were due to a lack of statistical power and a Type II error had been committed. Two non-mutually exclusive possibilities are that the last 3 Experiments lacked sufficient power and thus failed to detect an effect and that the effect sizes are smaller than originally estimated in Experiments 1 and 2, meaning even larger sample sizes are required. In this case, null results could still be a result not of the absence of an effect of motive priming on evaluations, but due to one of the set of changes made between these experiments. Dealing with this limitation in particular is key, because as of these experiments, we could not conclude whether our hypotheses were in error or if a methodological problem had interfered in our attempts to observe evidence supporting our hypotheses.

### **Future Research**

Before expanding this research further into new motivations or more complex models, key limitations must be addressed. Most importantly, initial results from earlier studies should be confirmed, ideally under multiple circumstances. In descending order of importance, these steps should be undertaken. First, Experiments 1 and 2 should be directly replicated. Given current movements within psychology as a discipline, replication should become the main focus of this research before other steps are taken. Every variable, procedure, and material should be reused

exactly as was used in each study. Data should be analyzed using the exact same methods as well. Without this, it would be premature to continue to apply the same hypotheses under different conditions. Assuming confirmation of the initial results and direct replication, Experiment 3 and 4 should be conducted once more; however, the materials used should be identical to Experiments 1 and 2 with exception of the lexical decision task or other accessibility measure. This means using the warmth dimension rather than extroversion, keeping the dating profiles as a list of traits rather than a more expanded set of quotes, and using the same resource scarcity prime and disease threat prime. If results confirm the hypotheses of each study, then a repeat of Experiment 3 and 4 should be conducted using the methodological changes suggested here. If the mediator proposed in these experiments lacks support, there are two routes to pursue. The first is to focus less on a mediator and confirm the effects of a motive prime on evaluation across all proposed fundamental motivations; in addition, working men into these subsequent experiments should be key, and expanding samples to include participants of varying ages and exploring age as a predictor of evaluations would also expand this work. The second route is to keep replicating the first two experiments, exploring a new mediator, or a refined version of a previous methodology to measure a mediator, until a robust and replicable one can be found. Afterwards, the mediator can be included as new motivations and attitude objects are researched. Either way, a robust and data-driven foundation should be laid before moving experiments outward to incorporate new variables.

### **Conclusion**

Despite initial evidence that fundamental motivations can be primed and affect evaluations of a motive relevant attitude object, data showed that these findings remain inconclusive. Follow up experiments investigating similar effects and a potential cognitive

mediator returned null results, meaning it was not clear whether women's attitudes of potential mates are influenced by a discrete subset of motivation primes and variance in interpersonal traits exemplified by each potential mate. Established theoretical frameworks, such as the fundamental motives framework and Attitude Representation Theory continue to provide us with testable hypotheses, and future research should focus on careful replication that seeks to clarify previously seen effects. Human motivation is an important and evolutionarily relevant facet of behavior and will continue to be a vital area of study, even in older and more established areas such as attitudes. The construal model of attitudes and fundamental motivations are complementary frameworks which may function in tandem to predict behavior under multiple conditions from survival to parenting. For now, there is some evidence suggesting a great deal of information remains to be uncovered and understood, and we should seek to build a stable platform upon which all future research in this area can build outward from.

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## VITA

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## ABSTRACT

# NO MORE MR. NICE GUY: EFFECTS OF SALIENT MOTIVES ON WOMEN'S MATE PREFERENCES

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The traditional view of attitudes held that people evaluate attitude objects as consistently positive or negative regardless of the circumstances. The construal view of attitudes, in contrast, holds that people evaluate objects flexibly and adaptively, depending on which associations happen to be activated in any given context (Lord & Lepper, 1999). Attitudes and evaluation as defined by the construal model are tied to a vast amount of human behavior. In particular, evaluations are a key part of the process of human mate selection as it is defined by evolutionary biology and psychology. The present research seeks to further support the construal model for attitudes while simultaneously expanding the study of evaluation into motivation and human mate selection. Specifically, we examine how women evaluate potential partners when they are exposed to environmental cues signaling some threat in the environment. Over the course of 5 experiments we primed a variety of different environmental threats, primarily resource scarcity and disease threat, and examined how women's evaluations differed depending on the traits possessed by two potential mates. We hypothesized that women's evaluations would differ when primed with a threat, and that women would evaluate men who lacked traits important to mitigating an environmental threat less positively compared to women not so primed. Results were mixed, with Experiments 1 and 2 supporting this general hypothesis, and Experiments 3 – 5 returning

null results. Implications for this research are discussed with a focus on future research, complications with the design of Experiments 3 – 5, and how best to address each limitation.