

Self-Esteem and the Relation between Arousal and Relationship-Initiation Motivation

by

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B.Sc., University of Toronto, 2008

M.Sc., University of Victoria, 2013

A Dissertation Submitted in Partial Fulfillment
of the Requirements for the Degree of

DOCTOR OF PHILOSOPHY

in the Department of Psychology

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Abstract

Both physiological and emotional arousal can increase romantic attraction towards a desirable potential partner. Such attraction reflects *relationship-initiation motivation*, a connection motivation directed at a new partner, because attraction increases the drive to pursue a social interaction or relationship with another person. Therefore, arousal appears to influence the *need to belong*, the inherent motivation for positive social interactions. A large body of research also reveals that self-esteem influences people's pursuit of belongingness, especially during relationship initiation. Yet the literature linking arousal and attraction and the research linking self-esteem and attraction have never been connected. The present research shows that self-esteem moderates how arousal influences relationship-initiation motivation.

To examine the moderating effect of self-esteem on the relation between arousal and relationship-initiation motivation, I conducted three studies. Study 1 involved manipulating women's physiological arousal in an anticipated social interaction. Results showed that arousal directly increased relationship-initiation motivation for higher self-esteem individuals (HSEs) but not lower self-esteem individuals (LSEs). Study 2 replicated Study 1 with men, showing that arousal increased relationship-initiation motivation for HSEs but not LSEs, but in this case, the effect wholly depended on men applying a positive emotional label to their arousal. Study 3 involved manipulating both men's and women's arousal in an imagined social interaction. For women, arousal directly decreased HSEs' but

increased LSEs' relationship-initiation motivation, the opposite result to Study 1. For men, arousal directly increased HSEs' but decreased LSEs' relationship-initiation motivation, replicating the results of Study 2.

My package of studies connects self-esteem and arousal research, unifying two formerly separate subject areas. These findings provide an underlying mechanism (i.e., arousal) that explains how social risk interacts with self-esteem to influence relationship-initiation motivation. Consequently, my research increases the breadth and depth of current self-esteem theories.

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Acknowledgements

Many individuals aided in the completion of this dissertation. My supervisor, Dr. Danu Anthony Stinson, provided constant feedback, direction, and motivation that gave me focus on my research and my writing. My committee members, Drs. Louise Chim and Ryan Rhodes, also provided me with valuable feedback and support. I appreciate their time and patience in this long journey. It has been a pleasure to have them on my committee. I am grateful to Lisa Hoplock, who was always available in case I needed advice and direction. I would also like to thank the many research assistants who contributed numerous hours in collecting extensive amounts of data for my studies. Finally, my family and friends were always there for me. I thank all the people who have helped me complete this dissertation to the best of my abilities. I would never have done it without their support.

Self-Esteem and the Relation between Arousal and Relationship-Initiation Motivation

Matt, a single young heterosexual man, meets Jane, an attractive young woman, at the gym. Does Matt's perception of Jane's attractiveness depend on whether he meets her after exercising or before exercising? Jennifer goes to a social gathering where she knows almost nobody. Will Jennifer's social behavior depend on whether the music at the social gathering is fast-paced or slow-paced? Moreover, would the answers to these questions depend on Matt's and Jennifer's self-esteem? These questions seek to understand the ways that physiological and emotional arousal may interact with an important aspect of the self to influence people's romantic motivation and behavior. My PhD research answers these and other questions by examining how self-esteem moderates the association between arousal and *relationship-initiation motivation*, the drive to connect with a new romantic partner or social partner in general.

To foreshadow the arguments to come, classic research on arousal and emotion suggests that when aroused, people give the arousal an emotional label based upon contextual cues (e.g., Schachter & Singer, 1962). As well, when aroused, people attempt to find the source of arousal, also using contextual cues. As a result, this labeling of the arousal source influences social motivation. For example, if fear is induced in the presence of an attractive person, people may associate the fear-induced arousal with the attractive person, rather than the fearful stimuli, leading to increased relationship-initiation motivation (Dutton & Aron, 1974). Thus, arousal may play a role in regulating social belongingness. Because self-esteem also plays a role in regulating belongingness, arousal may help to explain self-esteem differences in relationship-initiation motivation. Though existing bodies of research have examined connections between arousal and relationship-initiation motivation, and between self-esteem and relationship-initiation motivation, no research examines self-esteem differences in this process. So by examining self-esteem differences in the link between arousal and relationship-initiation motivation, I unite two previously separate fields of research. Moreover, by

providing evidence that arousal plays a role in regulating relationship-initiation motivation, I provide evidence that the social regulatory function of self-esteem may have developed from more primal regulatory systems, an observation that increases the comprehensiveness of current self-esteem theories.

Arousal, Emotions, and Relationship-Initiation Motivation

Classic theories on arousal and emotions provide a framework that can be used to develop an explanation for how arousal influences social motivation and behavior. One of the earliest theories on arousal and emotions, the James-Lange Theory of Emotion (James, 1884; Lange, 1887), suggested that a stimulus will trigger physiological arousal, which then will trigger an emotional response. For example, a person may encounter a large dog (stimulus) that triggers an increased heart rate (physiological arousal), which then leads to the brain's interpretation of this heightened arousal as fear (emotional response).

Contrary to the James-Lange Theory, the Cannon-Bard Theory of Emotion (Cannon, 1927; Bard, 1934) suggested that physiological arousal and emotions may be independent, and may occur simultaneously as a result of the same environmental stimulus. Cannon (1927) provided evidence of the independence of physiological arousal and emotions by removing cats' sympathetic nervous systems (SNS). Because the SNS regulates the body's automatic processes related to physiological arousal, removal of the SNS will reduce physiological arousal. Because the James-Lange Theory asserted that physiological arousal is necessary for emotional responses, it predicted reduced emotional responses in cats without the SNS. Opposing these predictions, however, Cannon (1927) found that after removal of cats' SNS, cats did not have reduced emotional responses. This pattern of results suggested that physiological responses and emotions operate independently. For example, a person may encounter a large dog, which simultaneously leads to both increased heart rate and fear emotions.

Physiological arousal and emotions are not always independent, though. Schachter and Singer's (1962) Two-Factor Theory of Emotion suggested that physiological arousal sometimes can determine emotional responses. When physiological arousal is ambiguous, one's cognitive processes may interpret environmental stimuli to label the arousal with a particular emotion. For example, a person may encounter a large dog, which triggers an increase in heart rate. The person then perceives that the dog does not have a leash. Knowledge of the potential dangers posed by large dogs without leashes leads to the corresponding label of the arousal as fear. Schachter (1957) provided evidence that ambiguous physiological arousal can strengthen emotional responses. Specifically, he found that those who started with higher resting blood pressure had heightened emotional reactions to fear and anger stimuli than those who started with lower resting blood pressure.

Researchers have adapted these classic theories of physiological arousal and emotion to explain the relation between arousal and social motivations and behaviors. Most notably, researchers have examined the relation between arousal and romantic attraction, such that physiological or emotional arousal leads to increased romantic attraction, one's desire for another as a romantic partner (e.g., Dutton & Aron, 1974). One classic study on arousal and attraction manipulated fear arousal to examine its influence on romantic attraction. In this study, an attractive female confederate surveyed presumably heterosexual men on a high, shaky suspension bridge to stimulate high-fear arousal or on a low, stable bridge to stimulate low-fear arousal (Dutton & Aron, 1974). With high-fear arousal induced by the shaky suspension bridge, men exhibited more attraction to the confederate compared to men on the stable bridge. To explain these results, researchers have proposed numerous mechanisms.

To explain how fear arousal increases romantic attraction, the *Misattribution Theory of Arousal* posited that the source of the fear arousal is misattributed to the female confederate rather than the bridge, leading to increased sexual arousal and thus, romantic attraction to the confederate (Dutton & Aron, 1974). A fear-inducing situation and the presence of an attractive person afford the opportunity

to interpret the arousal as either fear or sexual arousal (Dutton & Aron, 1974). The misattribution of fear arousal from the bridge as sexual arousal led to increased sexually-oriented cognitions and thus, increased sexual attraction to the attractive confederate. As such, the Misattribution Theory of Arousal extended the Schachter-Singer Two-Factor Theory of Emotion from predicting how arousal influences emotions, generally, to predicting that arousal influences attraction. The Misattribution perspective suggested that when a source of arousal is ambiguous, a person uses her or his cognitions to attribute the arousal to environmental stimuli; if this arousal is attributed to a potential romantic partner, it will increase one's attraction to this partner.

One of the major shortfalls of the Misattribution Theory is that it suggested that an ambiguous source of arousal is required for arousal to increase attraction (Calvert-Boyanowsky & Leventhal, 1975). However, the pattern of arousal leading to attraction can occur with an unambiguous source of arousal. For example, the relation between a high shaky bridge and fear arousal is readily apparent; thus, it may not be a completely ambiguous stimulus (Kenrick & Cialdini, 1977). Because the arousal does not have to be ambiguous for arousal to increase attraction, a solely misattribution perspective is not sufficient to explain this pattern. Consequently, later perspectives on arousal and attraction avoid this requirement of an ambiguous source of arousal.

The *Negative Reinforcement* perspective of arousal provided an explanation of how arousal influences attraction that does not require an ambiguous source of arousal (Kenrick & Cialdini, 1977). This perspective suggested that negative arousal leads a person to approach social sources, which abate negative emotions caused by the negative arousal. Being on a high shaky bridge (i.e., Dutton & Aron, 1974) stimulated fear arousal, a form of arousal that leads to a negative emotion. To lessen the negative fear emotion triggered by the arousal, participants in the high-fear arousal condition perceived the confederate as more attractive than participants in the low-fear arousal condition. Increased attraction reflected relationship-initiation motivation. This increased relationship-initiation motivation allowed

the participant to feel closer to another person and alleviate negative emotions by satisfying their social needs. Interpreting increased attraction as a mechanism to abate negative emotions makes logical sense, but it has some flaws.

Though the Negative Reinforcement perspective of arousal seemed to explain Dutton and Aron's (1974) results well, it suffered from a lack of empirical support in later research (Foster, Witcher, Campbell, & Green, 1998). The perspective predicted that any positive social interaction can reduce negative emotions, suggesting that target attractiveness and gender did not matter (Kenrick & Cialdini, 1977). As well, it predicted that only negatively-valenced arousal would lead to increased attraction (Kenrick & Cialdini, 1977). Contrary to these predictions, target attractiveness *does* matter. Aroused participants found an attractive confederate *more* attractive and an unattractive confederate *less* attractive than non-aroused participants (White, Fishbein, & Rutsein, 1981). Target gender also matters. Using male confederates in Dutton and Aron's (1974) bridge study did not lead to increased attraction by presumably heterosexual men in a high-fear arousal condition compared to similar men in a low-fear arousal condition. Finally, regardless of whether emotional arousal is positive or negative, the relation between arousal and attraction remains the same (White et al., 1981). Consequently, the Negative Reinforcement perspective of arousal is not currently popular among psychological scientists. In the forthcoming studies in this dissertation, I have excluded the Negative Reinforcement perspective because of its inconsistent support.

To avoid the shortcomings of the previous perspectives, the *Response Facilitation* perspective of arousal suggested that arousal amplifies a person's dominant response in a particular situation (Allen, Kenrick, Linder, & McCall, 1989). Increased relationship-initiation motivation, and its manifestation as increased attraction, may reflect a dominant and practiced response to an attractive person. For example, in Dutton and Aron's (1974) bridge study, increased fear arousal led to increased attraction to the attractive confederate because attraction to an attractive person is the dominant

response. In using a dominant response explanation, the Response Facilitation perspective of arousal avoided the shortfalls of the previous perspectives by explaining how all sources of arousal can increase relationship-initiation motivation, regardless of the valence or ambiguity of the arousal source (Foster et al., 1998). This perspective also provided an explanation as to why target gender and attractiveness influence the pattern between arousal and attraction, consistent with empirical evidence on arousal and attraction.

After meta-analyzing research testing each of these perspectives on arousal and attraction, Foster and his colleagues (1998) conceived the *Judgment-Adjustment Theory of Arousal and Attraction*. This theory focused on two major stages in how arousal influences attraction: judgment and then adjustment. Judgment involves the automatic, less controlled process of arousal influencing evaluation. This initial reaction to arousal does not require mental effort. Because it does not require mental effort, judgment can occur when one has a high cognitive load, that is, when one already is exerting significant mental effort. Thus, in the judgment phase, arousal influences attraction automatically, similar to the processes posited in both the Misattribution and Response Facilitation perspectives of arousal (Foster et al., 1998). After this automatic judgment, *if-and-only-if* the person possesses sufficient cognitive resources, a person may use contextual cues to determine the source of arousal and adjust this initial evaluation to be more accurate. Adjustment is not an automatic process; it involves purposeful and conscious control to correct an initial judgment.

Regardless of the perspective used to explain why arousal increases attraction, the empirical evidence strongly suggests that arousal *does* generally increase attraction and relationship-initiation motivation in many situations. Increased relationship-initiation motivation may lead to the pursuit of positive social interactions through increased relationship-initiation behavior, responses that may satisfy a drive that psychological scientists call the *need to belong*. Thus, evidence suggests that the need to belong may depend on arousal to function, at least in part.

The Need to Belong and Relationship-Initiation Motivation

The need to belong is the inherent need for close, stable, and positive interpersonal relationships (Baumeister & Leary, 1995). In essence, the need to belong is the need for interpersonal acceptance. The importance of this type of need has been established for a number of years in psychology. Maslow (1943) ranked social belongingness as crucial on his hierarchy of needs, only surpassed by safety and physiological needs. Evolutionary psychologists have examined social behavior that satisfies the need to belong as reflective of evolutionary goals, an evolved adaptation to maximize one's survival capacity and one's reproductive capabilities (e.g., DeWall, Deckman, Pond, & Bonser, 2011). Belonging to a group allows for sharing of labor and resources, thus reducing risks to one's survival and increasing cooperation to overcome problems (Hogan, Jones, and Cheek, 1985). As well, the more belongingness one experiences, the more likely the person is to reproduce (Hogan et al., 1985). The idea of the need to belong is also rooted in attachment theory. The theory asserts that humans have the need to form interpersonal attachments, strong emotional bonds with another person (Ainsworth, 1973; Ainsworth & Bowlby, 1991; Bowlby, 1958). Attachment theory suggests that the need for strong, interpersonal attachment is instinctive and natural, starting from an infant's bond to its primary caregiver (Ainsworth & Bowlby, 1991). Overall, psychological research on needs, evolution, and attachment strongly suggests that the need to belong is innate.

If the need to belong is not satisfied, there are significant negative consequences. If people are deprived of this need, they will have an increased likelihood of suffering from health, adjustment, and overall well-being issues. For example, deprivation of the need to belong is associated with increased stress (e.g., Beekman, Stock, & Marcus, 2016). In addition, this deprivation can manifest into somatic complaints, such as increased risk of cardiovascular disease (Caspi, Harrington, Moffitt, Milne, & Poulton, 2006). Satisfying the need to belong can buffer a person against psychological and physical ailments (e.g., Seeman, 2000).

The need to belong drives a person's motivation. To satisfy the need to belong, people automatically form social bonds. For example, infants automatically form social bonds with their caregivers (Ainsworth & Bowlby, 1991). Just being physically close to people automatically increases a person's attraction to them and the likelihood of pursuing a social bond (e.g., Allgeier & Byrne, 1973; Newcomb, 1956). Because the need to belong is such an innate need, it is important to consider how a person satisfies the need to belong with close, stable, and positive interpersonal relationships. To foster a strong relationship that satisfies the need to belong, a person must first initiate the relationship. Consequently, relationship-initiation motivation and behavior is an important part of fulfilling the need to belong. Relationship initiation is about initiating a strong interpersonal connection. Thus, it is essential to determine what factors are involved in this initial relationship creation process.

The Need to Belong and Social Self-Regulation

Social interactions can help satisfy the need to belong. In *high-risk social situations* that afford both the possibility of acceptance and rejection, the potential for positive interpersonal connections could bolster one's feeling of belongingness, but the potential for social rejection could weaken one's feeling of belongingness (Murray, Holmes, & Collins, 2006; Murray, Derrick, Leder, & Holmes, 2008). Thus, in a high-risk social situation, there are two major strategies to maximize one's belongingness: pursue belongingness and face the threat of social rejection, or do not pursue belongingness and avoid the threat of social rejection (Murray et al., 2006; Murray et al., 2008). These two general strategies to maximize belongingness are also apparent during relationship initiation. High relationship-initiation motivation is conducive to maximizing belongingness, because it could lead to an active pursuit of positive interpersonal connections through approach behavior (Leary, Tambor, Terdal, & Downs, 1995), perhaps by approaching another person and behaving in warm manner (Elliot, 1999; Elliot, 2008). Low relationship-initiation motivation also is conducive to maximizing belongingness, by self-protecting against the threat of rejection through avoidance behavior (Murray et

al., 2008), perhaps by avoiding a social situation altogether or behaving in a withdrawn manner (Elliot, 1999; Elliot, 2008).

Social Self-Regulation and Arousal

So relationship-initiation motivation and behavior service the need to belong. Moreover, arousal is known to influence a person's relationship-initiation motivation in a high-risk social situation. For example, a meeting with an attractive person can afford increased belongingness if the relationship persists, but it also affords the threat of social rejection. In this high-risk social situation, heightened physiological or emotional arousal increases relationship-initiation motivation in the form of attraction (e.g., Allen et al., 1989; Dutton & Aron, 1974; White et al., 1981). Thus, high arousal seems to lead to high relationship-initiation motivation and the active pursuit of new social connections, whereas low arousal seems to lead to low relationship-initiation motivation and the self-protective avoidance of possible rejection. Thus, it is reasonable to propose that arousal also regulates the need to belong, specifically because arousal regulates relationship-initiation motivation.

Why might this be the case? Arousal is a physiological variable that is quite primal, meaning that it is a basic, fundamental variable that applies to many living creatures. In contrast, relationship-initiation motivation is a social variable that is more complex, applying only to humans and some primates. Thus, the systems that regulate social behavior likely developed much later in human's evolutionary history than did the systems that regulate arousal. This time sequence may shed light on the reasons why arousal and relationship-initiation motivation are linked. I propose that the system that regulates relationship-initiation motivation developed based upon a more primal regulatory system. The idea that certain regulatory systems often develop from more primal systems is not a novel concept. Just like social pain developed using the same substrates as physical pain (Macdonald & Leary, 2005), the systems that regulate relationship initiation motivation may have developed by co-opting more primal systems, like the arousal system.

To understand how social self-regulation may have been built upon the foundations of another self-regulatory system, I must first understand self-regulatory theories in general. All self-regulatory systems share similar underlying mechanisms. Kenrick and his colleagues (Kenrick, Griskevicius, Neuberg, & Schaller, 2010) suggest that self-regulatory systems help organisms recognize environmental opportunities and threats, determine benefits and costs, mobilize relevant resources, and respond to the environment. In essence, all self-regulatory systems seem to operate on evaluations of rewards and costs, and these evaluations lead to approach or avoidance behavior. Gray's two-factor learning theory suggests that the Behavior Activation System (BAS) automatically responds to rewards with approach and that the Behavior Inhibition System (BIS) automatically responds to costs with avoidance (Gray, 1987). This primal self-regulation system has been seen in humans, rats (e.g., Gray 1987), and cockroaches (e.g., Eiserer & Ramsay, 1981). Similarly, Hull (1943) theorized about the appetitive drives (i.e., responding to reward) and aversive drives (i.e., responding to costs) that automatically drive approach or avoidance behavior. The underlying mechanisms of reward and costs apply to self-regulatory systems that involve more concrete, conscious goals. In the biopsychosocial model, challenge appraisals are made in response to situations where a person has sufficient resources to cope (i.e., rewarding situations) and threat appraisals are made in response to situations where a person does not have sufficient resources to cope (i.e., costly situations; Blascovich & Tomaka, 1996). These lead to approach and avoidance behavior respectively. There are also domain-specific self-regulatory systems. For example, the social self-regulation system functions to satisfy the need to belong, the inherent need for close, stable, and positive interpersonal relationships. Murray's Risk Regulation Theory suggests that self-esteem helps to regulate behavior by detecting inclusion and exclusion cues (i.e., reward and cost) to determine whether a person will be accepted or rejected (Murray et al., 2008). Such cue detection leads to either approach or avoidance behavior, respectively.

Regardless of the complexity of the system, all forms of self-regulation seem to operate with the same underlying mechanisms of approaching rewards and avoiding costs.

This idea that all self-regulatory systems function based upon evaluating rewards and costs to influence approach and avoidance behavior is important. Not only do these underlying mechanisms connect all self-regulatory systems, this connection suggests that primal self-regulatory systems can complement more complex self-regulatory systems. Primal self-regulatory systems are associated with physiological responses. When the BAS is activated, HR is increased, and when the BIS is activated, HR is decreased (Fowles, 1980). When a person makes a challenge appraisal, HR is increased, and when a person makes a threat appraisal, HR is decreased (Blascovich & Tomaka, 1996). Considering that all self-regulatory systems share underlying mechanisms, perhaps the social self-regulatory system also is associated with physiological responses. Physiological responses may explain how the social self-regulation system functions. Thus, including physiological responses in models of the social self-regulation system will increase the comprehensiveness of current theoretical perspectives. For example, existing research on social self-regulation suggests that self-esteem interacts with social risk to influence relationship-initiation motivation (e.g., Cameron, Stinson, Gaetz, & Balchen, 2010), but it does not provide underlying mechanisms to explain this relation. So my proposal that arousal may explain, in part, social self-regulation during relationship initiation expands on prior research in an important way.

Here is where the connection to self-esteem becomes apparent in my theorizing: The self-esteem system is known to regulate the need to belong by regulating social behavior and motivation, and in particular, relationship-initiation motivation and behavior.

Self-Esteem and Relationship-Initiation Motivation

Self-esteem regulates the strategy to maximize belongingness in a high-risk social situation. In a high-risk relationship-initiation context, there is a goal conflict between whether to pursue increased

belongingness through high levels of relationship-initiation motivation, or whether to self-protect against threats to belongingness through low levels of relationship-initiation motivation. Self-esteem regulates interpersonal motivation and behavior aimed at maximizing belongingness to satisfy the need to belong (Anthony, Holmes, & Wood, 2007). The self-esteem regulatory system detects social rewards (i.e., acceptance) and social costs (i.e., rejection), and on the basis of these affordances, regulates social motivation. Higher self-esteem leads to *over-detecting* positive, rewarding social cues, whereas lower self-esteem leads to *under-detecting* positive, rewarding social cues (e.g., Baumeister, Heatherton, & Tice, 1993; Roth, Snyder, & Pace, 1986). Likewise, higher self-esteem leads to *under-detecting* negative, costly social cues, whereas lower self-esteem leads to *over-detecting* negative, costly social cues (e.g., Baumeister et al., 1993; Cameron, et al., 2010; Roth et al., 1986).

Because higher self-esteem individuals (HSEs) perceive social rewards more than costs in high-risk social situations, they exhibit increased relationship-initiation motivation (e.g., Cameron et al., 2010; Stinson, Cameron, Hoplock, & Hole, 2015). In other words, HSEs pursue increased belongingness. Because lower self-esteem individuals (LSEs) perceive social rewards less than costs, they exhibit decreased relationship-initiation motivation (e.g., Cameron et al., 2010; Stinson, Cameron, Hoplock, & Hole, 2015). In other words, LSEs self-protect against threats to belongingness. Supporting these self-esteem differences, extant research shows that in a high-risk social situation, HSEs express higher relationship-initiation motivation than LSEs (e.g. Cameron et al., 2010; Cameron, Stinson, & Wood, 2013; Stinson, Cameron, Hoplock, & Hole, 2015).

These particular self-esteem differences in relationship-initiation motivation do not exist in *low-risk* social situations, at least not in the same manner. Without risk, there is no goal conflict between increasing belongingness and self-protecting against the threat of social rejection. By definition, in a situation with low social risk there exists little to no threat of being rejected. Thus, there is only one reasonable strategy for maximize belongingness: increasing relationship-initiation motivation to

increase belongingness. Thus, in a low-risk social situation lacking threats to belongingness, there are either no self-esteem differences in relationship-initiation motivation (Cameron et al., 2010), or the pattern is reversed, with HSEs expressing lower relationship-initiation motivation than LSEs (Stinson, Cameron, & Robinson, 2015).

Stinson, Cameron, and Robinson (2015) found that HSEs have the strongest relationship-initiation motivation in reaction to social costs, whereas LSEs have the strongest relationship-initiation motivation in reaction to social rewards. Consequently, in a high-risk social situation, HSEs have stronger relationship-initiation motivation than LSEs due to the notable social costs, and in a low-risk social situation, LSEs have stronger relationship-initiation motivation than HSEs due to the notable social rewards. Thus, the association between self-esteem and relationship initiation motivation is complex, and depends largely on situational levels of social rewards and costs.

In theory, both self-esteem and arousal influence relationship-initiation motivation. Self-esteem moderates the relation between social risk and relationship-initiation motivation, and arousal seems to increase relationship-initiation motivation. Likely, these two patterns do not operate independently. Rather, it is feasible that self-esteem interacts with arousal to influence relationship-initiation motivation.

A Model of the Moderating Effect of Self-Esteem on Social Risk, Arousal, and Relationship-Initiation Motivation

Though researchers have thoroughly examined how self-esteem moderates the association between social risk and relationship-initiation motivation, no research to date has examined the mechanisms underlying this association. I propose that arousal may explain why self-esteem moderates the association between social risk and relationship-initiation motivation. This idea draws on the models of arousal and attraction that I reviewed earlier to propose that social risk triggers arousal (either physiological or emotional), and this arousal then leads to social motivation and behavior, such

as relationship-initiation motivation. Furthermore, each step of the model is moderated by self-esteem.

Figure 1 illustrates the model.

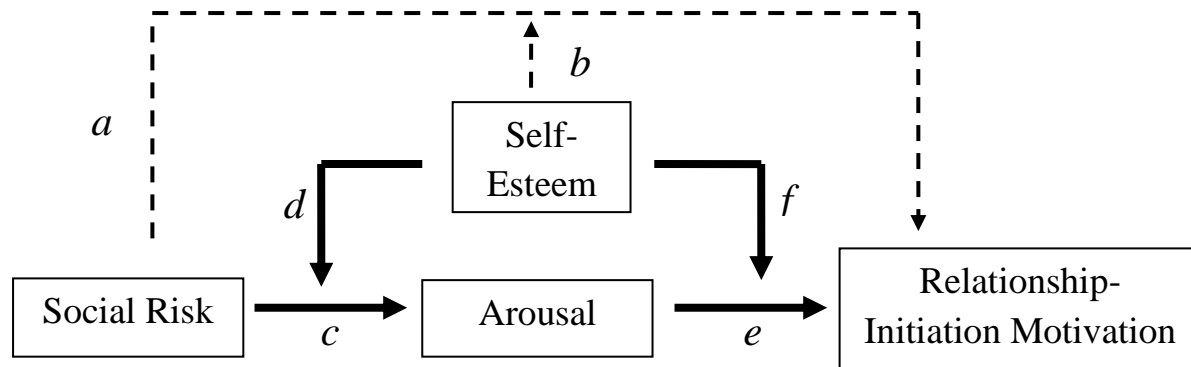


Figure 1. A conceptual model of how social risk influences relationship-initiation motivation via arousal, with each path in the model moderated by self-esteem.

As I have already reviewed, extant research has already established that self-esteem moderates the direct relation between social risk and relationship-initiation motivation (e.g., Cameron et al., 2010; Cameron et al., 2013). This interaction is depicted in paths *a* and *b* in Figure 1. In brief, with high social risk, HSEs perceive social rewards more than costs, leading to increased relationship-initiation motivation (e.g., Cameron et al., 2010; Stinson, Cameron, & Robinson, 2015). Conversely, with high social risk, LSEs perceive social costs more than rewards, leading to decreased relationship-initiation motivation. With low social risk, HSEs and LSEs either do not differ in terms of relationship-initiation motivation (Cameron et al., 2010), or HSEs have lower relationship-initiation motivation than LSEs (Cameron et al., 2013). A typical social situation will have some element of social risk.

This interaction between self-esteem and risk predicting relationship-initiation motivation may be explained by arousal. In my Master's thesis, I proposed that the self-esteem regulatory system developed from a more primal regulatory system that depended on arousal to function. Specifically, the Behavioral Activation and Behavioral Inhibition Systems (BAS-BIS) provide an explanation for behavior in terms of rewards and costs (Gray, 1987, 1990). The BAS responds to positive stimuli and

reward with active, approach behavior. The BIS, on the other hand, responds to negative stimuli and costs with passive, inhibited behavior. Moreover, Fowles (1980, 1988) suggests that reward increases heart rate (HR), and punishment, or costs, decreases HR. Fowles predicted that reward prompts increased HR due to the body's preparation for active, approach behavior. On the other hand, cost prompts decreased HR, due to the body's preparation for passive, inhibited behavior.

Because reward is associated with BAS activity and punishment is associated with BIS activity, BAS activation is likely to be associated with a higher HR and BIS activation is likely to be associated with a lower HR (Fowles, 1980, 1988). Therefore, if the self-esteem regulatory system is based upon the BAS-BIS system, at least in part, then rewarding social cues should lead to increased HR, and costly social cues should lead to decreased HR. However, recall that self-esteem regulates perceptions of rewards and costs in a given high-risk situation, with HSEs being more attuned to rewards and LSEs being more attuned to costs (Stinson, Cameron, & Robinson, 2015). Therefore, self-esteem should also moderate the influence of social risk on arousal. This prediction is evident in paths *c* and *d* in Figure 1.

My Master's thesis research provides evidence that self-esteem moderates the relation between social risk and arousal. I hypothesized that social risk influences physiological arousal differently for HSEs and for LSEs, such that social risk increases HSEs' arousal and relationship-initiation motivation, but decreases LSEs' arousal and relationship-initiation motivation. Specifically, I predicted that social risk would produce an HR response consistent with BAS-activation in HSEs, because HSEs detect more positive and fewer negative social cues in high-risk social situations (e.g., Baumeister et al., 1993; Cameron et al., 2010; Roth et al., 1986). On the other hand, I predicted that social risk would produce an HR response consistent with BIS-activation in LSEs, because LSEs detect fewer positive and more negative social cues in high-risk social situations (e.g., Baumeister et al., 1993; Cameron et al., 2010; Roth et al., 1986).

My Master's research tested these predictions by examining the effects of a social risk manipulation on HR, a measure of physiological arousal. Specifically, I examined HR reactivity, the difference between a participant's max and baseline HR. By using HR reactivity, I minimized the effects of individual HR differences between participants. Also, I examined the effect of the social risk manipulation on participants' relationship-initiation motivation and behavior. Throughout the entire study, the men who participated were attached to an HR monitor to measure physiological arousal. First, there was a five-minute period to measure a baseline resting HR. Participants then completed the Rosenberg Self-Esteem Scale (Rosenberg, 1965). Next, participants were introduced to the constrained communications paradigm of risk manipulation. In this paradigm, participants were either randomly assigned to the high-risk or the low-risk social condition. Then participants were led to believe that they would have a live web camera interaction with a female confederate. Those in the *high-risk social condition* thought that the confederate could either decide to meet them face-to-face after the live web camera interaction or not, and thus, the participant faced the possibilities of social rejection or social acceptance. Those in the *low-risk social condition* thought that the confederate had no opportunity to meet the participant face-to-face after the live web camera interaction, and thus, the participant had a low chance of social rejection or acceptance. After learning about the communication task, participants completed questionnaires that included items measuring relationship-initiation motivation, including an approach motivation scale, a risk and goals survey, and a survey regarding their expectations of an upcoming interaction with the purported other participant.

Results on relationship-initiation motivation replicated extant research. Overall, there was a significant interaction between self-esteem and social risk on relationship-initiation motivation. Also, the simple effects were consistent with previous research results. As expected, in the high-risk social situation, HSEs expressed stronger relationship-initiation motivation than LSEs. On the other hand, in the low-risk social situation, there were no significant self-esteem differences in relationship-initiation

motivation. As well, HSEs in the high-risk social situation expressed stronger relationship-initiation motivation than HSEs in the low-risk social situation. Conversely, LSEs in the high-risk social situation tended to have lower relationship-initiation motivation than LSEs in the low-risk social situation, though it was not statistically significant. Thus, paths *a* and *b* in Figure 1 are supported by these relationship-initiation motivation results, which replicate previously published effects.

More important for the current research, the results for HR reactivity paralleled the results for relationship-initiation motivation in the expected manner, as depicted in Figure 2. Overall, there was a significant interaction between self-esteem and social risk on HR reactivity. Also, the simple effects were consistent with the results for relationship-initiation motivation. In the high-risk social situation, HSEs had higher HR reactivity, and thus higher physiological arousal, than LSEs. On the other hand, in the low-risk social situation, HSEs had lower HR reactivity than LSEs. As well, HSEs in the high-risk social situation had higher HR reactivity than HSEs in the low-risk social situation. Conversely, LSEs in the high-risk social situation had lower HR reactivity than LSEs in the low-risk social situation. Thus, paths *c* and *d* in Figure 1 are supported by these HR reactivity results.

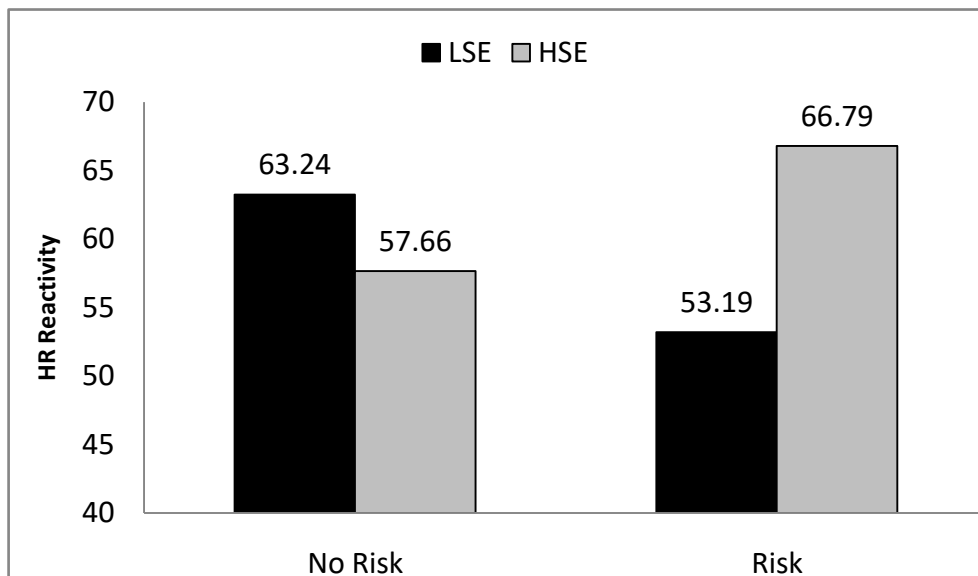


Figure 2. HR reactivity as a function of self-esteem and risk condition in my Master's study. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the mean on self-esteem.

The Present Research

Though the paths *a* to *d* in Figure 1 were tested and supported by my Master's thesis, I needed to examine whether or not arousal influences relationship-initiation motivation as a function of self-esteem to support paths *e* and *f* of the proposed model. Thus, my PhD dissertation research will do just that. My hypotheses concerning paths *e* and *f* in Figure 1 draw upon the Judgment-Adjustment and Response Facilitation perspectives on arousal and attraction (i.e., relationship-initiation motivation), each of which yields similar predictions about the relation between self-esteem, arousal, and relationship-initiation motivation.

In the Response Facilitation model, additional arousal triggers a person's dominant response (Allen et al., 1989), which research suggests will be different for HSEs and LSEs. In general, HSEs tend to favor approach goals and LSEs tend to favor avoidance goals (Heimpel, Elliot, & Wood, 2006). Put another way, HSEs' dominant social response is to pursue approach goals whereas LSEs' dominant response is to pursue avoidance goals. If we generalize this rule to a relationship initiation, then HSEs'

dominant response is to pursue relationship initiation whereas LSEs dominant response is to avoid relationship initiation. Thus, the Response Facilitation perspective predicts that arousal will increase HSEs' relationship-initiation motivation, whereas arousal will decrease LSEs' relationship-initiation motivation.

The Judgment-Adjustment model predicts that arousal influences attraction in two steps (Foster et al., 1998). First, people make an automatic *judgment* in response to the arousal, which leads to an increase in attraction. This stage is independent of individual differences, such as self-esteem. Next, with adequate cognitive resources, people will move on to the *adjustment* stage, where they will adjust this initial judgment in an attempt to increase its accuracy using contextual cues.

Existing research suggests that perception of contextual cues is influenced by self-esteem. Specifically, HSEs over-detect positive social cues, and LSEs over-detect negative social cues (e.g., Baumeister et al., 1993; Cameron et al., 2010; Roth et al., 1986). Thus, during the adjustment stage, HSEs' over-detection of positive social cues may lead to increased relationship-initiation motivation, whereas LSEs' over-detection of negative social cues may lead to decreased relationship-initiation motivation. In other words, people may use their dominant motivational style to *adjust* the initial uncontrolled response to arousal. Although each of these classical perspectives concerning arousal and attraction has been well-validated in previous research, no research to date has examined how self-esteem may moderate these processes. Consequently, my research adds more detail to classical theories of arousal.

As well, when combined with the results of my Master's research, the current research clarifies how self-esteem moderates the relation between social risk and relationship-initiation motivation by testing a new model (Figure 1). This model proposes that arousal serves as the mechanism underlying how self-esteem regulates the relation between social risk and relationship-initiation motivation. By

finding a mechanism underlying these relations, I contribute to expanding the precision of knowledge in the fields of self-esteem and relationships.

To test the model under the framework of the major perspectives of arousal, I use an experimental chain method to test sections (chain links) of the model individually and then ‘chain’ the links together after all parts of the model are tested (Spencer, Zanna, & Fong, 2005). The experimental chain method involves multiple experiments that manipulate the independent variables and the mediation variables to support a causal relation among variables.

In my particular experimental chain, I examine whether social risk interacts with self-esteem to influence arousal, and whether arousal interacts with self-esteem to influence relationship-initiation motivation. This experimental chain involves manipulating social risk to examine if there is a causal relation between social risk and arousal that is moderated by self-esteem. I tested these links in my Master’s research, described previously (i.e., paths *a* to *d* in Figure 1; paths *a* and *b* have also been empirically validated in the extant literature, e.g., Cameron et al., 2010; Cameron et al., 2013; Murray et al., 2006; Murray et al., 2008; Stinson, Cameron, Hoplock, & Hole, 2015; Stinson, Cameron, & Robinson, 2015). Then, I manipulate arousal to examine if there is a causal relation between arousal and relationship-initiation motivation that is moderated by self-esteem. I will test this link in the present research (i.e., paths *e* to *f* in Figure 1). If all of the chain links are validated by my research, then I will have evidence that arousal can explain the relation between social risk and relationship-initiation motivation.

To implement the experimental chain method compellingly, I need to ensure that my measurement of arousal in pathway *c* of the model in Figure 1 is equivalent to my manipulation of the arousal in pathway *e* of the model (Spencer et al., 2005). Physiological arousal is relatively straightforward to measure and manipulate, and I use the same operational definition of arousal – increased HR – in both my Master’s research testing path *a* and the current research testing path *e*. In

the current research, I also use a variety of methods to manipulate arousal, providing convergent validity for my findings.

I chose not to conduct a single experiment testing all paths in my model. Such a study would have required complex statistical analyses to interpret the relations between the variables, and would not have provided causal evidence concerning the relations among variables (Spencer et al., 2005). The experimental chain method avoids this complexity in a straightforward manner, and will allow me to determine if there is causal relation between the predictor and the outcome variables in my model. However, using the experimental chain method, I cannot easily determine the proportion of the relation between social risk and relationship-initiation motivation that is explained by arousal (Spencer et al., 2005). This weakness is outweighed by the many strengths of this method, however.

If the current research finds support for paths *e* and *f* in my model, then based on the experimental chain method and considered in light of the results of my Master's thesis, I will have evidence that social risk interacts with self-esteem to influence arousal, and arousal interacts with self-esteem to influence relationship-initiation motivation. These findings contribute to the literature by providing a mechanism (i.e., arousal) to explain how social risk interacts with self-esteem to influence relationship-initiation motivation, and by revealing the biological substrates of the self-esteem regulatory system.

Study 1

Study 1 tests whether physiological arousal influences relationship-initiation motivation as a function of self-esteem in a social situation. I sample only female participants to increase statistical power, which is the probability of rejecting a false null hypothesis. In other words, I want to ensure that I find an effect if it exists, rather than risk a Type II error, where I incorrectly retain a false null hypothesis. Increasing the homogeneity of a sample can reduce variance, which increases the effect size and increases power (Funder et al., 2013). If I include both men and women in the study, the increase in variance would reduce the effect size and power, thus increasing the chance of a Type II error. In this study, I also increase the homogeneity of the sample in other ways. Specifically, I sample only college students within a certain age range who have fluency in English to reduce the variance of the sample even further.

In this study, I use an established paradigm for studying relationship initiation to decrease the possibility of confounds due to poor study design choices and to allow me to compare and contrast my results with prior research. The social paradigm involves leading participants to believe that they will film an introductory video for a potential interaction partner, which their partner will watch and evaluate, and asking participants to anticipate whether their partner will be accepting or rejecting (Cameron et al., 2010). In the present experiment, prior to filming their video and reporting their expectations, participants either exercise to increase physiological arousal in the experimental condition or do not exercise in the control condition.

Prior research suggests that arousal will increase relationship-initiation motivation (e.g., Calvert-Boyanowsky & Leventhal, 1975; Dutton & Aron, 1974; Kenrick & Cialdini, 1977). But this previous research did not consider the influence of individual differences such as self-esteem.

I predict that arousal will increase HSEs' relationship-initiation motivation, whereas arousal will decrease LSEs' relationship-initiation motivation. I also explore whether the specific emotional

label that participants' attach to their arousal matters using the Positive and Negative Affect Schedule (PANAS; Watson, Clark, & Tellegen, 1988). Because physiological arousal does not inherently have an emotional valence, I predict that self-esteem will influence how a person labels arousal. In typical social situations, HSEs over-detect positive social cues and LSEs over-detect negative social cues (e.g., Baumeister et al., 1993; Cameron et al., 2010; Roth et al., 1986). Therefore, I predict that HSEs will label the arousal positively and LSEs will label the arousal negatively.

Methods

Participants. The participants were 125 women ($M_{\text{age}} = 19.25$, $SD = 1.53$; $M_{\text{self-esteem}} = 6.77$, $SD = 1.32$). Participants were undergraduate students, fluent in English, and were romantically single. Participants were 72% White, 8.5% South Asian, 7.6% Southeast Asian, 4.2% Mixed Ethnicity, 2.5% Black, 2.5% Middle Eastern, 0.8% First Nations, and 0.8% Hispanic.

Procedures and Measures. After reading and completing an informed consent form (Appendix A), participants completed the study alone under the guise of a communication study, where they believed that there would be a potential social interaction with another participant (Refer to Appendix B for full researcher script). The study started with participants filling out a questionnaire that included the Rosenberg Self-Esteem Scale (1965), demographics questions, questions regarding physical activity, and filler questions to disguise the nature of the study (Refer to Appendix C – Survey). Participants were then randomly assigned to either an *exercise* condition or a *no exercise* condition. The exercise condition involved rapidly running up and down an aerobic step for two minutes (for more information on exercise as an arousal manipulation, see Foster et al., 1998). An aerobic step is an elevated platform that provides a cardiovascular workout by allowing the user to step up and down off the platform. The experimenter ensured that the participants were working as hard as possible by giving encouraging instructions every thirty seconds (e.g., 'go as fast as you can'). After exercise, HR was measured using a Myo Watch Monitor strapped to the participants' wrists to confirm that participants'

had reached a state of heightened physiological arousal, as indicated by a HR of over 120 beats per minute. If the participants' HR was under 120 beats per minute, the participants were instructed to do the exercise for another thirty seconds as fast as possible.¹ By ensuring that all participants expended considerable physical effort in the exercise condition, I ensured that the exercise would be taxing for every participant, regardless of individual differences in physical fitness. In the no exercise condition, participants did not perform the exercise and just moved onto the next phase of the study. For all participants, HR was recorded after completing the initial survey (baseline HR), after completing the second survey (HR after Survey 2), and at the end of the study (end HR). In addition, participants in the exercise condition also had their HR assessed after the exercise portion.

After the initial HR measurement, the experimenter explained that the participants were going to have a social interaction through live web camera with a male interaction partner. All participants believed that the partner could choose whether or not to meet the participants face-to-face after the live web camera interaction. This part of the study involved deception, as the interaction partner did not actually exist. This deception was fully approved by the Human Research Ethics Board at the University of Victoria.

After learning about the interaction task and viewing a photograph of their potential interaction partner (a man of average attractiveness per pilot testing), participants used a 7-point social risk analysis scale (1 = strongly disagree, 7 = strongly agree) to measure relationship-initiation motivation that included 17 items such as "I am looking forward to meeting my interaction partner" and "I am looking forward to making a new friend today" (refer to Appendix C – Survey 2; Hoplock, 2011). In addition, participants used a 5-point scale (1 = strongly disagree, 5 = strongly agree) to complete the Positive and Negative Affect Schedule (PANAS; Watson et al., 1988; refer to Appendix C – Survey 2). Finally, participants were asked to set up two chairs for a potential meeting with the partner, and the

¹Only one participant ended the exercise period with a HR under 120 beats per minute, but after the additional 30 seconds of exercise, her HR was above the desired threshold.

researcher secretly recorded the distance between the chairs. Closer *chair distance* suggests that the participants wanted to sit closer to the purported interaction partner, indicating stronger relationship-initiation motivation (e.g., Kaitz, Bar-Haim, Lehrer, & Grossman, 2004). At the end of the study, participants were fully debriefed.

Results

Five participants were excluded because they were 25 years old or older, placing them in a different developmental phase compared to the purported interaction partner and the other participants (Arnett, 2000). Four participants were excluded because they were more than three standard deviations below the mean on their attractiveness ratings of the purported partner, suggesting they found him particularly unattractive (and thus were unlikely to be interested in meeting him). After the exclusions, 116 participants remained.

Zero-order correlations among variables are presented in Table 1. Notably, self-esteem was not correlated with either HR measure, suggesting pre-existing self-esteem differences in HR would not confound the results. In addition, self-esteem was positively correlated with positive arousal, which is consistent with prior research concerning self-esteem and emotionality (e.g., Brown & Marshall, 2001; Ozyesil, 2012). Initiation goals were negatively correlated with chair distance, suggesting that both relationship-initiation variables measured a similar construct.

Table 1. *Variables assessed and zero-order correlations among variables in Study 1*

	2	3	4	5	6	7
1. Self-Esteem	.03	-.18	.27**	-.16	.10	.02
2. Baseline HR	-	.30**	-.01	-.10	.12	-.03
3. HR After Survey 2	-	-	-.01	-.02	.08	-.11
4. Positive Arousal	-	-	-	-.13	.28**	-.18
5. Negative Arousal	-	-	-	-	-.23*	.03
6. Initiation Goals	-	-	-	-	-	-.30**
7. Chair Distance	-	-	-	-	-	-

* $p < 0.05$, ** $p < 0.01$,

Heart Rate

I regressed HR at each recorded time point (baseline HR: $M = 88.65$, $SD = 23.51$; HR after Survey 2: $M = 98.66$, $SD = 25.13$; end HR: $M = 96.40$, $SD = 21.03$) onto dummy-coded condition (no exercise = 0, exercise = 1) to ensure that HR for participants in the exercise condition remained elevated throughout the study period compared to participants in the no exercise condition. There were no initial differences in baseline HR between conditions ($F(1, 115) = 1.11$, $p = .301$, $R^2 = .01$). However, after the second survey, which came immediately after participants in the exercise condition completed the step task, HR for participants in the exercise condition ($M = 108.10$, $SD = 26.13$) was higher than HR for participants in the no exercise condition ($M = 90.11$, $SD = 20.98$; $F(1, 115) = 6.87$, $p = .010$, $R^2 = .06$). This condition difference persisted to the end of the study ($F(1, 115) = 5.33$, $p = .022$, $R^2 = .05$), though it was slightly diminished. Clearly, the exercise was physiologically arousing.

Positive and Negative Arousal

To create a self-reported positive arousal variable, I aggregated the positive arousal items from the PANAS (i.e., attentive, active, excited, enthusiastic, and alert) into a reliable *positive arousal*

variable ($\alpha = .69$; $M = 3.13$, $SD = .66$). Then I regressed positive arousal onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 2. There was a main effect for self-esteem, such that HSEs had more positive arousal than LSEs. There was no main effect for condition, and there was also no interaction. These results indicate that regardless of exercise condition, HSEs reported higher positive arousal than LSEs.

Table 2. Results of hierarchical regressions predicting positive arousal in Study 1

Predictor	Positive Arousal			
	B	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 114)				.07
Self-Esteem	.26	[.04, .23]	.005	
Condition	.05	[-.18, .31]	.55	
<i>Step 2</i> (df = 113)				.07
SE X Condition	.01	[-.18, .19]	.935	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

To create a self-reported negative arousal variable, I aggregated the negative arousal items from the PANAS (i.e., distressed, upset, nervous, and jittery) into a reliable *negative arousal* variable ($\alpha = .72$; $M = 2.87$, $SD = .81$). Then I regressed negative arousal onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 3. There was no main effect for self-esteem, and there was also no interaction. However, there was a trend for condition to predict negative arousal, such that participants in the no exercise condition reported more negative arousal than those in the exercise condition. In other words, exercise may have decreased participants' negative arousal.

Taken together, these results suggest that for women, the emotion label that people attach to arousal does not influence the links between self-esteem, arousal, and attraction.

Table 3. Results of hierarchical regressions predicting negative arousal in Study 1

Predictor	Negative Arousal			
	B	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 114)				.05
Self-Esteem	-.14	[-.20, .03]	.147	
Condition	-.18	[-.59, .02]	.064	
<i>Step 2</i> (df = 113)				.06
SE X Condition	-.15	[-.36, .11]	.287	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Initiation Goals

I aggregated the items assessing relationship-initiation motivations into a reliable *initiation goals* variable ($\alpha = .71$; $M = 3.07$, $SD = .81$). Then I regressed initiation goals onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 4. There were no main effects for self-esteem and condition, but as predicted, self-esteem did moderate the association between arousal condition and initiation goals.

In the no exercise condition, self-esteem did not predict initiation goals, though there was a trend for HSEs to have weaker initiation goals than LSEs, $\beta = -.22$, 95% CI [-.3, .03], $t(113) = -1.63$, $p = .105$. In the exercise condition, self-esteem did predict initiation goals, such that HSEs reported stronger initiation goals than LSEs, $\beta = .33$, 95% CI [.06, .34], $t(113) = 2.79$, $p = .006$. HSEs also reported stronger initiation goals in the exercise condition than the no exercise condition, $\beta = .39$, 95% CI [.23, 1.04], $t(113) = 3.09$, $p = .003$. LSEs' initiation goals did not vary by condition, $\beta = -.16$, 95% CI [-.67, .14], $t(113) = -1.31$, $p = .192$. These results suggest that physiological arousal from exercise increases HSEs', but not LSEs' relationship-initiation motivation. These results were unchanged when I controlled for participants' chronic exercise habits.

Table 4. Results of hierarchical regressions predicting initiation goals in Study 1

Predictor	Initiation Goals			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 114)				.008
Self-Esteem	.10	[-.05, .18]	.289	
Condition	.10	[-.15, .47]	.308	
<i>Step 2</i> (df = 113)				.09
SE X Condition	.41	[.12, .55]	.003	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

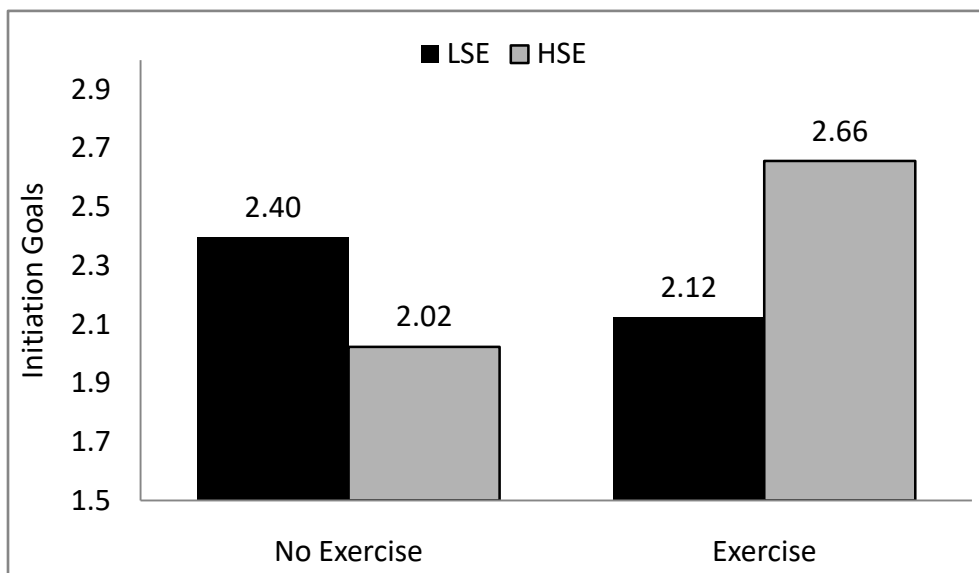


Figure 3. Initiation goals as a function of self-esteem and exercise condition in Study 1. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the sample mean on self-esteem.

Chair Distance

The chair distance measurements ranged from 16.50 inches to 66.00 inches. I regressed chair distance ($M = 41.88$, $SD = 7.94$) onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. Recall that greater distances reflect weaker relationship-initiation goals. The results of this regression can be seen in Table 5. There were no main effects for self-esteem or condition, but once again, self-esteem moderated the effect of arousal on this indicator of relationship-initiation motivation.

In the no exercise condition, HSEs had greater chair distance than LSEs, $\beta = .28$, 95% CI [.003, 3.34], $t(113) = 1.99$, $p = .045$, but HSEs and LSEs had the same chair distance in the exercise condition, $\beta = -.10$, 95% CI [-2.03, .90], $t(113) = -.86$, $p = .391$. HSEs' chair distance did not vary as a function of arousal, $\beta = -.07$, 95% CI [-5.03, 2.93], $t(113) = -.52$, $p = .602$. However, LSEs had greater chair distance in the exercise condition than in the no exercise condition, $\beta = .32$, 95% CI [.97, 9.18], $t(113) = 2.45$, $p = .016$. These results reveal that physiological arousal decreased LSEs' relationship-initiation motivation. These results were unchanged when I controlled for exercise habits.

Table 5. Results of hierarchical regressions predicting chair distance in Study 1

Predictor	Chair Distance			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 114)				.02
Self-Esteem	.01	[-1.09, 1.23]	.905	
Condition	.12	[-1.05, 4.94]	.200	
<i>Step 2</i> (df = 113)				.05
SE X Condition	-.29	[-4.46, -.11]	.044	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

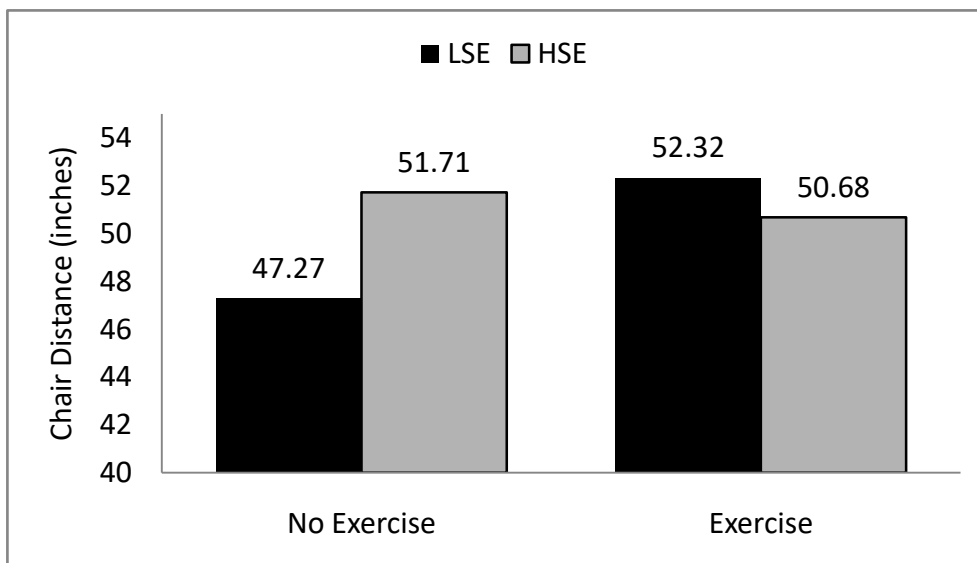


Figure 4. Chair distance as a function of self-esteem and exercise condition in Study 1. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the mean on self-esteem.

Discussion

Consistent with the predictions of both the Response Facilitation perspective and the Judgment-Adjustment perspectives, physiological arousal increased HSEs' relationship-initiation motivation, as indicated by their initiation goals, but decreased LSEs' relationship-initiation behavior, as indicated by their chosen chair distance. That is, arousal increased people's dominant response, which was determined by self-esteem.

One puzzling aspect of these results is the fact that the effect of arousal was evident for HSEs on one measure of relationship-initiation motivation but was evident for LSEs on the other measure. Perhaps the results for initiation goals were driven by HSEs because the initiation goals variable measures approach motivation. The initiation goals variable reflects how much a person wants to initiate a relationship, which is akin to approach. HSEs tend to have stronger approach motivation than LSEs in typical social situations because HSEs over-detect positive social cues.

Conversely, the results for chair distance may have been driven by LSEs because chair distance measures avoidance motivation. The idea of chair distance reflecting avoidance motivations is less intuitive than the idea of initiation goals reflecting approach motivations. To explain my reasoning, I will introduce the dual-process model (Chaiken & Trope, 1999) that suggests that a phenomenon, like relationship-initiation motivation, can occur as a result of two different types of cognitive processing. First, there is controlled cognitive processing, which is under intentional control and is associated with awareness. Then, there is automatic cognitive processing, which does not need attention or awareness.

The initiation goals variable reflects controlled cognitive processing because participants are aware that it is associated with relationship initiation. For example, items like "I want to share my feelings with my interaction partner" clearly reflect a relationship-initiation situation. The chair distance variable reflects automatic cognitive processing because participants are not aware that it is

associated with relationship initiation. There is no intuitive connection between chair distance and relationship initiation.

Why does an automatic cognitive process reflect avoidance motivation? I propose that activation of these automatic processes may depend on contingencies of self-esteem. Crocker (Crocker & Wolfe, 2001) theorized that individuals differ in how much they perceive that acceptance by others is contingent on their success. LSEs tend to have higher contingencies of self-worth, meaning that they believe that others' acceptance or rejection of them depends more on their success or failure, compared to HSEs (Baldwin & Sinclair, 1996). Strong contingency expectations are associated with avoidance motivation and behavior. Research suggests that LSEs *automatically* activate contingency expectations in situations that may involve interpersonal acceptance and rejection (Baldwin, Baccus, & Fitzsimons, 2004), whereas HSEs do not. Consequently, in terms of the chair distance variable, LSEs automatically activate these contingencies of self-worth and their associated automatic avoidance motivations. This may explain why LSEs drive the results of chair distance and why chair distance reflects avoidance. This is an interesting possibility for future research.

One potential confound for my results is self-esteem differences in physical fitness, which would affect physiological arousal in response to the exercise. Extant research suggests that self-esteem and physical activity are correlated, and that HSEs tend to be more physically active than LSEs (Sonstroem & Morgan, 1989). If the confound did occur, the physiological responses to exercise would not be randomly assigned across HSEs and LSEs. Instead, the arousal manipulation would affect physiological arousal differently for HSEs and LSEs, and my arousal manipulation would be flawed. Thus, I would not be able to determine if HSEs and LSEs experienced the same physiological arousal or if the initial physiological arousal was influenced by pre-existing differences in physical activity.

However, in the first questionnaire in Study 1, I included items assessing physical activity and found no significant differences between HSEs and LSEs in exercise habits. Thus, exercise affected

HSEs' and LSEs' physiological arousal similarly, eliminating the potential confound caused by physical activity differences. Also, I saw no main effect of self-esteem on arousal throughout the study period, which eliminates this confound. Another concern was that those who frequently trained in physical activity may have been resistant to physiological arousal techniques. However, when I controlled for physical activity in the analyses I reported, the results were unchanged. Thus, it does not appear that individual differences in physical activity levels can explain my results.

My next study seeks to replicate these results with a sample of men.

Study 2

Study 2 uses the same method as Study 1, but participants are men. I choose to sample only men to increase power by increasing the homogeneity of the sample, reduce the variance, and consequently increase the effect sizes (Funder et al., 2013). Once again, I predict that arousal will increase HSEs' but decrease LSEs' relationship-initiation motivation. I also explore whether the labeling the arousal as positive or negative arousal matters for men.

Methods

Participants. The participants were 125 men ($M_{\text{age}} = 19.78$, $SD = 1.58$; $M_{\text{self-esteem}} = 7.11$, $SD = 1.24$). Participants were undergraduate students and were fluent in English. The participants were 59.8% White, 13.7% South Asian, 12.7% Southeast Asian, 4.9% Mixed Ethnicity, 2.9% Black, 2.9% First Nations, 2% Middle Eastern, and 1% Hispanic.

Procedures and Measures. The procedure was identical to Study 1, except that the participants were men and the interaction partner was a woman.² The research assistant was also a woman.

Results

Ten participants were excluded because they were not born in Canada and I did not want cultural differences to influence the results. One participant was excluded because he was more than three standard deviations below the mean on self-esteem scores. After the exclusions, 114 participants remained.

Zero-order correlations among variables are presented in Table 6. Like in Study 1, self-esteem was not correlated with either HR measure, suggesting that pre-existing self-esteem differences in HR would not confound the results. Again, self-esteem was positively correlated with positive arousal, reflecting chronic self-esteem differences in affectivity (e.g., Brown & Marshall, 2001; Ozyesil, 2012). But unlike in Study 1, self-esteem was also negatively correlated with negative arousal, which also

² Unlike in Study 1, participants did not see a photo of the partner.

reflects chronic self-esteem differences in affectivity. Unlike in Study 1, initiation goals were not correlated with chair distance, suggesting that the variables measure distinct constructs in this sample. Based on these differences between Study 1 and Study 2, it seems that there may be gender differences in the labeling of arousal and the interpretation of the relationship-initiation variables in the study.

Table 6. *Variables assessed and zero-order correlations among variables in Study 2*

	2	3	4	5	6	7
1. Self-Esteem	.12	.03	.23*	-.39**	.28**	-.06
2. Baseline HR	-	.64**	-.05	-.04	.16	-.18
3. HR After Survey 2	-	-	-.02	-.05	.10	-.08
4. Positive Arousal	-	-	-	-.13	.25**	-.22*
5. Negative Arousal	-	-	-	-	-.12	.11
6. Initiation Goals	-	-	-	-	-	-.08
7. Chair Distance	-	-	-	-	-	-

* $p < 0.05$, ** $p < 0.01$,

Heart Rate

I regressed HR (baseline HR: $M = 85.23$, $SD = 14.64$; HR after Survey 2: $M = 101.17$, $SD = 20.69$; end HR: $M = 96.17$, $SD = 18.35$) at each recorded time point onto dummy-coded condition (no exercise = 0, exercise = 1) to ensure that HR for participants in the exercise condition remained elevated throughout the study period compared to participants in the no exercise condition. There were no initial differences in HR between conditions ($F(1, 113) = 2.36$, $p = .131$, $R^2 = .02$). However, after the second survey, which came immediately after participants in the exercise condition completed the exercise task, HR for participants in the exercise condition ($M = 113.40$, $SD = 16.75$) was higher than HR for participants in the no exercise condition ($M = 88.50$, $SD = 16.37$; $F(1, 113) = 59.64$, $p < .001$, $R^2 = .38$). This condition difference persisted to the end of the study ($F(1, 113) = 38.26$, $p < .001$, $R^2 =$

.28), though compared to the HR measurement immediately after the exercise, it was slightly diminished. Thus, the exercise was effective at increasing physiological arousal throughout the duration of the study.

Positive and Negative Arousal

To create a self-reported positive arousal variable, I aggregated the positive arousal items from the PANAS into a reliable *positive arousal* variable ($\alpha = .63$; $M = 3.65$, $SD = .53$). Then I regressed positive arousal onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 7. There was a main effect for self-esteem, but there was no main effect for condition. There was also an interaction between self-esteem and exercise condition (Figure 5).

In the no exercise condition, self-esteem did not predict positive arousal, $\beta = .05$, 95% CI [-.09, .13], $t(111) = .36$, $p = .717$. In the exercise condition, however, self-esteem predicted positive arousal, such that HSEs reported more positive arousal than LSEs, $\beta = .42$, 95% CI [.07, .29], $t(111) = 3.21$, $p = .002$. There were no positive arousal differences between the exercise and no exercise conditions for HSEs, $\beta = .22$, 95% CI [-.04, .50], $t(111) = 1.66$, $p = .100$ or LSEs, $\beta = -.17$, 95% CI [-.46, .10], $t(111) = -1.29$, $p = .201$.

Unlike the results for Study 1 with women, the current results for men suggest that exercise causes HSEs to report higher positive arousal than LSEs.

Table 7. Results of hierarchical regressions predicting positive arousal in Study 2

Predictor	Positive Arousal			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 112)				.05
Self-Esteem	.23	[.02, .18]	.015	
Condition	.03	[-.16, .22]	.778	
<i>Step 2</i> (df = 111)				.09
SE X Condition	.26	[.004, .31]	.045	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

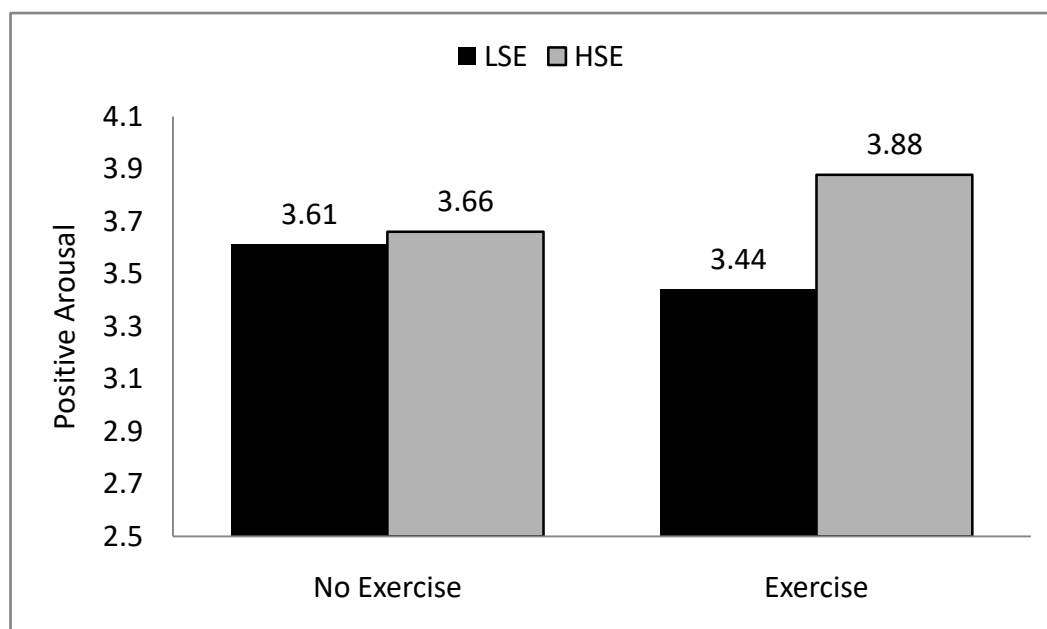


Figure 5. Positive arousal as a function of self-esteem and exercise condition in Study 2. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the mean on self-esteem.

To create a self-reported negative arousal variable, I aggregated the negative arousal items from the PANAS into a reliable *negative arousal* variable ($\alpha = .77$; $M = 2.67$, $SD = .85$). Then I regressed negative arousal onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 8. There was a main effect for self-esteem and condition. There was no interaction.

The main effects suggest that LSEs had more negative arousal than HSEs, and that those in the no exercise condition had more negative arousal than those in the exercise condition. In other words, exercise decreased participants' negative arousal.

Table 8. Results of hierarchical regressions predicting negative arousal in Study 2

Predictor	Negative Arousal			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 112)				.21
Self-Esteem	-.39	[-.38, -.15]	<.001	
Condition	-.24	[-.70, .13]	.005	
<i>Step 2</i> (df = 111)				.23
SE X Condition	.16	[-.07, .39]	.175	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Initiation Goals

I aggregated the items assessing relationship-initiation motivations into a reliable *initiation goals* variable ($\alpha = .67$; $M = 3.88$, $SD = .72$). Then I regressed initiation goals onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. The results of this regression can be seen in Table 9. There was a main effect for self-esteem but no main effect of condition. Also, self-esteem did not moderate the association between arousal condition and initiation goals.

Table 9. Results of hierarchical regressions predicting initiation goals in Study 2

Predictor	Initiation Goals			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 113)				.06
Self-Esteem	.28	[.05, .27]	.003	
Condition	.01	[-.24, .28]	.882	
<i>Step 2</i> (df = 111)				.05
SE X Condition	.03	[-.19, .24]	.826	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

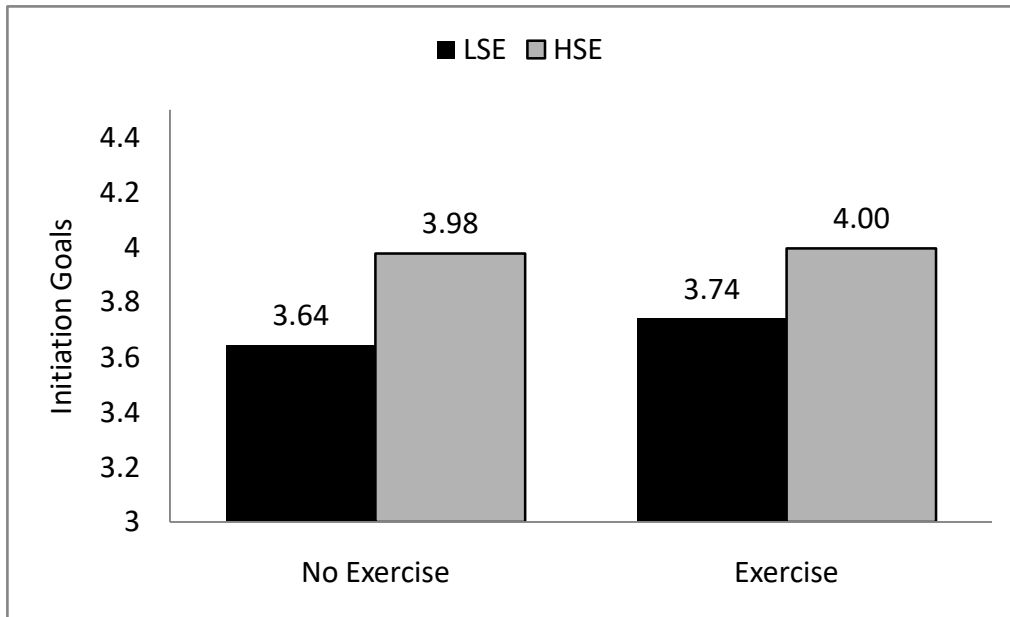


Figure 6. Initiation goals as a function of self-esteem and exercise condition in Study 2. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the sample mean on self-esteem.

Chair Distance

The chair distance measurements ranged from 27.50 inches to 66.00 inches. I regressed chair distance ($M = 50.40$, $SD = 6.84$) onto: Step 1) mean-centered self-esteem, dummy-coded condition (no exercise = 0, exercise = 1); Step 2) the interaction between variables. Recall that greater distances reflect weaker relationship-initiation goals. The results of this regression can be seen in Table 10. There were no main effects for self-esteem or condition, and self-esteem did not moderate the effect of arousal on this indicator of relationship-initiation motivation.

Table 10. Results of hierarchical regressions predicting chair distance in Study 2

Predictor	Chair Distance			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 113)				.01
Self-Esteem	-.06	[-1.34, .73]	.562	
Condition	-.11	[-4.00, 1.11]	.264	
<i>Step 2</i> (df = 111)				.01
SE X Condition	-.05	[-2.45, 1.70]	.720	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

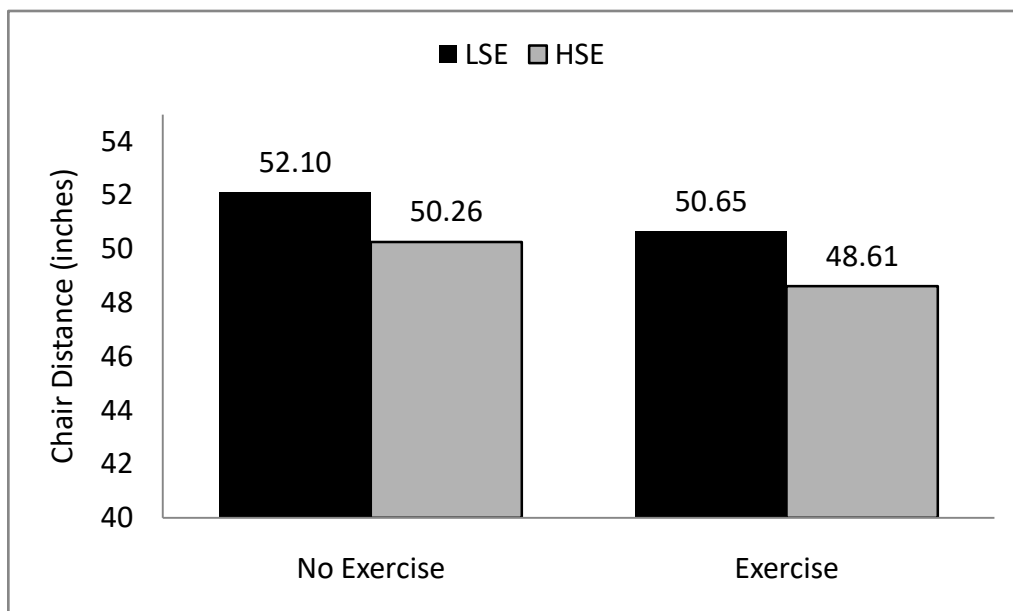


Figure 7. Chair distance as a function of self-esteem and exercise in Study 2. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the mean on self-esteem.

Exploratory Analyses: Mediated Moderation

Inconsistent with my hypotheses, I did not find evidence that self-esteem and arousal condition interacted to influence initiation goals or chair distance. However, I did find that self-esteem and arousal condition interacted to influence self-reported positive arousal in a manner consistent with my hypotheses concerning motivation: Exercise caused HSEs to experience stronger positive arousal than LSEs.

Because labeling of an arousal state with emotional terms like “active,” “enthusiastic,” or “alert” can influence people’s responses to arousal (e.g., Schachter & Singer, 1962), it is possible that even though the interaction between self-esteem and arousal condition did not directly affect initiation goals or chair distance, it could have influenced these variables indirectly via positive arousal (i.e., self-esteem x arousal condition → positive arousal → initiation goals and chair distance). Because in social situations, HSEs over-detect and LSEs under-detect positive social cues (e.g., Baumeister et al., 1993; Cameron et al., 2010; Roth et al., 1986), HSEs are more likely to label an ambiguous source of arousal like exercise as positive. Consequently, aroused HSEs likely report more positive arousal than aroused LSEs. This labeling of arousal as positive may be one possible avenue for arousal to increase relationship-initiation motivation, in the form of increased initiation goals and decreased chair distance. An indirect effect can occur even if there is no direct significant effect (Hayes, 2009).

This proposed model reflects *mediated moderation* (e.g., Morgan-Lopez & Mackinnon, 2006; Muller, Judd, & Yzerbyt, 2005). In this particular model, path *a* from the predictor variable (i.e., exercise condition) to the mediational variable (i.e., positive arousal) is conditional upon the level of a moderator variable (i.e., self-esteem), but path *b* from the mediational variable to the outcome variables (i.e., initiation goals and chair distance) are unconditional. In other words, positive arousal will influence the outcome variables, regardless of self-esteem. The results of the analyses testing this mediation model for initiation goals is presented in Figure 8, and the results for chair distance are depicted in Figure 9.

Initiation Goals. The first step in this specific mediated moderation analysis is to establish whether path *a*, which reflects the association between the exercise condition and positive arousal, was moderated by self-esteem. As described previously and depicted in Table 7, self-esteem and exercise condition did interact to predict positive arousal. The second step of this mediated moderation analysis

is to test whether path *b*, which reflects the association between positive arousal and initiation goals, was statistically significant, controlling for all other variables in the model.

To test this path, I added positive arousal to a new Step 3 of the earlier regression predicting initiation goals (see Table 11). As expected, positive arousal independently predicted initiation goals. Finally, when I used Hayes' (2013) PROCESS macro for SPSS using 5,000 bootstrap samples to estimate the 95% bias-corrected CI of the indirect path, results revealed that the moderated indirect path through positive arousal (i.e., the product of paths *a* and *b*) was statistically significant for initiation goals, indirect path = .06, *SE* = .04, 95% CI [.001, .17].

Based on these results, HSEs labeled their physiological arousal with positive emotional terms, whereas LSEs did not, which in turn led HSEs to exhibit stronger initiation goals than LSEs.

Table 11. Results of hierarchical regressions, including positive arousal, predicting initiation goals in Study 2

Predictor	Initiation Goals			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 113)				.08
Self-Esteem	.28	[.05, .27]	.003	
Condition	.01	[-.24, .28]	.882	
<i>Step 2</i> (df = 111)				.08
SE X Condition	.03	[-.19, .24]	.826	
<i>Step 3</i> (df = 110)				.11
Positive Arousal	.21	[.02, .54]	.034	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

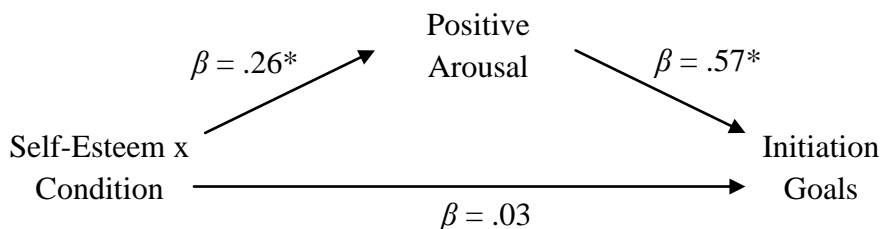


Figure 8. A conceptual model of how self-esteem and exercise condition influence initiation goals via self-reported positive arousal in Study 2. **p* < .05.

Chair Distance. I conducted the same mediated moderation analysis for chair distance. I have already established that self-esteem and condition interacted to predict positive arousal. When I added positive arousal to a new Step 3 of the earlier regression predicting chair distance (see Table 12), positive arousal independently predicted chair distance ($\beta = -.22$, 95% CI [-5.35, -.33], $t(110) = -2.24$, $p = .027$). When I used Hayes' (2013) PROCESS macro for SPSS using 5,000 bootstrap samples to estimate the 95% bias-corrected CI of the indirect path, results revealed that the moderated indirect path through positive arousal (i.e., the product of paths a and b) was also statistically significant for chair distance, indirect path = $-.44$, $SE = .35$, 95% CI [-1.44, $-.01$].

Based on these results, HSEs labeled their physiological arousal with positive emotional terms whereas LSEs did not, which in turn led HSEs to place their chair closer to their interaction partner than LSEs.

Table 12. Results of hierarchical regressions, including positive arousal, predicting chair distance in Study 2

Predictor	Chair Distance			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 113)				.01
Self-Esteem	-.06	[-1.34, .73]	.562	
Condition	-.11	[-4.00, 1.11]	.264	
<i>Step 2</i> (df = 111)				.01
SE X Condition	-.05	[-2.45, 1.70]	.720	
<i>Step 3</i> (df = 110)				.06
Positive Arousal	-.22	[-5.35, -.33]	.027	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

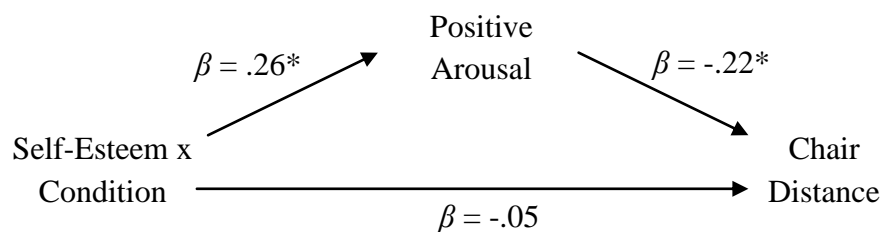


Figure 9. A conceptual model of how self-esteem and arousal condition influence chair distance via self-reported positive arousal in Study 2. * $p < .05$.

Discussion

Although there was no direct effect of self-esteem and arousal on relationship-initiation motivation in this experiment, the mediated moderation analyses revealed that HSEs in the exercise condition labeled their arousal positively, and in turn, this positive arousal increased their relationship-initiation motivation. This pattern did not exist for LSEs; LSEs in the exercise condition did not label their arousal positively, and consequently, their relationship-initiation motivation did not increase. This pattern of results suggests that for men, emotional labeling was necessary for arousal to influence relationship-initiation motivation.

These results add a novel perspective on classic research on arousal and attraction (e.g., Dutton & Aron, 1973). Perhaps the classic findings that arousal increased attraction for men can be explained by men labeling the ambiguous source of arousal as positive.

The results for Study 1 and Study 2 are different. For HSE women, arousal directly increased relationship-initiation motivation. For HSE men, arousal increased relationship-initiation motivation only after the men labeled the arousal as positive. I will explore this difference further in my next experiment, which includes both men and women. I also used a new experimental paradigm in my third experiment to determine if my results, including the gender differences, generalize beyond the experimental context of my first two experiments.

Study 3

Like my first two experiments, my third experiment tests whether arousal and self-esteem influence relationship-initiation motivation in a social situation. However, this time I manipulate arousal using music, not exercise. Participants listen to music designed to either induce high arousal or low arousal. Extant research suggests that music played at a fast tempo (i.e., high beats per minute) increases arousal more than music played at a slow tempo (e.g., Balch & Lewis, 1996; Edworthy & Waring, 2006). Thus, I borrow a paradigm used by Husain and her colleagues (2002) to manipulate arousal, using the exact same music that the researchers used in their study.

As they listen to the music, participants complete relationship-initiation questionnaires. To recreate the experience of interacting with a potential romantic partner, participants imagine that they are single and are interacting with an attractive stranger. Participants then report how accepted they predict they would feel and how willing they would be to initiate a social interaction with the hypothetical partner. In addition, to measure relationship-initiation behavior, participants report their willingness to join a social group held at inconvenient times.

In Study 3, I sample both men and women because I am interested in gender differences. Although including both men and women increases the heterogeneity of the sample and consequently decreases the effect size, I use a recruitment method that leads to a large sample size. Specifically, I recruit participants from the University Centre at the University of Victoria. The University Centre is a crowded area at the University of Victoria that consists of a cafeteria, student help desks, and a variety of administrative offices. Because the area is crowded, it is easier to recruit a large sample at the University Centre compared to at a lab. Thus, statistical power will still be sufficient in this study.

I predict that participants in the high arousal condition will have higher HRs than participants in the low arousal condition. Consistent with Study 1 and Study 2, and consistent with the predictions made by the Judgment-Adjustment and Response-Facilitation perspectives, I predict that high arousal

will increase HSEs' but decrease LSEs' relationship-initiation motivation. I also explore whether affective labeling explains this effect, and whether such an indirect path, if present, differs for men and women.

Methods

Participants. There were 318 participants ($M_{age} = 26.16$, $SD = 10.07$; $M_{self-esteem} = 6.76$, $SD = 1.32$) recruited from the University Centre at the University of Victoria. Participants were 76.4% White, 8.2% Southeast Asian, 6% Mixed Ethnicity, 4.7% South Asian, 1.7% First Nations, 1.3% Hispanic, 0.9% Black, and 0.9% Middle Eastern.

Procedure and Measures. After reading and filling out an informed consent form (Refer to Appendix H), participants completed the study about "General Behaviors" individually (Refer to Appendix I for full researcher scripts). Participants were asked to complete a short five to ten minute survey on a laptop computer. First, participants completed a preliminary survey that included the Rosenberg Self-Esteem Scale (1965), demographics questions, and filler questions to disguise the focus of the study (Refer to Appendix J for all questions). After completing the preliminary survey, a research assistant assessed participants' baseline HR using a Myo Watch Monitor (i.e., the same monitor used in Studies 1 and 2).

Then participants were asked to wear headphones. Participants were led to believe that the headphones served to drown out the ambient noise in the area because the University Centre often gets noisy. Thus, this part of the study used deception, which had been fully approved by the Human Research Ethics Board at the University of Victoria. Participants wore the headphones and listened to music for the rest of the study. Participants were randomly assigned to listen to one of two types of music. Following Husain et al. (2002), participants in the high arousal condition listened to Mozart's "Sonata K. 448" played in a major key at a fast tempo (165 beats per minute). Participants in the low arousal condition listened to the same music at a slow tempo (60 beats per minute). The music was

looped (i.e., repeated when it finished) so that it played as long as the participants were wearing the headphones. Once they were wearing the headphones, participants wrote about how they traveled to school for three minutes (Refer to Appendix K for this section of the study). This writing task was designed to last long enough to habituate the participants to the music and allow time for the music to affect arousal. This three-minute duration was chosen to exceed that of previous research to ensure adequate time for the music to affect arousal (e.g., Carpentier & Potter, 2007, used music lasting 50 to 60 seconds).

After describing their commute to school, participants were instructed to “imagine you are interacting with someone you have just met and who you are romantically or sexually attracted to. Imagine that you are single and not in a committed relationship.” Then participants used a 7-point scale (1 = Strongly Disagree, 7 = Strongly Agree) to answer eight questions assessing their anticipated acceptance from others, including “I feel like I would get along well with this person” and “I think this person would be accepting of me” (adapted from Fletcher, Kerr, Li, & Valentine, 2014; refer to Appendix L – Meeting Questionnaire for all questions).

Next participants read that Dr. Stinson’s social psychology laboratory was planning to form and conduct a focus group that involved meeting new people and interacting socially (adapted from Hoplock, 2013). Participants used a 7-point scale (1 = Extremely Unlikely, 7 = Extremely Likely) to rate their agreement with the questions “How much would you like to participate in this focus group?” and “How willing are you to attend sessions held late in the evenings, and on Saturday and Sunday mornings at 8am?” As well, there was the option for participants to leave their name and e-mail so that a researcher could contact them about joining the group (Refer to Appendix L – Relationship-Initiation Behavior Task). In reality, there was no focus group planned. Thus, this part of the study used deception, which had been fully approved prior to the study’s commencement.

Then participants were once again instructed to “imagine you are interacting with someone you have just met and who you are romantically or sexually attracted to. Imagine that you are single and not in a committed relationship.” Then they used a 7-point scale (1 = Extremely Unlikely, 7 = Extremely Likely) to answer twelve-items assessing initiation goals, including “I would like to share my feelings with this person” and “I would like to tell this person about my hopes and dreams” (adapted from Pilkington & Richardson, 1988; refer to Appendix L – Initiation Goals Questionnaire for all questions).

After that, participants used a 5-point scale (1 = Strongly Disagree, 5 = Strongly Agree) to complete the PANAS (Watson et al., 1988; Refer to Appendix L – PANAS). Finally, the research assistant recorded the participants’ HR once again, and the participants were fully debriefed.

Results

Because I collected data in a public area of campus, I was not able to select participants based on demographic characteristics as I was able to do in my first two studies. Thus, I excluded participants post-hoc who did not meet age and language requirements. I was liberal with these rules, though, to minimize the number of excluded participants and maximize statistical power. Thirty-two participants were excluded who were over 40 years old to reduce the age variability in the sample. Age variability may have obscured my ability to detect effects. Excluding these participants also made the results more comparable to my results in Studies 1 and 2. Forty participants were excluded who had lived in Canada for fewer than two years because their grasp of the English language may have interfered with their comprehension of the questionnaire items. As well, restricting these participants reduced cultural variability in my sample. Four participants were excluded for being more than three standard deviations below the mean for Self-Esteem. After the exclusions, 242 participants remained.

Zero-order correlations among variables are presented in Table 13. Like in Study 1 and Study 2, self-esteem was not correlated with baseline HR, indicating that pre-existing self-esteem differences in

HR do not confound the results. Positive arousal was positively correlated with all of the dependent variables (anticipated acceptance, initiation goals, and initiation behavior), suggesting that the labeling of arousal as positive predicted heightened relationship-initiation motivation and behavior. All of the dependent variables were positively correlated with each other, suggesting that they all measured similar constructs.

Table 13. *Variables assessed and zero-order correlations among variables in Study 3*

	2	3	4	5	6	7	8
1. Self-Esteem	-.12	-.14*	.07	-.22**	.24*	.27**	-.04
2. Baseline HR	-	.79**	-.04	.15*	-.02	.01	.01
3. End of Study HR	-	-	-.03	.16**	-.05	-.03	.03
4. Positive Arousal	-	-	-	.17**	.29**	.13*	.16**
5. Negative Arousal	-	-	-	-	-.06	-.09	.001
6. Anticipated Acceptance	-	-	-	-	-	.39**	.12
7. Initiation Goals	-	-	-	-	-	-	.07
8. Initiation Behavior	-	-	-	-	-	-	-

* $p < 0.05$, ** $p < 0.01$,

Heart Rate

I regressed baseline HR ($M = 77.57$, $SD = 13.58$) onto: Step 1) dummy-coded gender (women = 0, men = 1); mean-centered self-esteem ($M = 6.76$, $SD = 1.32$); and dummy-coded condition (low arousal = 0, high arousal = 1); Step 2) the two-way interactions between variables; Step 3) the three-way interaction among variables. Baseline HR varied as a function of gender and as a function of the gender by condition interaction (Table 14). This could introduce potential confounds and would obscure my ability to detect the predicted effects. Thus, I controlled for baseline HR in all of the subsequent analyses.

Table 14. Results of hierarchical regressions predicting baseline HR in Study 3

Predictor	Baseline HR			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 239)				.07
Self-Esteem	-.08	[-2.08, .42]	.192	
Gender	-.21	[-9.25, -2.45]	.001	
Condition	-.11	[-6.21, .50]	.095	
<i>Step 2</i> (df = 236)				.11
SE X Condition	.01	[-2.36, 2.64]	.911	
SE X Gender	-.09	[-4.25, 1.08]	.241	
Condition X Gender	.31	[3.99, 17.44]	.002	
<i>Step 3</i> (df = 234)				.12
SE X Condition X Gender	-.18	[-10.27, .39]	.069	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

I regressed end of study HR ($M = 79.85$, $SD = 13.79$) onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1); mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1), and; Step 3) the two-way interactions between variables entered at Step 2; Step 3) the three-way interaction among variables entered at Step 2. As anticipated, results showed that people in the high arousal condition ($M = 80.46$, $SD = 14.57$) had higher end HR than people in the low arousal condition ($M = 79.22$, $SD = 13.33$). This regression is presented in Table 15.

In examining the end HR differences between conditions, it seems that though there was a statistically significant condition difference, the actual effect size was quite small. Those in the high arousal condition had an average end HR of 80.46, whereas those in the low arousal condition had an average end HR of 79.22, a difference of 1.24 beats per minute. This small effect size likely stemmed from group differences in baseline HR. Those in the high arousal condition ($M = 76.28$, $SD = 13.32$) had lower baseline HR than those in the low arousal condition ($M = 78.68$, $SD = 13.83$). However, I regressed baseline HR onto dummy-coded condition (low arousal = 0, high arousal = 1) and found no initial differences in baseline HR between conditions ($F(1, 241) = 1.93$, $p = .166$, $R^2 = .09$).

Nevertheless, condition differences in baseline HR still could have minimized the condition differences in end HR.

I also examined condition differences in end HR subtracted by baseline HR (i.e., HR reactivity). As predicted, those in the high arousal condition ($M = 4.18$, $SD = 9.98$) had higher HR reactivity than those in the low arousal condition ($M = .53$, $SD = 7.75$). I regressed HR reactivity onto dummy-coded condition (low arousal = 0, high arousal = 1) and found significant differences in HR reactivity between conditions ($F(1, 241) = 10.35$, $p = .001$, $R^2 = .20$). Clearly, baseline HR had an effect on end HR. These patterns of results explain why controlling for baseline HR led to a significant condition differences in end HR. Without controlling for baseline HR, the initial condition differences in baseline HR would have obscured the effect of arousal on end HR.

Table 15. Results of hierarchical regressions predicting end of study HR in Study 3

Predictor	End of Study HR			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 241)				.64
Baseline HR	.80	[.73, .88]	<.001	
<i>Step 2</i> (df = 238)				.65
Self-Esteem	-.03	[-1.09, .47]	.434	
Gender	-.03	[-2.86, 1.46]	.526	
Condition	.11	[.81, 4.99]	.007	
<i>Step 3</i> (df = 235)				.65
SE X Condition	.01	[-1.44, 1.73]	.857	
SE X Gender	-.02	[-1.96, 1.43]	.756	
Condition X Gender	.003	[-4.26, 4.45]	.967	
<i>Step 4</i> (df = 234)				.65
SE X Condition X Gender	-.01	[-3.66, 3.20]	.895	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Positive and Negative Arousal

I aggregated the positive arousal items from the PANAS into a reliable *positive arousal* variable ($\alpha = .81$; $M = 2.53$, $SD = .86$). Then I regressed positive arousal onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1), mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1); Step 3) the two-way interactions between self-esteem, condition, and

gender; Step 4) the three-way interaction between self-esteem, condition, and gender. The results of this regression can be seen in Table 16.

There were no significant main effects or two-way or three-way interactions. These results remained relatively the same when I controlled for negative arousal in Step 1. Therefore, unlike in Study 2, there was no reason to test a moderated mediation analysis with positive arousal as the mediator.

Table 16. Results of hierarchical regressions predicting positive arousal in Study 3

Predictor	Positive Arousal			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 241)				.001
Baseline HR	-.03	[-.01, .006]	.654	
<i>Step 2</i> (df = 238)				.006
Self-Esteem	.07	[-.04, .13]	.321	
Gender	-.03	[-.28, .19]	.707	
Condition	.01	[-.21, .25]	.860	
<i>Step 3</i> (df = 235)				.02
SE X Condition	-.11	[-.27, .07]	.245	
SE X Gender	-.11	[-.31, .06]	.200	
Condition X Gender	-.05	[-.59, .36]	.636	
<i>Step 4</i> (df = 234)				.03
SE X Condition X Gender	-.31	[-.68, .06]	.098	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Next, I aggregated the negative arousal items from the PANAS into a reliable *negative arousal* variable ($\alpha = .58$; $M = 1.60$, $SD = .58$). Then I regressed negative arousal onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1), mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1); Step 3) the two-way interactions between self-esteem, condition, and gender; Step 4) the three-way interaction between self-esteem, condition, and gender. The results of this regression can be seen in Table 17.

There was a significant main effect of baseline HR on Negative Arousal, such that people with higher HRs reported stronger negative arousal. There was also a significant main effect of self-esteem,

indicating that LSEs had more negative arousal than HSEs. But there were no significant two-way or three-way interactions.

Table 17. Results of hierarchical regressions predicting negative arousal in Study 3

Predictor	Negative Arousal			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 241)				.02
Baseline HR	.15	[.001, .012]	.021	
<i>Step 2</i> (df = 238)				.07
Self-Esteem	-.21	[-.15, -.04]	.001	
Gender	.002	[-.15, .16]	.974	
Condition	.03	[-.12, .18]	.672	
<i>Step 3</i> (df = 235)				.08
SE X Condition	.10	[-.05, .17]	.281	
SE X Gender	.01	[-.11, .13]	.888	
Condition X Gender	.08	[-.19, .42]	.469	
<i>Step 4</i> (df = 234)				.08
SE X Condition X Gender	-.007	[-.25, .23]	.948	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Anticipated Acceptance

I aggregated items assessing anticipated acceptance in a hypothetical social situation into a reliable *anticipated acceptance* variable ($\alpha = .85$; $M = 5.33$, $SD = .75$). Then I regressed anticipated acceptance onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1), mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1); Step 3) the two-way interactions between self-esteem, condition, and gender; Step 4) the three-way interaction between self-esteem, condition, and gender. The results of this regression can be seen in Table 18.

There was a significant main effect of self-esteem on anticipated acceptance, indicating that HSEs anticipated greater acceptance than LSEs. There was also a significant main effect of gender, indicating that women ($M = 5.38$, $SD = .73$) anticipated greater acceptance than men ($M = 5.25$, $SD = .77$). There were no significant two- or three-way interactions.

Table 18. Results of hierarchical regressions predicting anticipated acceptance in Study 3

Predictor	Anticipated Acceptance			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 241)				.00
Baseline HR	-.01	[-.01, .01]	.904	
<i>Step 2</i> (df = 238)				.07
Self-Esteem	.25	[.07, .21]	<.001	
Gender	-.13	[-.40, -.01]	.040	
Condition	.001	[-.19, .19]	.983	
<i>Step 3</i> (df = 235)				.08
SE X Condition	.05	[-.10, .18]	.576	
SE X Gender	.02	[-.13, .17]	.778	
Condition X Gender	-.08	[-.53, .25]	.467	
<i>Step 4</i> (df = 234)				.08
SE X Condition X Gender	-.03	[-.35, .27]	.799	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Initiation Goals

I aggregated items assessing relationship-initiation motivations into a reliable *initiation goals* variable ($\alpha = .85$; $M = 4.40$, $SD = .98$). Then I regressed initiation goals onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1), mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1); Step 3) the two-way interactions between self-esteem, condition, and gender; Step 4) the three-way interaction between self-esteem, condition, and gender. The results of this regression can be seen in Table 19.

There was a main effect for self-esteem, indicating that HSEs reported stronger initiation goals than LSEs. There was also a main effect for gender, indicating that men ($M = 4.56$, $SD = .91$) reported stronger initiation goals than women ($M = 4.26$, $SD = .99$). Consistent with the different results obtained for women and men in Study 1 and Study 2, there was also a three-way interaction between gender, self-esteem, and condition, which is depicted in Figure 10.

Table 19. Results of hierarchical regressions predicting initiation goals in Study 3

Predictor	Initiation Goals			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 241)				.001
Baseline HR	.03	[-.01, .01]	.653	
<i>Step 2</i> (df = 238)				.09
Self-Esteem	.24	[.09, .26]	<.001	
Gender	.15	[.04, .53]	.023	
Condition	-.04	[-.31, .16]	.545	
<i>Step 3</i> (df = 235)				.10
SE X Condition	-.05	[-.23, .13]	.567	
SE X Gender	.10	[-.06, .32]	.183	
Condition X Gender	-.04	[-.59, .39]	.693	
<i>Step 4</i> (df = 234)				.13
SE X Condition X Gender	.32	[.23, .99]	.002	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

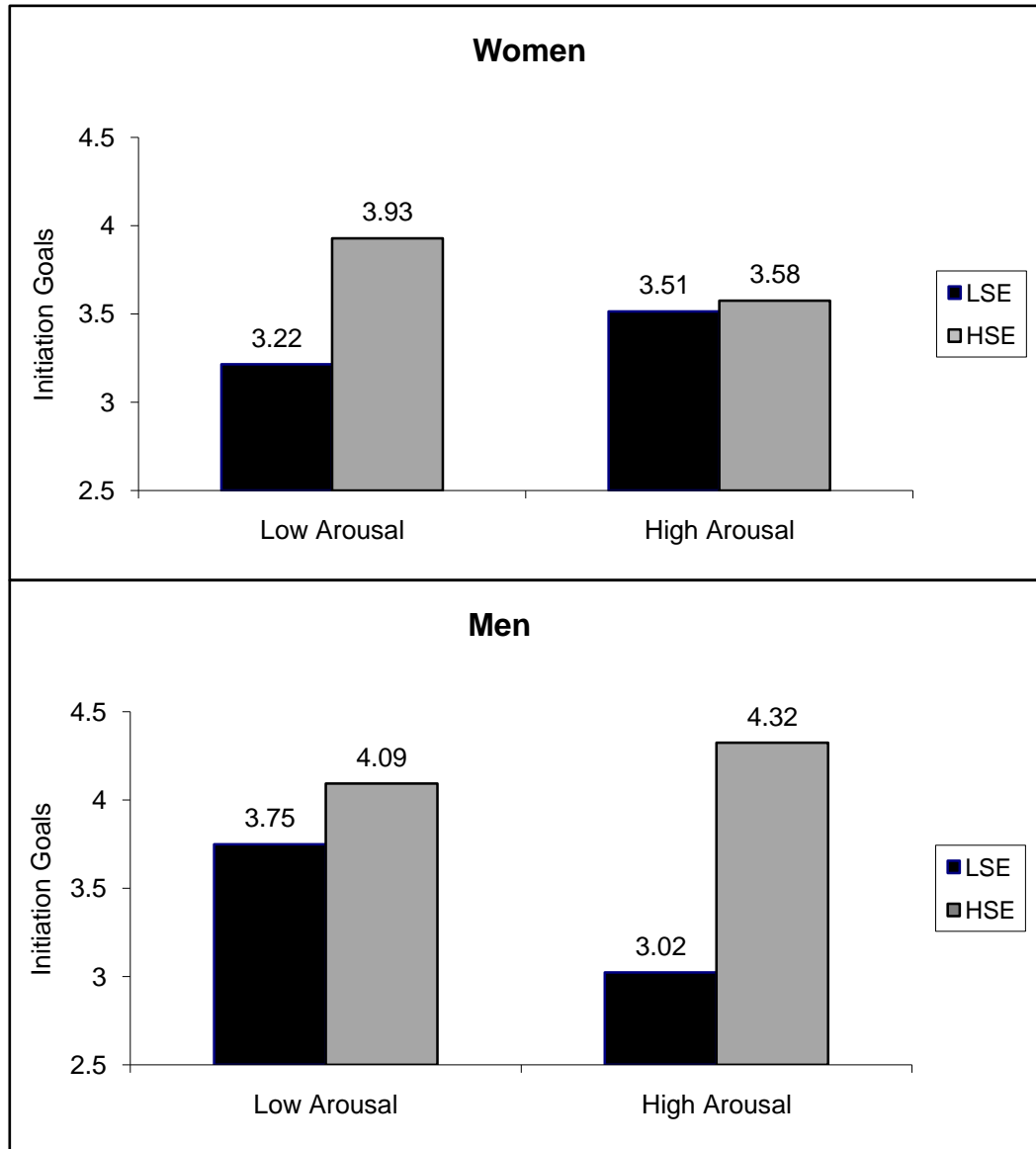


Figure 10. Initiation goals as a function of self-esteem, gender, and condition in Study 3. Results are graphed for individuals scoring one standard deviation above (HSEs) and below (LSEs) the sample mean on self-esteem.

Women. Simple-effects testing revealed a self-esteem by condition interaction for women (Table 20), which is depicted in the top panel of Figure 10. In the low arousal condition, HSEs reported stronger initiation goals than LSEs, $\beta = .41$, 95% CI [.11, .44], $t(133) = 3.31$, $p = .001$, but this self-esteem difference was eliminated in the high arousal condition, $\beta = .03$, 95% CI [-.13, .17], $t(133) =$

.27, $p = .785$. HSEs' initiation goals did not vary as a function of arousal condition, $\beta = -.19$, 95% CI [-.88, .12], $t(133) = -1.51$, $p = .134$. However, LSEs tended to report stronger initiation goals in the high arousal condition than in the low arousal condition, $\beta = .21$, 95% CI [-.02, .86], $t(133) = 1.88$, $p = .062$. These results were not consistent with the results observed for women in Study 1.

Table 20. Results of hierarchical regressions predicting initiation goals for women in Study 3

Predictor	Initiation Goals			
	β	CI	p	ΔR^2
<i>Step 1</i> (df = 136)				.03
Baseline HR	.17	[.00, .02]	.044	
<i>Step 2</i> (df = 134)				.07
Self-Esteem	.20	[.02, .24]	.020	
Condition	.01	[-.31, .36]	.904	
<i>Step 3</i> (df = 133)				.10
SE X Condition	-.29	[-.48, -.04]	.023	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Men. Simple-effects testing also revealed a self-esteem by condition interaction for men (Table 21), which is depicted in the bottom panel of Figure 10. In the low arousal condition, self-esteem did not predict initiation goals, $\beta = .14$, 95% CI [-.09, .32], $t(100) = 1.14$, $p = .263$. But in the high arousal condition, HSEs reported stronger initiation goals than LSEs, $\beta = .64$, 95% CI [.26, .78], $t(100) = 3.94$, $p < .001$.

HSEs' initiation goals were not influenced by arousal, $\beta = .17$, 95% CI [-.19, .82], $t(100) = 1.24$, $p = .218$. However, LSEs reported weaker initiation goals in the high arousal condition than the low arousal condition, $\beta = -.39$, 95% CI [-1.38, -.10], $t(100) = -2.30$, $p = .024$. These results were consistent with the results observed for men in Study 2.

Table 21. Results of hierarchical regressions predicting initiation goals for men in Study 3

Predictor	Initiation Goals			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 103)				.01
Baseline HR	-.09	[-.02, .007]	.357	
<i>Step 2</i> (df = 101)				.11
Self-Esteem	.32	[.10, .40]	.001	
Condition	-.06	[-.46, .24]	.523	
<i>Step 3</i> (df = 100)				.15
SE X Condition	.27	[.04, .64]	.028	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Initiation Behavior

I standardized relationship-initiation behavior items and aggregated them into a reliable initiation behavior variable ($\alpha = .75$). These items included two questions about how likely a participant would be to join a social focus group run by Dr. Stinson's lab at inconvenient times and one dummy-coded item on whether or not the participant left their name and e-mail address for the group (did not leave name/e-mail = 0, left name/e-mail = 1). I regressed initiation behavior onto: Step 1) baseline HR; Step 2) dummy-coded gender (women = 0, men = 1), mean-centered self-esteem, dummy-coded condition (low arousal = 0, high arousal = 1); Step 3) the two-way interactions between self-esteem, condition, and gender; Step 4) the three-way interaction between self-esteem, condition, and gender. The results of this regression can be seen in Table 22. No significant effects emerged.

I suspect that this measure was not valid. Previous studies using this measure were conducted during the regular school term. However, the current study was conducted in the summer, and many participants were touring the campus or were international students visiting Victoria temporarily. Consequently, even if participants had high relationship-initiation motivation, they may have been unable to commit to the focus group.

Table 22. Results of hierarchical regressions predicting initiation behavior in Study 3

Predictor	Initiation Behavior			
	β	CI	<i>p</i>	ΔR^2
<i>Step 1</i> (df = 241)				.000
Baseline HR	.01	[-.01, .01]	.843	
<i>Step 2</i> (df = 238)				.004
Self-Esteem	-.03	[-.10, .06]	.606	
Gender	.06	[-.13, .32]	.409	
Condition	.03	[-.17, .27]	.660	
<i>Step 3</i> (df = 235)				.008
SE X Condition	.07	[-.11, .23]	.479	
SE X Gender	.02	[-.16, .20]	.804	
Condition X Gender	.04	[-.36, .55]	.682	
<i>Step 4</i> (df = 234)				.01
SE X Condition X Gender	-.09	[-.52, .20]	.384	

Note. df = degrees of freedom, SE = Self-Esteem, CI = 95% confidence interval for the unstandardized parameter estimate, ΔR^2 = R-square change.

Discussion

The results of Study 3 suggested that there were gender differences in how self-esteem interacted with arousal to influence relationship-initiation motivation. For women, arousal increased LSEs' relationship-initiation motivation, but for men, arousal decreased LSEs' relationship-initiation motivation. For women, there was a trend for arousal to decrease HSEs' relationship-initiation motivation, but for men, there was a trend for arousal to increase HSEs' relationship-initiation motivation. The results for women were inconsistent with my hypotheses, whereas the results for men were consistent with my hypotheses.

Because the results for men were consistent with the results for women in Study 1 and men in Study 2, it suggests that men in Study 3 perceived the social situation and the music arousal similarly to women in Study 1 and men in Study 2. Specifically, the results for men suggest that music arousal functioned in a similar way as physiological arousal in influencing relationship-initiation motivation. However, the results for women in Study 3 were inconsistent with the results of the other studies,

which suggests that women in Study 3 perceived the social situation or the music arousal differently than women in Study 1 and men in Study 2.

I need to caution that the interpretations of the results for women in Study 3 are based upon speculations that are not entirely appropriate due to the existence of null results. There are numerous reasons for null results, based upon the differences between Study 3 and the prior studies. For example, for women, the music arousal may not have been effective or the social paradigm may not have been convincing. I speculate that the unexpected results for women in Study 3 were likely due to the changes in both the social paradigm and the arousal manipulation. But why do men perceive the social paradigm and the arousal similar and women perceive the social paradigm and the arousal differently compared to the participants in Study 1 and Study 2?

I propose that these gender differences in Study 3 may arise due to existing social norms. Men are more expected to initiate romantic relationships than women (Cameron et al., 2010). Consequently, I suggest that men's relationship-initiation motivation is more generalized across contexts than women's relationship-initiation motivation. In other words, because men are more expected to initiate relationships, men are more likely than women to perceive a social situation as a relationship-initiation situation.

On the other hand, because women are less expected to initiate relationships, women's perceptions of a social situation are more context-dependent than that of men. For women, situations need to fit more specific criteria to be perceived as relationship-initiation situations, compared to men. Cameron and her colleagues (2013) have also suggested that the relation between self-esteem and relationship-initiation motivation in a high-risk social situation is more context-dependent for women than for men. In Study 3, I propose that women did not perceive the social paradigm of an imagined social interaction as a relationship-initiation situation because it did not fit their specific criteria of a relationship-initiation situation. Thus, arousal did not influence women as predicted in Study 3.

However, again, this is based upon speculation. The best way to clarify these results is to conduct a similar study and compare the results of that study and Study 3.

A small sample size also may have contributed to the unexpected results for women, which may have reflected random error rather than a true effect. Unfortunately, I had to discard around 25% of participant data due to age restrictions, potential cultural differences, and language barriers. As well, I originally predicted that Study 3 would examine the interaction between self-esteem and arousal. Thus, in the power analysis, I prepared for a 2 x 2 study, which would give me around 60 participants per factorial point (post-hoc statistical power = 0.84). In fact, there was an interaction between self-esteem, arousal, and gender, making it a 2 x 2 x 2 study, which gave me around 30 participants per factorial point (post-hoc statistical power = .76). Therefore, to clarify these results, future research needs to account for gender effects in the power analysis and have a larger sample than mine.

General Discussion

Classic research suggests that arousal increases relationship-initiation motivation (e.g., Calvert-Boyanowsky & Leventhal, 1975; Dutton & Aron, 1974; Kenrick & Cialdini, 1977). Thus, arousal seems to satisfy the need to belong. The self-esteem system also regulates the need to belong by regulating social behavior and motivation (e.g., Cameron et al., 2010; Cameron et al., 2013; Stinson, Cameron, Hoplock, & Hole, 2015). Thus, arousal and self-esteem are both linked to relationship-initiation motivation. I proposed a model (Figure 1) to show how arousal explains the mechanisms underlying the relation between social risk and relationship-initiation motivation. In partial support of this model, my Master's research found that self-esteem does moderate the relation between social risk and arousal. To provide further support of the model, my PhD research tested whether self-esteem moderates the relation between arousal and relationship-initiation motivation.

My predictions were based on two dominant models of arousal and attraction: the Judgment-Adjustment and the Response Facilitation perspectives. Both perspectives led me to predict that arousal increases relationship-initiation motivation for HSEs but decreases it for LSEs. My results generally supported these predictions. Study 1 provided evidence that for women, arousal increased HSEs' but decreased LSEs' relationship-initiation motivation. Study 2 provided evidence that for men, arousal increased HSEs' but decreased LSEs' relationship-initiation motivation by influencing positive emotional arousal. Study 3 provided evidence that for women, arousal decreased HSEs' but increased LSEs' relationship-initiation motivation, whereas for men, arousal increased HSEs' but decreased LSEs' relationship-initiation motivation. Thus, the only results that did not support these perspectives were those of Study 3 for women.

I have already suggested a possible explanation for the discrepancy between the results for women in Studies 1 and 3. Specifically, extant research suggests that there is a stronger relation between self-esteem and relationship-initiation motivation for men than for women (Cameron et al.,

2013). The weaker relation between self-esteem and relationship-initiation motivation for women may stem from contextual influences in perceptions of social risk. Women seem to have perceived the social situation differently for Study 1 and Study 3, which led to the different results between the studies. On the other hand, men seemed to have perceived the social situation similarly for Study 2 and Study 3, which led to similar results between the studies. The shift in paradigm between Study 1 and Study 3 may have led to the inconsistent results for women. The settings were different, with Study 1 taking place in a lab room with only two people and Study 3 taking place in a crowded area. The social situations were different, with Study 1 having a potential live video camera interaction and Study 3 having an imagined social interaction. Consequently, it is difficult to determine which aspect of the paradigm difference actually changed women's perception of social risk. But I can speculate.

One of the perceived contextual differences for women between Study 1 and Study 3 may have been perceptions of the social situation based on the social paradigm. In Study 1, women may have perceived a relationship-initiation situation because there was the potential for them to have a real social interaction with a real partner through a live web camera. In Study 3, women may not have perceived a relationship-initiation situation because there was no potential for the participant to have a real social interaction with a real partner, as it was an imagined situation.

In addition, Study 1 and Study 3 used different manipulations of arousal, which may have contributed to the response differences between Study 1 and Study 3 for women. For women, Study 1 showed that physiological arousal increased HSEs' but decreased LSEs' relationship-initiation motivation, whereas Study 3 showed that arousal through music decreased HSEs' but increased LSEs' relationship-initiation motivation. These results suggest that perhaps women interpreted arousal through music differently than physiological arousal. A person's response to certain music may depend on the listener's current state and past experience (e.g., Sloboda, 2005; Västfjäll & Gärling, 2006), whereas a person's response to exercise will almost always include an increase in HR. Thus, because

context may affect women's perceptions of a social situation more than men's perceptions, individual differences in women's responses to the chosen musical piece may have contributed to the unexpected results. Perhaps these individual differences were not randomly assigned across arousal conditions.

Conversely, for men, the similar results for Study 2 and Study 3 suggest that men interpreted arousal through music similarly to physiological arousal. More research is definitely needed to clarify how gender moderates the influence of social context and type of arousal in a social situation. I propose a future study where all participants experience arousal through exercise and arousal through music at different occasions to examine their perceptions of the social situation. This study may clarify how these different types of arousal affect perceptions of a social situation for men and women. By comparing participants' reactions to physiological arousal to their reactions to arousal through music, I can control for individual differences in reactions to the different types of arousal. Consistent with my findings and existing research, I predict that men would perceive the social situation as a relationship-initiation situation for both types of arousal. For women, I predict that women would perceive the social situation differently for physiological arousal and arousal through music. The perception of the social situation for physiological arousal would be similar to that of men, but the perception of the social situation for arousal through music would depend on individual differences.

Even though the differences between Study 1 and Study 3 for women were unexpected, most of the results still supported the predictions of the Judgment-Adjustment and Response Facilitation perspectives. How can I reconcile my results with prior research demonstrating a direct positive effect of arousal on relationship-initiation motivation (i.e., in the form of attraction; Dutton & Aron, 1974; Kenrick & Cialdini, 1977)?

The Judgment-Adjustment and Response Facilitation perspectives suggest that arousal decreases relationship-initiation motivation for LSEs, which is not entirely consistent with classic research. However, if a researcher does not account for self-esteem, the results may reflect the response

patterns of HSEs, not LSEs, due to the sample characteristics. The classic studies on arousal and attraction (like the current research) were using predominantly high self-esteem samples. North American samples tend to have high self-esteem (Tafarodi, Lang, & Smith, 1999), so both the classic research and my research had relatively high self-esteem samples. In addition, the classic studies did not measure self-esteem differences. Though both the Judgment-Adjustment and Response Facilitation perspectives are similar to those of the classic research, Judgment-Adjustment and Response Facilitation perspectives extend the predictions from HSEs to LSEs.

My research also suggests that labeling arousal with an emotional valence can influence the response to that arousal in some circumstances. In Study 2, physiological arousal only increased men's relationship-initiation motivation *if* it was labeled as positive arousal, and HSEs positively labeled arousal more than LSEs. I propose that HSEs positively labeled physiological arousal because they over-detected positive, rewarding social cues, whereas LSEs over-detected negative, costly social cues (e.g., Baumeister et al., 1993; Cameron, Stinson, Gaetz, & Balchen, 2010; Roth et al., 1986). Thus, HSEs interpreted the source of arousal positively and LSEs did not interpret it positively.

This positive label occurred in Study 2 but not in Study 3, because the men were aware of their arousal in Study 2 but not in Study 3. The relation between exercise and physiological arousal is readily apparent, but the relation between music and arousal is not. In other words, arousal from exercise is unambiguous, but arousal from music is ambiguous. Why would an unambiguous source of arousal lead to an emotional label? According to the Judgment-Adjustment perspective, the adjustment stage requires awareness and attention (Foster et al., 1998). Thus, a person may consciously adjust their initial judgment to add a valence label to an unambiguous source of arousal but not an ambiguous source. To test these predictions, future research can manipulate men's awareness of arousal in a social situation and examine the effects on emotional labeling. For example, a researcher may use the same music manipulation as Study 3 but either inform participants that the music increases arousal or not. I

predict that with an unambiguous source of arousal (i.e., telling participants about the arousal), HSE participants would give the arousal an emotional label, but with an ambiguous source of arousal (i.e., not telling participants about the arousal), HSE participants would not give the arousal an emotional label.

For all of the studies, self-reported positive arousal was significantly correlated with initiation goals, suggesting that labeling of arousal is directly related to relationship-initiation motivation, independent of the actual source of arousal. Perhaps labeling functions as a mechanism for arousal to influence relationship-initiation motivation, as the mediated moderation analysis suggested in Study 2. Extant research suggests that the Behavioral Activation System (BAS) responds to positive stimuli with approach behavior, leading to increased HR (Gray, 1987, 1990). Thus, labeling may interact with arousal to influence relationship-initiation motivation. What is the direction of this relation? Does arousal occur first (e.g., the present research) or does emotional labeling (e.g., BAS research) occur first? To test this, researchers can conduct two studies: One study can manipulate arousal and examine emotional labeling, and the other study can manipulate emotional labeling and examine arousal. Likely, the relation exists in both directions.

In Dutton and Aron's (1974) classic bridge study, the researchers concluded that the potential romantic interaction and the fear-inducing shaky bridge led to interpreting the arousal as sexual or fear arousal respectively, influencing relationship-initiation motivation. Perhaps, the pattern is simpler than that. Perhaps instead of interpreting the arousal as sexual or fear arousal, the participants just labeled the arousal with a valence. In other words, participants may have positively labeled the arousal, leading to increased relationship-initiation motivation.

Further research must examine the effect of the label of arousal on relationship-initiation motivation. In one possible experiment, researchers can manipulate the label of arousal and then measure relationship-initiation motivation in a typical social situation. For example, participants may

listen to arousal-inducing music. In one condition, researchers tell the participants that the music will increase their positive emotions (i.e., emotional label condition), and in the other condition, researchers do not tell the participants anything related to labels (i.e., no label condition). I predict that those in the label condition will have stronger relationship-initiation motivation than those in the no label condition.

My research results support the proposed model (Figure 1) that suggests that self-esteem moderates, and arousal mediates, the relation between social risk and relationship-initiation motivation. Specifically, Study 1 supported that self-esteem moderates the relation between arousal and relationship-initiation motivation for women, i.e., pathways *e* and *f*, in a low-risk social situation. In combination with my Master's research that supported pathways *a* to *d* (i.e., that self-esteem moderates the relation between social risk and arousal), the entire model from *a* to *f* was supported. However, Study 2 did not seem to entirely support that arousal interacts with self-esteem to directly influence relationship-initiation motivation for men in a social situation. In Study 2, self-reported positive arousal seemed to mediate the relation between arousal and relationship-initiation motivation. Study 2's results suggest that interpretation and labeling of the arousal may play a significant role in some situations. Nevertheless, for the most part, the proposed model was supported. The proposed mechanism provides evidence that arousal explains the mechanisms underlying the relation between social risk and relationship-initiation motivation. In addition, by associating social variables with primal variables like arousal, I connect the self-esteem regulatory system to biological substrates and suggest that self-esteem developed from a primal regulatory system. Future research can explore how gender, context, and emotional labeling influence arousal's role in the self-esteem regulatory system. The research will lead to further understanding and details regarding the mechanisms underlying how self-esteem moderates the relation between social risk and relationship-initiation motivation.

The proposed model increases the comprehensiveness of current perspectives on arousal and relationship-initiation motivation. Connecting social self-regulation and relationship-initiation

motivation to underlying mechanisms of physiological arousal links social self-regulation to a wide range of self-regulatory theories. These links suggest that all self-regulatory theories have similar underlying mechanisms and that social self-regulation developed based on a primal self-regulatory system. Not only is this research important to support the proposed model, it also has implications for the public. This research is important because people frequently engage in relationship-initiation situations. People constantly make new social connections, so knowing how to maximize the potential to connect with others is important.

People generally have a good sense of their self-esteem. Explicit self-esteem measures like the Rosenberg Self-Esteem Scale (Rosenberg, 1965) are effective at revealing a person's self-esteem with unambiguous self-esteem items like "I feel that I am a person of worth, at least on equal plane with others." Even a one-item questionnaire that directly asks a person to rate her or his self-esteem correlates quite well with other self-esteem measures (i.e., Robins, Hendin, & Trzeniewski, 2001). People know their self-esteem. Adding one's personal self-esteem knowledge to arousal and relationship-initiation research can help a person improve her or his ability to connect with a new relational partner.

For example, if Jane has high self-esteem and knows that arousal will increase her relationship-initiation motivation, she may choose to take a potential romantic partner to a high-arousal situation like an amusement park with lots of roller coasters. This arousal-inducing situation will maximize Jane's relationship-initiation motivation and thus, maximize her potential to behave in a relationship-promoting fashion. On the other hand, if Jane has low self-esteem and knows that arousal will decrease her relationship-initiation motivation, she may choose to take a potential romantic partner to a low-arousal situation like watching a nature documentary at home. This low arousal situation will maximize Jane's relationship-initiation motivation and thus, maximize her potential to behave in a relationship-promoting fashion. Thus, my research has important implications on improving social connections.

Not only does this research have significant implications on improving social interactions in relationship-initiation situations, it has implications on the link between arousal and health. This line of research on arousal and social motivations suggests that LSEs are suppressing connection motivations. Existing research suggests that arousal should increase connection motivations (e.g., Dutton & Aron, 1974; Foster et al., 1998; Kenrick & Cialdini, 1977), but that is not the case for LSEs. Thus, LSEs are likely suppressing arousal or connection motivations. Existing research suggests that when LSEs' self-regulatory resources are depleted in a high-risk social situation, LSEs have as strong connection motivations as HSEs, which also suggests that LSEs are typically suppressing these connection motivations (e.g., Huang & Stinson, 2015; Murray et al., 2008). For both HSEs and LSEs, the automatic response to a relationship-initiation situation seems to be increased connection motivation to fulfill the need to belong. However, LSEs tend to suppress this motivation, and consequently, it appears on the surface that LSEs have decreased connection motivation in a relationship-initiation situation.

Suppression is associated with a number of health problems. For example, Pennebaker (1997) found that people who suppressed more had lower physical health and lower immune functioning. People who suppress their thoughts or emotions more have increased numbers of medical visits (Petrie, Booth, & Pennebaker, 1998). Existing research finds that LSEs often have poorer health than HSEs (e.g., Stinson et al., 2008; Trzesniewski et al., 2006). My line of research suggests that these poor health outcomes may be due in part to suppression of arousal and relationship-initiation motivation in social situations. This research suggests that reducing suppression is the key to reducing the negative health outcomes of LSEs. One method of reducing suppression is through changing LSEs' perspectives. For example, Cameron and her colleagues (2010) found that when LSEs perceived a low chance of rejection, they had equal or higher connection motivations compared to HSEs. This pattern of results suggests that reducing LSEs' perceptions of rejection will reduce suppression of motivation

and reduce the related negative health outcomes. Thus, my research has important implications for the health outcomes of the public.

Limitations and Future Research

There needs to be more testing to verify the proposed model (Figure 1). Perhaps, additional mediators, like labeling, will be found that can lead to increased clarity of the results and adjustments in the proposed model. I have already described some of the studies that could be conducted to validate and clarify my results. As well, there are many limitations in this research that can be ameliorated by future research. For one, it was difficult and not entirely valid to compare Study 1, Study 2, and Study 3, when the demographics of the participants were different between the studies. Examining all of the relevant independent and dependent variables in one study with a large representative sample would further support my results and explanations.

My package of studies used the experimental chain method to test my model (Figure 1) one section at a time. To balance out the limitations of the experimental chain method, future research can include all of the relevant variables in one study. This study would involve using a mediational analysis to examine how social risk, gender, and self-esteem influence relationship-initiation motivation via arousal. In this study, researchers would induce high-risk or low-risk social context. Based on the proposed model (Figure 1), I hypothesize that arousal would function as a mediator variable in the relation between social risk and relationship-initiation motivation. A mediation analysis is ideal to examine the mechanisms (i.e., arousal) underlying a relation (i.e., between social risk and relationship-initiation motivation).

This proposed method may introduce additional complexity associated with a statistical mediational analysis. A mediational analysis may increase the likelihood of biased estimates (Spencer et al., 2005). However, the likelihood of biased estimates can be decreased by experimentally manipulating the mediator (i.e., arousal). In addition, a mediational analysis may have low power

(Spencer et al., 2005) and thus, require a very large sample size. However, this problem can be resolved by improved recruitment methods. Finally, there may be multiple correlated mediators that may confound the results (Spencer et al., 2005). It is very complicated to unveil the complex interactions between potential mediators. However, if I consider and include potential relevant mediators based upon the literature (e.g., positive arousal), I can determine the effect size of each mediator and clarify the results with a mediational analysis (Fairchild, MacKinnon, Taborga, & Taylor, 2009). If these complexities can be overcome, such a method would allow researchers to determine how much of the relation between social risk and relationship-initiation motivation is explained by arousal and self-reported positive arousal (Spencer et al., 2005). To determine the proportion mediated by each variable, researchers can use effect size measures such as partial r^2 (Fairchild et al., 2009). I predict that self-reported positive arousal will explain a large proportion of variance in the relation between social risk and relationship-initiation motivation. In all of my studies, self-reported positive arousal was significantly correlated with relationship-initiation motivation, suggesting that it would account for a large amount of variance. As well, I predict that arousal will explain only a small proportion of variance but less than that of self-reported positive arousal. In my studies, arousal was not significantly correlated with relationship-initiation motivation or positive arousal.

Comparing arousal conditions in one large study can reduce problems associated with sample differences and experimenter differences between multiple studies. As well, with evidence from both the experimental chain method and a statistical mediational analysis, there will be converging evidence that bolsters the strength of the proposed model (Figure 1).

The proposed study would simplify comparisons between arousal conditions. Because all of the research questions are tested in one sample as opposed to three different samples, it is simple and valid to compare the results between the samples. Comparing Study 1, Study 2, and Study 3 was difficult because the studies used different samples in different contexts that might not be comparable. Study 1's

participants were young, female undergraduate students; Study 2's participants were young, male undergraduate students; and Study 3's participants were an assortment of people that were recruited from the University Centre at the University of Victoria. All of the samples had marked differences. For example, age differences indicate a different developmental phase, which could influence relationship-initiation motivation in a social situation. As well, university student participants tend to have relatively high self-esteem, socioeconomic status, and education (Twenge & Campbell, 2002) compared to participants from the community, which could lead to non-random differences in response to arousal. The confounding effects of these individual differences could be reduced if these differences were randomly assigned across conditions in a large-scale study.

Another future study can differentiate between the hypotheses of the Judgment-Adjustment and Response Facilitation perspectives. In the context of all of my studies, both perspectives predicted that arousal in a social situation increases HSEs' and decreases LSEs' relationship-initiation motivation. The Response Facilitation perspective's predictions remain consistent, regardless of the social situation. However, the Judgment-Adjustment's predictions only occur if people have sufficient cognitive resources to adjust their initial judgment. Adjustment requires cognitive resources because it is a conscious process that requires attention. Therefore, to differentiate between the two perspectives, research needs to manipulate cognitive load and examine its influence on relationship-initiation motivation.

In the case of high cognitive load, the Response Facilitation perspective predicts that arousal would still increase HSEs' and decrease LSEs' relationship-initiation motivation, but the Judgment-Adjustment predicts that arousal would increase all participants' relationship-initiation motivation. In other words, only the judgment stage would occur, and there would not be sufficient cognitive resources for the adjustment stage.

In fact, I have already conducted a study that manipulated ego depletion (a construct similar to cognitive load) and examined the effect on relationship-initiation motivation in a high-risk social situation (Huang & Stinson, 2015). Without ego depletion, there was a trend for HSEs to have stronger relationship-initiation motivation than LSEs, but after ego depletion, there was a trend for HSEs to have weaker relationship-initiation motivation than LSEs. Specifically, in a typical social situation, LSEs seemed to be suppressing relationship-initiation motivation, but with ego depletion, that suppression was no longer possible and LSEs' relationship-initiation motivation matched or became stronger than that of HSEs. The results of this study suggest that cognitive load may influence the relation between self-esteem, arousal, and relationship-initiation motivation. Specifically, arousal may increase depleted LSEs' relationship-initiation motivation. The idea that cognitive load may influence relationship-initiation motivation fits better with the Judgment-Adjustment perspective than the Response Facilitation perspective. The Judgment-Adjustment perspective's predictions change depending on a person's cognitive load, whereas the Response Facilitation perspective always has the same predictions. Future research needs to examine these predictions in greater detail to differentiate between the two perspectives of arousal. In a potential future study, researchers would examine how cognitive load influences arousal's effect on relationship-initiation motivation. Researchers could manipulate cognitive load by having participants suppress thoughts of a white bear (high cognitive load) or not (low cognitive load; e.g., Wegner, Schneider, Carter, & White, 1987). As well, researchers would manipulate arousal to be high or low. This proposed experiment would allow differentiation between the Judgment-Adjustment and Response Facilitation perspectives of arousal.

Overall, my Master's research and this current research used quite artificial social paradigms, which may have affected how arousal influenced relationship-initiation motivation. Study 1 and Study 2 used a potential social interaction through a streaming video camera, and Study 3 used an imagined social situation. The experimental contexts may not have reflected a normal social situation. Using a

realistic social context may clarify the relation between gender, self-esteem, arousal, and relationship-initiation motivation. In this study, attractive confederates can approach participants at the gym after they have exercised (high arousal) or before they have exercised (low arousal). Trained observers can code for relationship-initiation motivation and behavior. Another study paradigm may replicate Dutton and Aron's (1974) classic bridge study and interview participants on a high, shaky suspension bridge (high arousal) or before participants reach the bridge (low arousal). Both proposed studies use a realistic social context and reflect an actual social situation, reducing the potential confound of an invalid experimental paradigm.

Replication of the present research could use community samples of participants instead of mostly undergraduate students. University students usually have higher socioeconomic status, which is positively correlated with self-esteem (Twenge & Campbell, 2002). Instead of only recruiting at a university campus, I could recruit using online methods (e.g., Mechanical Turk) or postings at community locations (e.g., community centers, parks, etc.) for a representative sample. Future research can also sample from non-Western cultures. Because of presumed cultural differences in self-esteem, social interactions, and other variables, I omitted a large portion of participants from my analyses. Western cultures tend to have higher self-esteem than East Asian cultures (e.g., Tafarodi et al., 1999). Self-esteem is likely not the only difference between the present samples and non-university students or non-Western cultures. In addition, non-Western cultures may be more inhibited than Western cultures (e.g., Chen et al., 1998). Thus, those from non-Western cultures are less likely to express relationship-initiation motivation overtly compared to those from Western cultures, regardless of self-esteem, gender, or arousal. As well, because those from non-Western cultures are more defined by the context and the current group than those from Western cultures (e.g., Markus & Kitayama, 1991), contextual cues from the experimental paradigm may influence non-Westerners more than Westerners.

A sample with significantly lower self-esteem could lead to a more comprehensive understanding of the mechanisms in the proposed model. The results from this lower self-esteem sample should further support my claims regarding self-esteem's role in the relation between arousal and relationship-initiation motivation. I predict that samples of participants with wider ranges of self-esteem scores will yield a similar but stronger pattern compared to the results in the current studies. By comparing a lower self-esteem sample to a higher self-esteem sample, the self-esteem differences would appear greater and the effect sizes would be larger than the current set of studies. This would allow for increased clarity as to which variables actually drive the results. My studies use a predominantly HSE sample, comparing those one standard deviation above to those one standard deviation below the mean self-esteem. Consequently, I may be comparing moderately-high to very-high self-esteem individuals, and actual self-esteem differences may be minimized.

In addition to limitations in my social situation paradigms and my sample, there is a lack of variety in my independent variables. For example, I only used one form of physiological arousal and one form of emotional arousal. There are countless other forms of physiological and emotional arousal that people encounter daily. Therefore, future research should try to replicate my results under a different arousal context.

Conclusion

The proposed model (Figure 1) contributes to self-esteem theory by outlining the potential mechanisms explaining the relation between social risk and relationship-initiation motivation. In this package of studies, I examined the moderating effects of self-esteem in this relation, extending previous research. I provide some evidence that arousal plays a mediating role in this pattern, akin to the proposed model (Figure 1). These results are useful in understanding the mechanisms of how social risk influences relationship-initiation motivation.

Not only is the proposed model supported, the studies clarify perspectives on arousal and relationship-initiation motivation. Although classic perspectives of arousal have had substantial empirical support, few of them have considered self-esteem's role in the relation between arousal and attraction. My research connects self-esteem to the extant research on arousal and relationship-initiation motivation. Not only did I test the ability of classic perspectives to explain how (or whether) self-esteem moderates this relationship, I clarify that the Judgment-Adjustment and Response Facilitation perspectives predict and explain the results better than other perspectives. The data and the perspectives provide clarity in understanding the underlying mechanisms of how arousal influences relationship-initiation motivation. In addition, I provide clear avenues for future research.

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Appendix A: Study 1 and Study 2 – Information Letter and Consent Form

Student Investigator: Eric Huang, Department of Psychology, stinlab@uvic.ca
 Faculty Advisor: Dr. Danu Stinson, Department of Psychology, dstinson@uvic.ca

You are invited to participate in a study entitled “Communication Study” that is being conducted by Dr. Danu Stinson, a faculty member in the Department of Psychology at the University of Victoria. You may contact her if you have further questions by using the contact information provided above. This research is being funded by the Social Sciences and Humanities Council of Canada.

This study is designed to investigate compatibility in constrained communication between male and female strangers in a first interaction situation. What is meant by constrained communication is that strangers will not be in the same room when interacting but will instead communicate via video camera. First, you will first have your picture taken and then you will complete a preliminary survey about yourself (i.e. your demographic information, personality characteristics, and activity preferences). You may then do a short physical activity. A small portable device will be attached to you during this time so that we can monitor your heart rate. You will then have an interaction with another participant via video camera. In this interaction, you will create a brief (approximately 2 minute) videotaped message for the other participant. The other participant will watch your message and then you might interact with the other person. Finally, you will complete a short survey about your thoughts and feelings.

This study will take approximately 60 minutes of your time. In appreciation for your time you will receive course credit and may choose to receive a candy. Although you may be known to be a study participant by the researcher, your confidentiality and the confidentiality of the data will be protected: Your name will not be associated with your data in any way, and your data will be stored inside password protected computers in a secure area of the psychology building. The researchers will not indicate your name or other identifying information on your surveys. Your surveys, picture, and videotape will be identified by a number and this number will not be connected to your name in any manner. Your survey responses will not be shared with the other participants. As a participant in this study, you should be aware of the possible risks of participation. Although anticipated risks are minimal, it is possible that participation may cause some participants to experience temporary feelings of discomfort. The anticipated benefit to you is that you may experience and learn more about how psychological research is conducted. If you would like results of the study, an aggregated summary can be provided by email once it is ready. This summary will not contain information about how particular individuals scored but will represent an aggregation of results across all participants.

It is anticipated that the results of this study will be shared with others in the following ways: Scholarly journals or books, presentations at scholarly meetings, the internet, and the media. Data from this study will be disposed of by shredding paper records or deleting data files five years after publication.

You may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca). Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

With full knowledge of the abovementioned information, I hereby agree to participate in this study.

Participant Name

Signature of Participant

Date

Witness Name

Signature of Witness

Date

Appendix B: Study 1 – Researcher Script

[Before you start, set up the computer at the far desk. Bring in the heart rate monitor, camera, timer, and steps into the lab room. Prepare all the forms]

[Remember that each time you leave the room, take the camera out with you]

“Hi, are you here for the Communications Study 2?” [Wait for confirmation]“I am _____ (research assistant’s name) and I will be conducting this study. Thanks for coming. We really appreciate your participation. Before we begin, please turn off your cell phone. We will now walk to the testing room.”

[Walk to testing room]

“Right now I am going to give you a consent form and explain the study to you. If you decide to continue in the study, please sign the consent section [give them the **Information Letter and Consent Form**]. If you have any questions, feel free to ask them.”

[Hand out CONSENT FORM. Let them read it.]

“Do you have any questions?”

[Let them make their decision about consent.]

[After participant has signed the consent form, collect the consent form; the study will continue as follows.]

“Now, I would like you to sit on this chair beside this wall here and I will take your picture so that the other participant can see what you look like in advance of the meeting. You will also be shown a picture of the other participant before you make the video. Please do not smile for this photo.”

[Take picture and then seat participant at laptop]

“Great, now I would like you to fill out this preliminary survey.”

[Open the preliminary survey on the laptop, fill in the participant ID (e.g., A-PW14001F) and give the following instructions. Press F11 to maximize the survey on the screen]

“Please answer the following questions as honestly as possible. If you’re not sure what the best answer is for you, try to come as close as you can. **Please read the instructions carefully**, and if you have any questions, don’t hesitate to ask me – I’ll just be in the hall. If you don’t see me in the hall, I am just with the other participant in the room down the hall. When you are done, step out into the hall and let me know.” [Leave room and sit in the far chairs in the middle of the hall]

[When the participant is done the preliminary survey:]

“Thanks”

[Minimize their survey].

“Next, I am going to ask you to put this heart rate monitor around your left wrist. Make sure that it is in contact with your skin.” [Show them how to adjust the straps]. It won’t harm you in any way and you can take it off after the study is done. We want to mildly raise your heart rate. Do you have a heart or medical condition that we should be made aware of? [Record response if positive. If response is positive, automatically place them in the no exercise condition]

“Is it on comfortably? Please do a test to make sure that it is functioning correctly by placing your two fingers from your right hand against the two silver buttons on the watch's top face. Hold it there for about 5 seconds, and then the watch should show you your heart rate.”

[If it isn’t reading, have them remove their fingers from the HR monitor until the screen is normal. Then make sure their fingers are flat on the sensors with maximal surface area.]

[Record a baseline heart rate on paper – Measure it twice to make sure it’s relatively consistent (within 10 beats per minute)]

[If in Control condition proceed to next survey]

[If in Exercise condition]

“For the physical activity task, please take your shoes off. We would like you to run up and down this step as quickly as you can for two minutes. I will let you know once two minutes has passed and then I’ll get you to read your heart rate.”

[You want them to get to at least 120 beats per minute. If they haven’t reached that, they should, then get them to do it again for another 30 sec]

[Throughout the task, let the participant know the time left – i.e., 1min 30 seconds left, 1 min left, 30 seconds left!] – At 1 minute left, say “Keep going as quickly as you can!”

[After the task, record the heart rate (with two measures) on paper]

“Great, thanks. I’d like you to now measure your heart rate again by placing your two fingers from your right hand against the two silver buttons on the watch’s top face and holding them there. Let me know what the heart rate says. [Have them do this twice and confirm that the heart rate is over 120 beats per minute.”

[If heart rate is under 120 beats per minute]

“I’d like you to continue doing the step activity for another thirty seconds. Remember to go as hard as you can for this period of time.” [Then remeasure heart rate twice and record in place of other post-exercise measure]

[All participants]

“Next you are going to do a survey, then for the next task, you are going to make a two-minute videotape for your assigned partner in the other room. You’ve been randomly selected to make the video. This video is a live feed; that means that as we are taping your message your assigned partner will be able to view your message at the same time. Sometimes participants wonder if they will get to meet their interaction partner face to face, after making these videos. The good news is that you two *can* meet each other face to face, but only if the other participant decides that he wants to meet you. So after watching your tape, I’ll ask the other participant if he is interested in meeting you face-to-face. If he says yes, I’ll bring him to this room and you can meet. If he says no, then that will be the end of the study. Here is the picture of the other participant.”

[Insert USB key and load the image. Give the participant 5-10 seconds to look at it. Then eject it from the computer and put back into camera]

[Re-open the survey on the laptop and give the following instructions.]

[All participants]

“Please answer the following questions as honestly as possible. If you’re not sure what the best answer is for you, try to come as close as you can. **Please read the instructions carefully**, and if you have any questions, don’t hesitate to ask me – I’ll just be in the hall. If you don’t see me in the hall, I am just with the other participant in the room down the hall. When you are done, step out into the hall and let me know.” [Leave room and sit in the far chairs in the middle of the hall]

[Maximize survey with F11]

[When the participant is done the survey:]

“Thanks”

[and minimize their survey. Record heart rate another time (twice)]

“Now I will ask you to record your heart rate again.”

“So now you will make the video tape for the other participant. I’m going to go grab the camera and tripod. While getting it, would you help by setting up the chairs for both you and the other participant, in case he wants to meet up with you? You should put your chair on this side of the tape, as the camera goes on the other side. I will only be a minute.”

[Leave the room. Come back and see how far the chair is from the other chair, using the tape. Record this later, without the participant noticing.]

“Now we are going to record your heart rate again.” [Record it twice]

Finally, I am going to ask you to fill out a form regarding the other participant. I will return in a minute [Give the participant the OTHER PARTICIPANT sheet]

Ok, now the study is finished. I will request that you remove the heart rate monitor. Also, I have a few questions to ask you, and I will explain the entire study afterwards.

[Record their answers on RECORD SHEET]

“What did you think about what we did here today?”

“Is there anything you liked or disliked?”

“Is there anything that was confusing about the study?”

“Sometimes when participants take part in a study, they form ideas about what the researchers are trying to investigate. Do you have any ideas about what we are trying to investigate?”

[If the participant responds in a manner that suggests that they believed the videotape was scripted or fake...]

“What made you think that?”

“At what point in the study did these thoughts occur?”

“Okay, thanks. Now to finish our session today I am going to tell you a bit more about the study. I know you expected to have an opportunity to meet the other participant today but that is not possible and I’ll explain that shortly.”

“We would like to take this opportunity to thank you for your participation in this study. We truly appreciate your taking the time to help us with this research.

“When you first arrived here today, you were told that this study was designed to investigate first meeting situations. Although we were indeed interested in studying first meeting situations, the study was of a different nature than we originally explained to you.

“In this study you were shown a picture of another person. In reality, the picture was of a confederate and everyone saw the same picture. You were led to believe that you would meet the other participant face-to-face later in the session. In reality, because there was no other participant present, no meeting was ever possible. There was another component to this study: participants were randomly assigned to either complete a physical activity task where they ran up and down a step as quickly as possible to raise their heart rate or they did not complete a physical activity task. We hope that once we explain the purposes of the present research, it will be clear why we could not be totally forthcoming about the nature of this study.

“We were interested in whether physiological arousal strengthens how people tend to behave in first meeting situations. For arousal to strengthen people’s behavioural tendencies, arousal must first be attributed to the situation (in this case, potentially meeting someone new). If arousal is not attributed to the situation and instead is attributed to another source, then such misattribution of arousal will effectively eliminate the effect of arousal on behaviour. In the present study, we manipulated the attribution of arousal. This manipulation was the independent variable. You either participated in aerobic exercise to increase your heart rate, thus giving you another source to which you could attribute your arousal or you were in a control condition and did not participate in aerobic exercise, thus not giving you another source to which you could attribute your arousal. We expect that when arousal is attributed to another source, it will eliminate people’s behavioural tendencies. Specifically, we expect that it will influence people’s tendencies to approach or avoid others depending on their self-esteem.

“Self-esteem is related to people’s social thoughts, feelings, and behavior. Individuals with lower self-esteem tend to experience more social anxiety than individuals with higher self-esteem, and this difference is very apparent when social risk is present. A situation is risky when it is ambiguous whether one will be accepted or rejected- either could occur. In the present study, the situation was risky because participants thought that they would perhaps meet their interaction partner, if he or she wanted to meet the participant. We expect that when participants do not have the opportunity to attribute their arousal to another source, that individuals with lower self-esteem will restrain their social behaviour, particularly their warmth. In contrast, we expect that when participants DO have the opportunity to attribute their arousal to another source (in this case, a raised heart rate from physical activity), that individuals with lower self-esteem will NOT restrain their social behaviour because they will be attributing their arousal to the physical activity task and not risk. Self-esteem differences in whether people restrain their behaviour is totally dependent on risk: Self-esteem differences in social behaviour do not represent differences in social skills or abilities; if risk is reduced or eliminated, individuals with lower self-esteem behave just as warmly as individuals with higher self-esteem. In the present study, we expect that attribution of arousal to the physical activity task will have similar results to when risk is reduced or eliminated.”

“It’s actually very difficult to study these types of hypotheses. One way is to just let two people interact face-to-face. But that introduces a lot of variance into the situation, making it difficult to assess the effects of social risk or self-esteem on arousal and behavior. To have some experimental control in the situation, researchers can make sure that every participant has the same social experience, and that’s what we tried to do in this study by having everyone see the same photo of the actor.

“We apologize for misinforming you and not being able to disclose all the details of the study before hand. I hope you understand that it was necessary for this research. As you can imagine, if you knew that the person was an actor, your responses would not have been very realistic.”

“Do you have any questions?”

[Answer any questions they may have]

Because some elements of the study are different from what was originally explained, we have another consent form for you to read and sign if you are willing to allow us to use the information that you have provided. This form is a record that the purpose of the study has been explained to you, and that you are willing to allow your information to be included in the study.

[Give participant **Post-Debriefing Consent Form**]

Also, we have some written feedback about the study that you can keep. There’s some contact information on it as well, for people you can call if you have any questions or concerns about the study, and we have also included the number for Counseling Services, which you can contact if your participation in this research has raised any issues that you wish to discuss.

[give P **Post-Study Debriefing and Feedback Letter**]

Quotes from participants’ written or verbal reports can be useful in illustrating certain points in professional journals or oral reports. All quotes are anonymous and confidential. Any names that you might have spoken or written in your responses will be changed to maintain your anonymity. May we have permission to anonymously quote you in a professional journal or oral report?

[record if they say no]

Finally, we’d really appreciate it if you would help us out by not telling any other students about what you did in this study today. If people come into the study knowing about our specific predictions, as you can imagine, it would influence their results, and the data we collect would be not be useable. As a way of saying thank you, we’d also like to give you a chocolate bar or a pen...in addition to your experimental credit of course!

[let P choose]

Thanks so much!

[Show participant out]

After the session, make sure to write the participant's participant ID number AND experimental condition on ALL study materials (not including consent forms). Please put all labeled materials in an envelope labeled with the participant's participant ID, and store all consent forms in a separate folder.

Put away all the equipment and make sure to clean the heart rate monitor with a damp cloth.

Appendix C: Study 1 and Study 2 – Surveys

Survey 1

What is your participant ID number? _____

What is your gender? (Male/Female) _____

What is your age? _____

What is your ethnicity? (Aboriginal/First Nations; African/Black; Asian; East Indian; Hispanic, Middle Eastern; Caucasian/White; Not listed)

Were you born in Canada? (Yes/No) _____

Are you currently involved in a serious dating relationship? (Yes/No) _____

If yes, how long have you been involved in your current relationship? _____(months)

What is the current status of this relationship? (check all that apply)

Casual dating _____

Dating this person and others _____

Exclusive dating _____

Engaged _____

Married _____

Living together _____

Long distance _____

What is your sexual orientation? (Heterosexual; homosexual; bisexual; no answer)

Personal health questionnaire

The following questions ask about your current health. Please only consider the last 2 weeks.

1. How much sleep do you get in an average night? _____hours

Please use the following scale for questions # 2-7.

1	2	3	4	5
Rarely	Occasionally	Sometimes	Often	Always

2. ___Do you eat balanced meals (protein source, vegetables/fruit, grains, calcium source)?

3. ___Do you exercise regularly?

4. ___Do you floss your teeth regularly?

5. ___Do you meditate or take time out to reflect on your life?

6. ___How often do you encounter stressful situations or events?

7. ___How many hours a week do you exercise?

How do you feel generally?

Think about each statement that follows and rate the degree to which you agree or disagree with it on the following scale.

1	2	3	4	5	6	7	8	9
Very strongly disagree		Moderately disagree		Neutral		Moderately agree		Very strongly agree

- a. _____ I feel that I am a person of worth, at least on an equal basis with others.
- b. _____ I feel that I have a number of good qualities.
- c. _____ All in all I am inclined to feel that I am a failure.
- d. _____ I am able to do things as well as most other people.
- e. _____ I feel that I do not have much to be proud of.
- f. _____ I take a positive attitude toward myself.
- g. _____ On the whole I am satisfied with myself.
- h. _____ I wish that I could have more respect for myself.
- i. _____ I certainly feel useless at times.
- j. _____ At times, I think I am no good at all.

Below are a number of personality traits that may or may not apply to yourself. Using the following scale, please indicate the extent to which you agree or disagree with each statement. You should rate the extent to which the pair of traits applies to yourself, even if one characteristic applies more strongly than the other.

1	2	3	4	5	6	7	8	9
Very strongly disagree		Moderately disagree		Neutral		Moderately agree		Very strongly agree

I see myself as:

- a. Extraverted, enthusiastic _____
- b. Critical, quarrelsome _____
- c. Dependable, self-disciplined _____
- d. Anxious, easily upset _____
- e. Open to new experiences _____
- f. Reserved, quiet _____
- g. Sympathetic, warm _____
- h. Disorganized, careless _____
- i. Calm, emotionally stable _____
- j. Conventional, uncreative _____

For this section: Write the number that best represent how you truly feel on the line beside each statement. Some questions will ask you about your friends or your family in general. When answering other questions about romantic partners, please think of all steady or serious romantic relationships you have been in. Also, some of the questions may seem similar, but please try to answer each question on an individual basis (i.e., put down your first response and avoid comparing your answers).

1	2	3	4	5	6	7	8	9
Not true at all		Slightly true		Moderately true		Very true		Completely true

1. ____ When I am in a steady dating relationship, I often find myself feeling anxious about what my partner might think of me.
2. ____ When I am dating someone, I know that I deserve to be loved by that person.
3. ____ When I am in a dating relationship, I'm often afraid that my partner does not really love me.
4. ____ I am a good enough person to be in a romantic relationship with the person I want to be with.
5. ____ When I am in a dating relationship, I believe that I am worthy of being treated well by that person.
6. ____ I'm frightened that my romantic partner might abandon me.
7. ____ When I'm in a romantic relationship, my partner typically believes I have many good qualities.
8. ____ When I'm dating someone, that person regards me as very important in his/her life.
9. ____ When I'm in a steady dating relationship, my partner is responsive to my needs.
10. ____ When I'm romantically involved with someone, my partner typically cares a great deal about me.
11. ____ When I'm dating someone, my partner typically thinks that I'm a great person.

Survey 2

Please think about your upcoming interaction and respond to the items using the scale below.

1	2	3	4	5	6	7
Not at all						Extremely

1. I am looking forward to meeting my interaction partner_____
2. I am worried about what my interaction partner will think of me____
3. I am focused on preventing a negative interaction_____
4. I am focused on achieving a positive outcome to the interaction_____
5. I am focused on getting my interaction partner to like me _____
6. I do not care if I make a new friend today____
7. I am looking forward to making a new friend today____
8. I am afraid of being rejected by my interaction partner____
9. I feel good about meeting my interaction partner_____
10. I am cautious about expressing my opinions to my interaction partner_____

Please think about your upcoming interaction and respond to the items using the scale below.

1	2	3	4	5	6	7
Not at all						Extremely

1. How much would you want your interaction partner to get to know you as an individual?
2. How much would you want to share your feelings with your interaction partner?
3. How much would you want to tell your interaction partner about your hopes and dreams?
4. How much would you want to tell your interaction partner about your fears and insecurities?
5. How much would you want to avoid being vulnerable with your interaction partner?
6. How much would you want to avoid revealing yourself to your interaction partner?
7. How much would you want to distance yourself emotionally from your interaction partner?

This scale consists of a number of words that describe feelings and emotions that you might be experiencing during your participation today. Read each item and then mark the appropriate answer in the space next to that word. Use the following scale to record your answer:

In the study today, I've been feeling . . .

1	2	3	4	5
Not at all	A little	Moderately	Quite a bit	Very/Extremely

_____interested

_____irritable

_____distressed

_____excited

_____upset

_____strong

_____guilty

_____scared

_____hostile

_____enthusiastic

_____proud

_____alert

_____ashamed

_____inspired

_____nervous

_____determined

_____attentive

_____jittery

_____active

_____afraid

Appendix D: Study 1 and Study 2 – Heart Rate Sheet

Heart Rate – Communications Study 2

Participant _____

Baseline _____

After Exercise _____ N/A _____

After Second Survey _____

After Background Sheet _____

Distance Between _____

Appendix E: Study 1 and Study 2: Other Participant Sheet

Participant ID: _____

The next questions will all be on a scale of 1-7, with one being the lowest on the scale and seven being the highest. These are all questions based on the other participant.

How much would you like to meet the other participant? _____

How nervous would you be to meet the other participant face-to-face? _____

Appendix F: Study 1 and Study 2 – Record Sheet

Participant Study ID: _____ (e.g., PF13001M)

Condition (check): NE _____ E _____

Time Start _____

Time End _____

What class are you doing this course for? Course code _____

Post-Study Comments Sheet

Write anything else unusual that takes place here too.

1. What did you think about what we did here today?

2. Is there anything you liked or disliked?

3. Is there anything that was odd or confusing about the study?

4. Sometimes when participants take part in a study, they form ideas about what the researchers are trying to investigate. Do you have any ideas about what we are trying to investigate?

[If the participant responds in a manner that suggests that they believed that the other person isn't real or that the two experiments were not related]

5. What made you think that?

6. At what point in the study did these thoughts occur?

Appendix G: Study 2 – Researcher Script
Researcher Script - Full

[Before you start, set up the computer at the far desk. Bring in the heart rate monitor, camera, timer, and steps into the lab room. Prepare all the forms]

[Remember that each time you leave the room, take the camera out with you]

“Hi, are you here for the Communications Study 2?” [Wait for confirmation]“I am _____ (research assistant’s name) and I will be conducting this study. Thanks for coming. We really appreciate your participation. Before we begin, please turn off your cell phone. We will now walk to the testing room.”

[Walk to testing room]

“Right now I am going to give you a consent form and explain the study to you. If you decide to continue in the study, please sign the consent section [give them the **Information Letter and Consent Form**]. If you have any questions, feel free to ask them.”

[Hand out CONSENT FORM. Let them read it.]

“Do you have any questions?”

[Let them make their decision about consent.]

[After participant has signed the consent form, collect the consent form; the study will continue as follows.]

“Now, I would like you to sit on this chair beside this wall here and I will take your picture so that the other participant can see what you look like in advance of the meeting. Please do not smile for this photo.”

[Take picture and then seat participant at laptop]

“Great, now I would like you to fill out this preliminary survey.”

[Open the preliminary survey on the laptop, fill in the participant ID (e.g., A-PW14001F) and give the following instructions. Press F11 to maximize the survey on the screen]

“Please answer the following questions as honestly as possible. If you’re not sure what the best answer is for you, try to come as close as you can. **Please read the instructions carefully**, and if you have any questions, don’t hesitate to ask me – I’ll just be in the hall. If you don’t see me in the hall, I am just with the other participant in the room down the hall. When you are done, step out into the hall and let me know.” [Leave room and sit in the far chairs in the middle of the hall]

[When the participant is done the preliminary survey:]

“Thanks”

[Minimize their survey].

“Next, I am going to ask you to put this heart rate monitor around your left wrist. Make sure that it is in contact with your skin.” [Show them how to adjust the straps]. It won’t harm you in any way and you can take it off after the study is done. We want to mildly raise your heart rate. Do you have a heart or medical condition that we should be made aware of? [Record response if positive. If response is positive, automatically place them in the no exercise condition]

“Is it on comfortably? Please do a test to make sure that it is functioning correctly by placing your two fingers from your right hand against the two silver buttons on the watch's top face. Hold it there for about 5 seconds, and then the watch should show you your heart rate.”

[If it isn’t reading, have them remove their fingers from the HR monitor until the screen is normal. Then make sure their fingers are flat on the sensors with maximal surface area.]

[Record a baseline heart rate on paper – Measure it twice to make sure it’s relatively consistent (within 10 beats per minute)]

[If in Control condition proceed to next survey]

[If in Exercise condition]

“For the physical activity task, please take your shoes off. We would like you to run up and down this step as quickly as you can for two minutes. I will let you know once two minutes has passed and then I’ll get you to read your heart rate.”

[You want them to get to at least 120 beats per minute. If they haven’t reached that, they should, then get them to do it again for another 30 sec]

[Throughout the task, let the participant know the time left – i.e., 1 min 30 seconds left, 1 min left, 30 seconds left!] – At 1 minute left, say “Keep going as quickly as you can!”

[After the task, record the heart rate (with two measures) on paper]

“Great, thanks. I’d like you to now measure your heart rate again by placing your two fingers from your right hand against the two silver buttons on the watch’s top face and holding them there. Let me know what the heart rate says. [Have them do this twice and confirm that the heart rate is over 120 beats per minute.]”

[If heart rate is under 120 beats per minute]

“I’d like you to continue doing the step activity for another thirty seconds. Remember to go as hard as you can for this period of time.” [Then remeasure heart rate twice and record in place of other post-exercise measure]

[All participants]

“Next you are going to do a survey, then for the next task, you are going to make a two-minute videotape for your assigned partner in the other room. You’ve been randomly selected to make the video. This video is a live feed; that means that as we are taping your message your assigned partner will be able to view your message at the same time. Sometimes participants wonder if they will get to meet their interaction partner face to face, after making these videos. The good news is that you two *can* meet each other face to face, but only if the other participant decides that she wants to meet you. So after watching your tape, I’ll ask the other participant if she is interested in meeting you face-to-face. If she says yes, I’ll bring her to this room and you can meet. If she says no, then that will be the end of the study.

[Re-open the survey on the laptop and give the following instructions.]

[All participants]

“Please answer the following questions as honestly as possible. If you’re not sure what the best answer is for you, try to come as close as you can. **Please read the instructions carefully**, and if you have any questions, don’t hesitate to ask me – I’ll just be in the hall. If you don’t see me in the hall, I am just with the other participant in the room down the hall. When you are done, step out into the hall and let me know.” [Leave room and sit in the far chairs in the middle of the hall]

[Maximize survey with F11]

[When the participant is done the survey:]

“Thanks”

[and minimize their survey. Record heart rate another time (twice)]

“Now I will ask you to record your heart rate again.”

“So now you will make the video tape for the other participant. I’m going to go grab the camera and tripod. While getting it, would you help by setting up the chairs for both you and the other participant, in case she wants to meet up with you? You should put your chair on this side of the tape, as the camera goes on the other side.

You will sit on this chair here, but please set up this other chair where you want the other participant to sit.

I will only be a minute.”

[Leave the room. Come back and see how far the chair is from the other chair, using the tape. Record this later, without the participant noticing.]

“Now we are going to record your heart rate again.” [Record it twice]

Finally, I am going to ask you to fill out a form regarding the other participant. I will return in a minute [Give the participant the OTHER PARTICIPANT sheet]

Ok, now the study is finished. I will request that you remove the heart rate monitor. Also, I have a few questions to ask you, and I will explain the entire study afterwards.

[Record their answers on RECORD SHEET]

“What did you think about what we did here today?”

“Is there anything you liked or disliked?”

“Is there anything that was confusing about the study?”

“Sometimes when participants take part in a study, they form ideas about what the researchers are trying to investigate. Do you have any ideas about what we are trying to investigate?”

[If the participant responds in a manner that suggests that they believed the other participant was fake or that the video wasn’t going to happen, etc...]

“What made you think that?”

“At what point in the study did these thoughts occur?”

“Okay, thanks. Now to finish our session today I am going to tell you a bit more about the study. I know you expected to have an opportunity to meet the other participant today but that is not possible and I’ll explain that shortly.”

“We would like to take this opportunity to thank you for your participation in this study. We truly appreciate your taking the time to help us with this research.

“When you first arrived here today, you were told that this study was designed to investigate first meeting situations. Although we were indeed interested in studying first meeting situations, the study was of a different nature than we originally explained to you.

“In this study, you were led to believe that you may meet the other participant face-to-face later in the session. In reality, because there was no other participant present, no meeting was ever possible. There was another component to this study: participants were randomly assigned to either complete a physical activity task where they ran up and down a step as quickly as possible to raise their heart rate or they did not complete a physical activity task. We hope that once we explain the purposes of the present research, it will be clear why we could not be totally forthcoming about the nature of this study.

“We were interested in whether physiological arousal strengthens how people tend to behave in first meeting situations. For arousal to strengthen people’s behavioural tendencies, arousal must first be attributed to the situation (in this case, potentially meeting someone new). If arousal is not attributed to the situation and instead is attributed to another source, then such misattribution of arousal will effectively eliminate the effect of arousal on behaviour. In the present study, we manipulated the attribution of arousal. This manipulation was the independent variable. You either participated in aerobic exercise to increase your heart rate, thus giving you another source to which you could attribute your arousal or you were in a control condition and did not participate in aerobic exercise, thus not giving you another source to which you could attribute your arousal. We expect that when arousal is attributed to another source, it will eliminate people’s behavioural tendencies. Specifically, we expect that it will influence people’s tendencies to approach or avoid others depending on their self-esteem.

“Self-esteem is related to people’s social thoughts, feelings, and behavior. Individuals with lower self-esteem tend to experience more social anxiety than individuals with higher self-esteem, and this difference is very apparent when social risk is present. A situation is risky when it is

ambiguous whether one will be accepted or rejected- either could occur. In the present study, the situation was risky because participants thought that they would perhaps meet their interaction partner, if she wanted to meet the participant. We expect that when participants do not have the opportunity to attribute their arousal to another source, that individuals with lower self-esteem will restrain their social behaviour, particularly their warmth. In contrast, we expect that when participants DO have the opportunity to attribute their arousal to another source (in this case, a raised heart rate from physical activity), that individuals with lower self-esteem will NOT restrain their social behaviour because they will be attributing their arousal to the physical activity task and not risk. Self-esteem differences in whether people restrain their behaviour is totally dependent on risk: Self-esteem differences in social behaviour do not represent differences in social skills or abilities; if risk is reduced or eliminated, individuals with lower self-esteem behave just as warmly as individuals with higher self-esteem. In the present study, we expect that attribution of arousal to the physical activity task will have similar results to when risk is reduced or eliminated.”

“It’s actually very difficult to study these types of hypotheses. One way is to just let two people interact face-to-face. But that introduces a lot of variance into the situation, making it difficult to assess the effects of social risk or self-esteem on arousal and behavior. To have some experimental control in the situation, researchers can make sure that every participant has the same social experience, and that’s what we tried to do in this study.

“We apologize for misinforming you and not being able to disclose all the details of the study before hand. I hope you understand that it was necessary for this research. As you can imagine, if you knew that the person was not real, your responses would not have been very realistic.”

“Do you have any questions?”

[Answer any questions they may have]

Because some elements of the study are different from what was originally explained, we have another consent form for you to read and sign if you are willing to allow us to use the information that you have provided. This form is a record that the purpose of the study has been explained to you, and that you are willing to allow your information to be included in the study.

[Give participant **Post-Debriefing Consent Form**]

Also, we have some written feedback about the study that you can keep. There’s some contact information on it as well, for people you can call if you have any questions or concerns about the study, and we have also included the number for Counseling Services, which you can contact if your participation in this research has raised any issues that you wish to discuss.

[give P **Post-Study Debriefing and Feedback Letter**]

Quotes from participants’ written or verbal reports can be useful in illustrating certain points in professional journals or oral reports. All quotes are anonymous and confidential. Any names that

you might have spoken or written in your responses will be changed to maintain your anonymity. May we have permission to anonymously quote you in a professional journal or oral report?

[record if they say no]

Finally, we'd really appreciate it if you would help us out by not telling any other students about what you did in this study today. If people come into the study knowing about our specific predictions, as you can imagine, it would influence their results, and the data we collect would not be useable. As a way of saying thank you, we'd also like to give you a candy...in addition to your experimental credit of course!

[let P choose]

Thanks so much!

[Show participant out]

Upload the participant's photo on the computer.

After the session, make sure to write the participant's participant ID number AND experimental condition on ALL study materials (not including consent forms). Please put all labeled materials in an envelope labeled with the participant's participant ID, and store all consent forms in a separate folder.

Put away all the equipment and make sure to clean the heart rate monitor with a damp cloth.

Appendix H: Study 3 – Consent Form

General Behaviors Information and Consent Letter

Project: General Behaviors

Faculty Investigator: Dr. Danu Stinson, Associate Professor, Psychology Department

Contact Information: dstinson@uvic.ca; 250-721-6281

You are invited to participate in a study entitled “General Behaviors” that is being conducted by Dr. Danu Stinson, a faculty member in the Department of Psychology at the University of Victoria. You may contact her if you have further questions by using the contact information provided above. This research is being funded by the Social Sciences and Humanities Council of Canada.

The purpose of this research is to investigate people’s general routine behaviors. If you agree to voluntarily participate in this research, **your participation will include filling out a short survey and having your heart rate tested.** Participation in this study will take approximately five minutes of your time. In appreciation for your time you may choose to receive either a chocolate bar or a pack of gum.

As a participant in this study, you should be aware of the possible risks of participation. Although anticipated risks are minimal, it is possible that participation may cause some participants to experience temporary feelings of discomfort. The anticipated benefit to you is that it offers the benefits of learning about the process of research and furthering our knowledge of psychology. Your participation in this research must be completely voluntary. If you decide to participate, you may withdraw at any time without any explanation and without reprisal. If you withdraw from the study your data will not be used. Although you may be known to be a study participant either by the researcher or by others around you at the time you participate, your confidentiality and the confidentiality of the data will be protected: Your name will not be associated with your data in any way, and your data will be stored inside a locked cabinet or on password protected computers in a secure area of the psychology building.

It is anticipated that the results of this study will be shared with others in the following ways: Scholarly journals or books, presentations at scholarly meetings, the internet, and the media. The consent forms will be stored for a year and then shredded and destroyed. The anonymous electronic data will be kept indefinitely for future analysis.

You may verify the ethical approval of this study, or raise any concerns you might have, by contacting the Human Research Ethics Office at the University of Victoria (250-472-4545 or ethics@uvic.ca). Your signature below indicates that you understand the above conditions of participation in this study and that you have had the opportunity to have your questions answered by the researchers.

Name of participant

Signature

Date

Appendix I: Study 3 – Scripts

Recruitment Script

[Researcher approaches potential participants or participants approach research table]

Hi! Are you interested in completing a short five-minute study that asks about your general behaviors and habits?

In appreciation of your time, you will either receive an individually wrapped chocolate bar or pack of gum.

[If no]

Ok. Have a great day!

[If yes]

Have you done this particular study before? [if yes] Unfortunately, we will not be able to run you through this study twice. Thanks for your time.

[if no]

Thank you! Here is a consent form for you to look over and sign. Please let me know if you have any questions.

Experimenter Script

“Thank you for participating in this short study entitled, ‘General Behaviors.’ I’ll just give you an overview of the study before you begin.

[Fill out participant ID and condition on screen and form.] (e.g., P001HA_Eric = Participant 001, Condition: High, Computer A: Toshiba, RA: Eric)

In a moment you will see instructions on the screen, please follow them. The first questionnaire will ask you some background information like your gender, age, and ethnicity. If you would like, please fill that out. Then there will be a written section and another questionnaire. You will input your answers using the trackpad and keyboard. When you have finished please let me know and I will give you your compensation. Do you have any questions?”

[Start the participant on the project.][After the first survey, the participant will raise her/his hand to signal you.]

I am going to ask you to measure your heart rate with this heart rate monitor. It won’t harm you in any way. [Show them how to measure it].

“Please do a test to make sure that it is functioning correctly by placing two fingers against the two silver buttons on the watch's top face. Hold it there for about 5 seconds, and then the watch should show you your heart rate.”[Measure twice. Record average heart rate on screen and paper. If difference is greater than 10, then take a third measure and average the closest ones.]

For the rest of the study, you will wear these headphones. We find that the University Centre can get quite loud, so listening to music through these headphones will help reduce the distraction for the upcoming questionnaires.

[Have participant put on headphones. Set music at repeat. Start music.]

First, we are going to have you write about your travel to school. When you have finished, please let me know. Do you have any questions?

[Start the appropriate music depending on the condition (High or Low). Set timer for three minutes.] [After three minutes, start the survey.]

[When the participant finishes.]

I will now measure your heart rate again. Please place two fingers against the two silver buttons on the watch's top face. Hold it there for about 5 seconds, and then the watch should show you your heart rate.”[Measure twice. Record average heart rate on screen and paper. If difference is greater than 10, then take a third measure and average the closest ones.]

The study is now over. Do you have any questions? Thank you for participation. As a token of our thanks, you can select a candy or gum from this table. [Give participant choice of candy.]
[Wipe down headphones.]

Appendix J: Study 3 – Survey 1

Please tell us a bit about yourself. Results will only be reported in aggregate form. You may decline to answer these questions if you wish.

1) What is your age? _____years

2) What is your gender?

_____ [open-ended text box]

3) Do you consider yourself to be: (check all that apply)

Heterosexual/Straight _____ Homosexual/Gay/Lesbian _____ Bisexual _____

Unsure/Questioning _____ Other _____ [open-ended text box]

4) With which racial or cultural group(s) do you most identify? (Check all that apply)

White/Caucasian _____

Chinese _____

South Asian (e.g., East Indian, Pakistani, Sri Lankan, etc.) _____

Black _____

Filipino _____

Latin American _____

Southeast Asian (e.g., Vietnamese, Cambodian, Malaysian, Laotian, etc.) _____

Arab _____

West Asian (e.g., Iranian, Afghan, etc.) _____

Korean _____

Japanese _____

Another group _____

7) Were you born in Canada? Yes _____ No _____

7a) If you answered “No” above, in which country were you born? _____

8) How many years have you lived in Canada? _____years

9) Is English your first language? Yes _____ No _____

10) What is your current major or intended major? _____

12) Are you currently involved in a serious dating relationship: Yes _____ No _____

If YES how long have you been involved in your current relationship? _____(months)

What is the current status of this relationship? (check all that apply)

Casual dating _____ Exclusive dating _____

Engaged _____ Living together _____

Married _____ Long distance _____

Dating this person and others _____

THANK YOU

Rosenberg Self-Esteem Scale (Rosenberg, 1965)

How do you feel generally?

Think about each statement that follows and rate the degree to which you agree or disagree with it on the following scale.

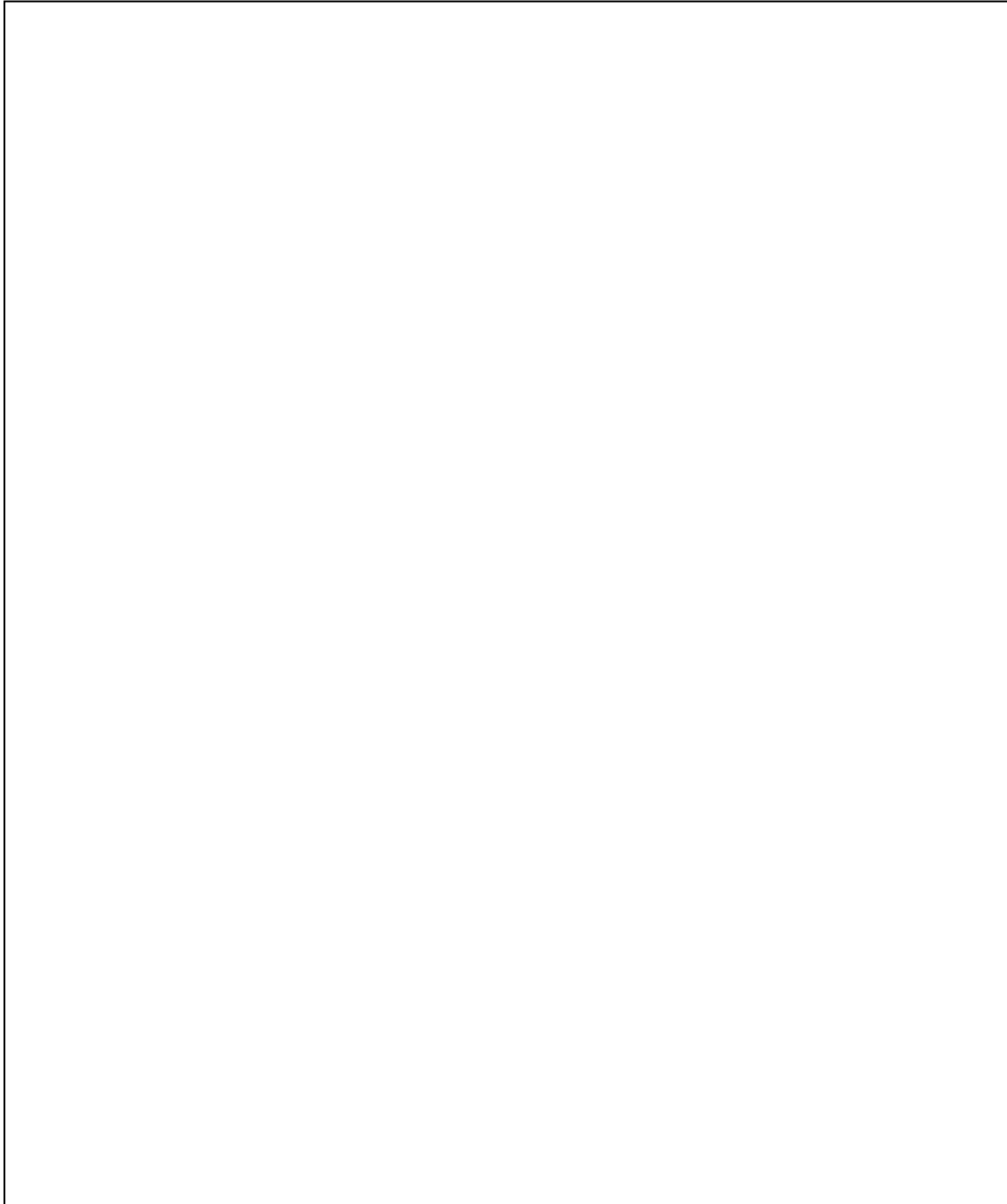
1	2	3	4	5	6	7	8	9
Very strongly disagree		Moderately disagree		Neutral		Moderately agree		Very strongly agree

- a. _____ I feel that I am a person of worth, at least on an equal basis with others.
- b. _____ I feel that I have a number of good qualities.
- c. _____ All in all I am inclined to feel that I am a failure.
- d. _____ I am able to do things as well as most other people.
- e. _____ I feel that I do not have much to be proud of.
- f. _____ I take a positive attitude toward myself.
- g. _____ On the whole I am satisfied with myself.
- h. _____ I wish that I could have more respect for myself.
- i. _____ I certainly feel useless at times.
- j. _____ At times, I think I am no good at all.

Please indicate to your experimenter that you are finished this section of the survey by raising your hand.

Appendix K: Study 3 – Filler Task

Please take three minutes to write about how you travel to school. If you live on campus, please describe the walk to class.

A large, empty rectangular box with a thin black border, intended for the student to write their response to the prompt above.

Appendix L: Study 3 – Survey 2

Meeting Questionnaire (based on Fletcher, Kerr, Li, & Valentine, 2014)

For each of the following statements, imagine you are interacting with someone you have just met and who you are romantically or sexually attracted to. Imagine that you are single and not in a committed relationship. Please rate your agreement with the following statements concerning the thoughts and feeling you might have while interacting with this person. Please indicate your answer using the scale below each question.

1. I feel like I would get along well with this person.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

2. I feel like I would have a lot in common with this person.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

3. I am interested in getting to know this person

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

4. This person appears likeable

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

5. I feel like I would have potential romantic chemistry with this person

1	2	3	4	5	6	7
---	---	---	---	---	---	---

Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree
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6. I think this person would be accepting of me.

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

7. I would be interested in going on a date with this person

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

8. I think this person would be interested in getting to know me

1	2	3	4	5	6	7
Strongly Disagree	Disagree	Slightly Disagree	Neutral	Slightly Agree	Agree	Strongly Agree

Relationship-Initiation Behavior Task

Please answer the following questions on a scale of 1 to 7 (1 = Extremely unlikely; 4 = Neither unlikely or likely; 7 = Extremely likely). Select the next button when you are finished.

Extremely unlikely 1----2----3----4----5----6----7 Extremely likely

Our lab is going to form and lead a focus group that involves meeting new people and interacting socially:

1. How much would you like to participate in this focus group?
2. How willing are you to attend sessions held late in the evenings, and on Saturday and Sunday mornings at 8am?

If you would like to participate in this focus group, please provide your name and email address below.

First Name: _____ Email: _____

Initiation Goals Questionnaire (based on Pilkington & Richardson, 1988)

Now, keep imagining that you are interacting with someone you have just met and who you are romantically or sexually attracted to. Imagine that you are single and not in a committed relationship. How likely is it that you would experience each of the following thoughts and feelings while interacting with this person?. Select the next button when you are finished.

Extremely unlikely 1----2----3----4----5----6----7 Extremely likely

1. I would feel cautious about expressing my opinions to this person.
2. I would like to share my feelings with this person.
3. I would like to tell this person about my hopes and dreams.
4. I would like to avoid being vulnerable with this person.
5. I would like to avoid revealing myself to this person.
6. I would like to distance myself emotionally from this person.
7. I would be able to easily share personal information with this person.
8. I would prefer to keep my distance from this person.
9. I would be afraid of getting close to this person because I might get hurt.
10. I would have no desire to know the personal details of this person's life.
11. I would find it difficult to trust this person.
12. I would be hesitant to share personal information about myself.

PANAS (Watson et al., 1988)

What I am feeling?

This scale consists of a number of words that describe feelings and emotions that you might be experiencing during your participation today. Read each item and then mark the appropriate answer in the space next to that word. Use the following scale to record your answer:

In the study today, I've been feeling . . .

1	2	3	4	5
Not at all	A little	Moderately	Quite a bit	Very/Extremely

interested				

irritable				

distressed				

alert				

excited				

ashamed				

upset				

inspired				

strong				

nervous				

guilty				

determined				

scared				

attentive				

hostile				

jittery				

enthusiastic				

active				

proud				

afraid				