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A proposal and examination of a novel life history and sociometer model of self-esteem

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Abstract

Self-esteem occupies an esteemed position in psychological research, but the self-esteem scholarship has often raised more questions than it has answered. Recent alternative approaches to self-esteem have made decent strides in resolving the mixed findings abound in the literature, such as a call for greater focus on self-esteem's functionality and domain-specific components of self-esteem. However, the lack of a well-grounded, parsimonious theory of self-esteem has kept these proximate theories and findings disparate and our overall understanding of self-esteem incomplete. The current dissertation sought to address these issues by developing a model of self-esteem based on the evolutionarily driven sociometer and life history theories such that important, unanswered issues concerning self-esteem research might be parsimoniously addressed, including what domains should affect self-esteem, how domains might be prioritized, and how our self-worth or value in those domains is managed. In particular, life history theory may answer these questions and also offer a way of mapping other classifications of life domains meaningfully according to two fundamental strategies, specifically mating versus somatic effort. According to the proposed model, life history determines the domains in life that a person may prioritize, and self-esteem hinges on his or her worth or value in those prioritized domains. The current dissertation also developed and tested a measure that specifies how people will respond to either low or high value in the domains they prioritize, which can resolve questions about when people will exert effort to self-enhance or self-protect, or reduce effort and devalue the domain. Two studies served as an introductory investigation of the theoretical propositions of the current work and the findings were discussed in light of the predictions made. Overall, the current research extends our understanding of self-esteem and provided some evidence for the ideas proposed. Possible improvements to the current investigation are suggested in the discussion.

1. Introduction

Research on self-esteem has evolved markedly over time. In its heyday, high self-esteem was viewed as a panacea to life's problems. Self-esteem, which refers to a person's overall affective evaluation of oneself, appears correlated with many aspects of psychological well-being, such as happiness, life satisfaction, and depression (e.g., Cheng & Furnham, 2003; Scheier, Carver, & Bridges, 1994; Branden, 1994), as well as various other social and behavioral outcomes, such as prosociality and addictions (e.g., Jones & Berglas, 1978; Juth, Smyth, & Santuzzi, 2008; Smelser, 1989). People also appear motivated to maintain a positively biased view of the self through self-serving behaviors (e.g., Alicke & Sedikides, 2009; Epstein, 2003; Pyszczynski, Greenberg, Solomon, Arndt, & Schimel, 2004; Tice, 1991; Wills, 1981). Taken together, these findings paint a convenient, coherent narrative that people have a fundamental need for self-esteem, and raising self-esteem can cause people to feel, perform, or live better. However, recent scrutiny has cast doubt on the validity of self-esteem and the conclusions drawn that people have a need to maintain self-esteem as an end in itself. In particular, stringent analyses have found self-esteem's predictive effects to be overstated (e.g., Boden, Fergusson, & Horwood, 2008) or highly variable (e.g., Judge & Bono, 2001). Conclusions drawn from the findings have also been found to run counter to expectations. For instance, in contrast to the common social psychological expectation that high self-esteem promotes better social adjustment (Fu, Padilla-Walker, & Brown, 2017; Tajfel & Turner, 1979; Smelser, 1989), having an unwarrantedly positive view of oneself can instead lead to antisocial behaviors such as excessive self-aggrandizement, narcissism, and aggressiveness (Baumeister, Campbell, Krueger, & Vohs, 2003).

These weak, mixed, and unexpected findings indicate that particular established views of self-esteem in the social psychological literature and self-esteem's associations with various psychological and behavioral outcomes require reconsideration. Some self-esteem

researchers have called for a greater focus on the functional purpose of self-esteem, which addresses what self-esteem really is for (Kurzban & Atkipis, 2007; Tracy, Cheng, Robins, & Trzesniewski, 2009). From this perspective, people's efforts to maintain self-esteem are not for the sake of feeling better about oneself per se, but instead to manage one's actual worth by accomplishing important tasks that bring value to oneself and others (e.g., Sedikides & Gregg, 2008; Leary, 2005). Other researchers have called for more attention to be paid towards domain-specific facets of the self (e.g., Crocker, Luhtanen, Cooper, & Bouvrette, 2003; Rosenberg, Schooler, Schoenbach, & Rosenberg, 1995; Marsh & O'Neill, 1984; Shavelson, Hubner, & Stanton, 1976) and, relatedly, emphasized that one's self-esteem is contingent on one's status in domains that are considered important to the self, instead of just any or all domains (Ferris, Lian, Brown, Pang, & Keeping, 2010; Harter & Marold, 1991).

Although these efforts have improved our understanding of self-esteem and potentially speak to some of the mixed findings, they have often been carried out disparately and leave questions unanswered (cf., Martiny & Rubin, 2016). For instance, researchers focusing on the function and purpose of self-esteem address how self-esteem helps people track their progress towards achieving important life goals, but do not address the range of goals across various domains that underlie self-esteem. Conversely, researchers focusing on the underlying domains of self-esteem address the goals in life that are generally important to people, but do not address how self-esteem might facilitate the pursuit of goals in these domains. In addition, because current self-esteem research does not employ theoretical frameworks that tackle the domains in life at a fundamental, adaptive level, the domains that social psychologists often purport to underlie self-esteem also appear randomly chosen and developed unsystematically (cf., Kruger, Wang, & Wilke, 2007). The domain-focused approach to self-esteem research additionally makes the assertion that self-esteem is contingent on successes in life domains that are important to the self, but leaves an

explanatory vacuum on how the importance of these domains is calibrated and prioritized for each individual. Further questions also remain concerning people's self-biased behaviors, whereby studies have identified self-enhancement, self-protection, and devaluation of threatening feedback as three ways that people can either raise or protect self-esteem (Alicke & Sedikies, 2009; Major & Schmader, 1998). However, the overgeneralization of reported efforts to "protect" self-esteem oversimplifies the relationship between self-esteem and these various psychological and behavioral outcomes (Baumeister, Campbell, Krueger, & Vohs, 2005). Absent is a systematic method to predict when people will enact which type of strategic behavior and, just as importantly, a fundamental basis for and ultimate reasons why these behaviors are enacted.

The research gaps left behind by these various approaches to self-esteem indicate that they elucidate proximate processes but do not venture deeply enough (Buss & Kenrick, 1998). Without a fundamental explanation that can theoretically unify these disparate approaches, our understanding of the function of self-esteem as well as its dynamics with various psychological and behavioral outcomes remains incomplete. Evolutionary psychology, with its strong focus on the fundamental, adaptive reasons that underlie various psychological phenomena, lends a promising perspective that may simultaneously and parsimoniously address these various research gaps, thus providing a valuable contribution and extension to our knowledge of self-esteem (cf., Leary, Tambor, Terdal, & Downs, 1995; Kavanagh, Robins, & Ellis, 2010; Kirkpatrick, Waugh, Valencia, & Webster, 2002; Kirkpatrick & Ellis, 2001). By looking at self-esteem, which has dominantly been in the purview of social psychology, from a fundamental and adaptionist paradigm, its puzzling features can be reconsidered and better explained in terms of their functions and the adaptive, ultimate goals they intend to serve.

To begin addressing these issues, this dissertation draws from two important lines of evolutionary-based research on life history theory (e.g., Griskevicius, Delton, Robertson, & Tybur, 2011) and sociometer theory (e.g., Leary et al., 1995) to propose a parsimonious account of how self-esteem might fluctuate and influence our behavior according to our fundamental survival and reproductive strategies. In particular, how does self-esteem facilitate the attainment of fundamentally important goals, and how do people decide what goals are worth pursuing and fretting over? The evolutionary perspective argues that goals are best conceived in terms of their adaptive function, and the goals that people want to achieve in life are ultimately tied to their desire to survive well, acquire mates, and reproduce eventually (e.g., Kenrick, Neuberg, & Cialdini, 2007; Kenrick, Li, & Butner, 2003). According to this perspective, self-esteem is a function of one's attainment of adaptive goals. The integration of life history theory into the study of human behavior and psychology is increasingly pervasive as life history theory offers a powerful framework for understanding how organisms, including humans, strategically allocate their finite time, energy, and resources across all sorts of major life activities given their ecological constraints and opportunities (Ellis, Figueredo, Brumbach, & Schlomer, 2009). These various life activities are adaptive tasks and goals which ultimately facilitate specific strategic routes to survival and reproductive success, and people calibrate their preferred strategy according to their developmental circumstances—i.e., their life history (Charnov, 1993; Stearns, 1992)—which in turn determines the domains and associated goals that they adaptively prioritize and take seriously. In other words, the domains that underlie self-esteem map onto the domains that are prioritized by life history such that, when a domain is weighted heavily according to a person's developmental circumstances, his or her self-esteem is expected to be positively correlated with value in that domain. How well one fares in a prioritized domain is therefore expected to have stronger implications for his or her self-esteem than how well he or she

fares in an unprioritized domain. For example, compared to people who grew up in safe and stable environments, people who grew up in poor or harsh environments are more likely to discount the future, have a larger appetite for risk, prefer a faster pace to having children, and place greater urgency on mating and reproductive goals (Griskevicius et al., 2011; Ellis et al., 2009). Thus, for people who grew up in poor or harsh environments, success in the domains associated with short-term gains and sooner (high quantity) reproduction may influence their self-esteem more strongly than success in the domains associated with long-term gains and later (high quality) reproduction. Through this framework, which accounts for variations in the allocation of effort across various major life activities, life history theory offers a way to determine people's prioritization of life domains (and associated goals) according to their developmental circumstances, which then addresses the domains (and goal attainment status in those domains) that most significantly influence self-esteem.

From an evolutionary perspective, our feelings are functional mechanisms that serve important, adaptive purposes (Nesse, 1990). One might feel more or less positive with the self depending on one's accomplishments, ability, or value in personally relevant and important areas of life. Rather than being an end in itself, this overall self-evaluative feeling likely functions as a gauge instead—i.e., a sociometer—that monitors one's status in important life domains and draws attention to the domains that require corrective action (Leary, 2005). Simply being able to gauge the current state of affairs is, however, not adaptively helpful unless that gauge is used to strategically calibrate appropriate behavior. Thus our adaptive self-esteem, like gas meters and thermostats that influence the behavior of machinery, also serve to influence people such that they behave in ways that promote higher value (achieve successes) or prevent low value (avoid failures) in important life domains. This perspective, which argues for the regulation and facilitation of goal attainments, can further specify how people's numerous self-biased behaviors occur and why. On the surface,

and when viewed from the perspective that people have a need for self-esteem, self-biased behaviors appear to be enacted just for the sake of feeling better about oneself, and some of the behaviors that people selectively engage in to maintain a positive self-image seem delusional. However, the current perspective sheds light on their functioning as mechanisms of self-esteem which serve to promote adaptive behavior. Specifically, value in a life history-prioritized domain directs the persistence of effort such that low value produces self-protection efforts while high value produces self-enhancement efforts (Alicke & Sedikides, 2009). This mechanism of self-esteem compels people to actively manage their value in their prioritized domains by seeking success while avoiding failures in pursuing their goals. Conversely, low value in an unprioritized domain leads to a devaluation of that domain (Major & Schmader, 1998) and abandonment of effort so that effort can be channelled more fruitfully elsewhere.

Taken together, by providing a fundamental explanatory account grounded on the adaptive nature of our psychology, this proposed integrated life history and sociometer model of self-esteem has the potential to address questions left unanswered by previous self-esteem research and unify the various disparate approaches. Previous conclusions drawn from self-esteem research that are guided by relatively isolated "mini-theories" (e.g., Tajfel & Turner, 1979; Martiny & Rubin, 2016; Elms, 1975) can be misleading, as in the notion that people have a self-esteem need as if self-esteem is a commodity with value in and of itself (Ryan & Brown, 2003; Kurzban & Atkipis, 2007; Swann Jr., Chang-Schneider, & McClarty, 2007), or that different people equally value the same goals (cf., Kenrick et al., 2002). Understanding the fundamental factors that influence people's self-esteem from which systematic predictions can be made about self-esteem as well as its associated behaviors is crucial to advancing our knowledge on self-esteem, from which a more accurate understanding of the dynamics between self-esteem and various life outcomes can be achieved. Although the

contribution this work is making is mainly theoretical, two empirical studies are offered as an introductory rather than extensive or exhaustive attempt to test the proposed model to predict how people prioritize adaptive goals in various domains, how one's value (i.e., worth, status, or ability) in those domains affect global self-esteem, and how various self-biased behaviors may be differentially predicted.

2. Self-esteem

The study of self-esteem has dominated social psychology since its early beginnings. William James (1890) emphasized the individual factors underlying self-esteem by regarding it as the ratio of one's successes to goals that are important in life. Symbolic interactionism approaches that arose later stressed the social factors that influence self-esteem, whereby views of the self are formed from feedback (implicit or explicit) given by others (Cooley, 1902; Goffman, 1959; Mead, 1934). More recent definitions assert that self-esteem should be distinguished from other self-concept components (e.g., self-efficacy, self-awareness) insofar as self-esteem specifically represents the *affective evaluative* component of the self-concept (Leary & Baumeister, 2000).

Contemporary treatments of self-esteem typically regard it as a global construct reflecting an "individual's positive or negative attitude toward the self as a totality" (Rosenberg et al., 1995; p. 141). How one feels about or judges the self is therefore central to the definition of self-esteem, which also makes it distinct from other subjective well-being factors, such as life satisfaction. According to Diener and Diener (1995), both self-esteem and life satisfaction indicate one's global evaluations, yet the direction and basis of these evaluations differ. Whereas life satisfaction involves an individual's cognitive evaluation of how fulfilled, gratified, or pleased he or she is with life as a whole including its various subdomains such as school, family, and friends, self-esteem reflects an individual's overall

attitude toward the worthiness, respectability, or value of the self (James, 1890; Leary & MacDonald, 2003). As drivers of behavior, achieving satisfaction is associated more closely with goal satiation and cessation of action, whereas achieving esteem is associated more closely with sustained goal pursuit and continued motivation to maintain or elevate the worth and value of the self. Thus, people who are dissatisfied with various areas in life still can still feel good about themselves and have high self-esteem, as the two constructs conceptually differ.

The positive correlations that have been found between self-esteem and various important psychological and behavioral outcomes appear to suggest that self-esteem is directly responsible for our psychological well-being (e.g., Alicke & Sedikides, 2009; Epstein, 2003; Pyszczynski et al., 2004; Wills, 1981; Juth et al., 2008; Cheng & Furnham, 2003; Rosenberg, 1965). For instance, some studies have found low self-esteem to be associated with anxiety and depressive symptoms (Cutrona, 1982; White, 1981) and high self-esteem to be associated with positive affective states (Taylor & Brown, 1988). Self-esteem has also been argued to produce better social adjustment, health, and performance across various tasks (Branden, 1994; Smelser, 1989; Baumeister, 1993; Greenberg et al., 1992). Some researchers have also suggested that socially undesirable behaviors such as aggression are caused by having low self-esteem (cf., Baumeister & Boden, 1998).

The need to maintain self-esteem has been implicated for people's numerous self-serving behaviors and cognitions. For instance, people are adept at processing information in a biased manner such that conclusions that flatter the self are reached (Kruglanski, 1989). These "positive illusions" have been conceptualized as manifestations of the motivation to either self-enhance or self-protect in order to maintain the positivity of their self-concept (Taylor & Brown, 1988). People solicit positive feedback about their social behavior (Sedikides, 1993) and selectively interact with others who are likely to provide it (Sanitioso

& Wlodarski, 2004). People also self-handicap through self-defeating behavior (e.g., drug consumption, procrastination; Ferrari & Tice, 2000; Jones & Berglas, 1978) so that, if one fails, self-esteem can be protected by blaming the external cause, but if one succeeds, self-esteem can be enhanced because success was achieved despite the obstacle (Rhodewalt, Morf, Hazlett, & Fairfield, 1991). People also selectively disregard threatening evaluative information about their self-worth in particular domains of life either by devaluing the importance of success in those domains or downplaying the diagnosticity of the negative feedback received, which allows them to legitimize the lack of effort in life domains where they are unlikely to succeed (Schmader, Major, Eccleston, & McCoy, 2001).

The initial conclusions reached based on these findings is that self-esteem is a human need, building self-esteem can lead to more desirable outcomes and promote a better life, and people are therefore motivated to protect or build self-esteem (cf., Leary, 2005) as if it were an end in itself, the deficiency of which is akin to hunger when lacking in nutrition. This strong psychological claim permeated popular beliefs throughout the 1980s and 1990s due to efforts by self-esteem advocates such as Nathaniel Branden, who stated that "self-esteem has profound consequences for every aspect of our existence" (Branden, 1994; p. 5), and that he "cannot think of a single psychological problem—from anxiety and depression, to fear of intimacy or of success, to spouse battery or child molestation—that is not traceable to the problem of low self-esteem" (Branden, 1984, p. 12). Other purveyors of self-esteem, such as Andrew Mecca, have also been cited as saying that "virtually every social problem can be traced to people's lack of self-love" (Davis, 1988; p. 10).

However, despite the numerous correlates of self-esteem identified by extant research, stringent studies more recently have found that "people with high self-esteem seem sincerely to believe they are smarter, more accomplished, more popular and likable, more attractive, and so forth, but some of those apparent advantages are illusory" (Baumeister et al., 2003; p.

42). When confounding factors such as intelligence and socioeconomic status were controlled for, the effects of self-esteem on health, relationships, and other life outcomes were significantly reduced (e.g., Boden et al., 2008; Emler, 2001). Additionally, the relationship between self-esteem and aggression is anything but clear-cut. Baumeister and Boden's (1998) comprehensive review concluded that little evidence actually supports the claim that aggression is caused by having low self-esteem; instead, a whole range of evidence suggests that unduly high positive self-views rather than negative self-views lead to feelings of entitlement and narcissism, which triggers aggressive behavior. Lastly, if we are to take the argument that people have a need for self-esteem at face value, then the numerous self-biased behaviors that people regularly indulge in have to be viewed as ultimately pointless and irrational because people are striving to preserve a view of the self that is delusionally more positive than warranted. That is, people are fooling themselves about how good (or not bad) they are to maintain positive self-feelings. That such a wide range of commonplace behaviors can be viewed in a negative light as irrational biases or flaws suggests that the paradigm through which we regard these behaviors is, in itself, suspect; if these behaviors are ubiquitous, then perhaps there are critical reasons for their existence and they need to be understood differently and more carefully (cf., Haselton, Nettle, & Andrews, 2005; Funder, 1987; Kenrick et al., 2009). These problematic findings and conclusions have prompted various researchers to develop better ways to address these weak or mixed effects of self-esteem.

2.1. Alternative approaches to self-esteem

One approach that scholars have taken to address the shortcomings of self-esteem research is to demonstrate that, rather than being an end in itself, self-esteem is instead dependent on real events and accomplishments (Kirkpatrick & Ellis, 2001; Kurzban &

Atkipis, 2007). From this functional viewpoint, self-esteem's purpose extends far beyond some superficial "feel good factor" to more fundamentally enabling people to recognize whether they have successfully enacted their desired strategies in life and achieved important life goals. Thus, the positive feelings associated with high self-esteem occur as a result of successes and serve as a reward to encourage more achievement, whereas the negative feelings associated with failures serve as a reminder to make up for those failures and not to commit the mistakes that led to those failures again (Leary et al., 1995; Kurzban, 2010). This functional approach to self-esteem has garnered convincing evidence showing that career success and other desired outcomes, for instance, tend to correlate with higher scores on measures of self-esteem, but inflating someone's sense of self does not lead to more career success or better outcomes (e.g., Perez, 1973; Judge & Bono, 2001). Without carefully establishing that the causal direction of accomplishments leading to self-esteem is stronger than that of self-esteem leading to accomplishments, the correlation between self-esteem and accomplishments had, therefore, initially led to the erroneous conclusion that "high self-esteem is not only desirable in its own right, but also the central psychological source from which all manner of positive behaviors and outcomes spring" (Baumeister et al., 2003; p. 3). In other words, positive psychology advocates calling for the promotion of self-esteem had incorrectly concluded that the relationship between increased self-esteem and positive life outcomes is equally bidirectional. On the contrary, rather than promoting desirable outcomes, artificially boosting a person's self-esteem (e.g., giving a child a prize just for participating to protect his feelings) can lead to baseless positive self-views instead, which do not constitute authentic self-esteem and are instead more closely related to fragile self-esteem or narcissism (Bushman & Baumeister, 1998; Campbell, Rudich, & Sedikides, 2002). The functional approach to self-esteem thus established that, rather than there being any such thing as a "self-esteem motive" or "need for self-esteem", a more accurate conception of self-esteem

construes it as an emergent, affective state that serves the purpose of providing feedback about the status of actual accomplishments (Leary, 2005).

Another approach that scholars have taken is based on the predictor-outcome matching principle (Swann Jr. et al., 2007) that the specificity of measures and outcomes should be conceptually similar, otherwise the strength of the relationship between the predictor and outcome variables will certainly be weak (Crocker et al., 2003; Fleming & Courtney, 1984; Rosenberg et al., 1995). This approach emphasized the importance of recognizing the domains that underlie the self and the specificity of their relationship with various outcomes. For instance, in Shavelson and colleagues' (1976) hierarchical model of the self (Figure 1), the self can be differentiated between general, academic, social, emotional, and physical self-concept domains, and each domain can still be divided further. The academic domain, for example, can be further differentiated as subject-specific domains such as English, history, science, and mathematics. When these self-concept domains were specifically examined, the mathematical self-concept of high school students was strongly related to their mathematics achievement, and the strength of the relationship decreased as mathematics achievement was compared with the more global academic self-concept, and it decreased even further when compared with the content-distinct verbal self-concept (Marsh & O'Neill, 1984).

This is related to a third argument that scholars have made (for the rather obvious point) that self-esteem should be more sensitive to events and circumstances that are relevant to the domains that people value strongly (Harter & Marold, 1991; MacDonald et al., 2003; Sheldon & Houser-Marko, 2001). According to this contingency approach, for example, the self-esteem of people who place greater importance on work performance is more likely affected by their work performance compared to people who do not care so much about work performance (Ferris, Lian, Brown, Pang, & Keeping, 2010). Intuitively, things that do not

matter to us are unlikely to bother us, and indeed people sometimes downplay the importance of a low-performing domain so as to discredit what it says about their overall worth and thus be less bothered by poor performance in that domain (e.g., Schmader et al., 2001). The relationship between self-esteem and particular psychological or behavioral events would, therefore, be robust only when those events are linked to domains that significantly underlie one's self-concept.

These arguments have certainly advanced our understanding of self-esteem, but each only to a limited degree. Due to researchers focusing on any one of these approaches separately from other approaches when addressing prior limitations of self-esteem, substantial questions remain unanswered where a parsimonious model can potentially integrate and simultaneously resolve these research gaps. For example, researchers examining the function of self-esteem have insightfully established that self-esteem facilitates the monitoring of progress towards achieving important life goals but do not address the range of goals that underlie people's self-esteem, which leads to the overgeneralization that people value the same goals in life (cf., Kenrick et al., 2002). The issue of what goals shape people's self-esteem is within the purview of researchers who have focused on the underlying domains of self-esteem, but domain-focused researchers fall short of systematically addressing how self-esteem might regulate the pursuit of goals in these domains. These approaches also do not examine the important processes through which self-esteem might actually carry out its functional work to promote effective goal pursuit. Rather than viewing the numerous self-biased behaviors that people engage in as delusions to fool themselves in a bid to make themselves feel better, these self-biased behaviors may instead reflect the important functional mechanisms of self-esteem. Self-enhancement, self-protection, or the devaluation of domains may represent processes through which self-esteem facilitates people's attainment

of important life goals, but the self-esteem literature has thus far failed to produce an integration of these self-biased behaviors within a broader theoretical framework.

In addition, although social psychologists have examined the domains underlying the self for some time now, "they had no a priori theoretical reasons for the choice of their domains" (Kruger et al., 2007; p. 555). Without the use of powerful theoretical frameworks that focus on people's drives and motives at a fundamental level, the domain frameworks that researchers have developed have been rather unsatisfactory and sometimes carry at least a hint of bias (if not blatantly) depending on the researcher's personal idiosyncrasies. For instance, Crocker et al. (2003) developed a set of life domains that supposedly determines people's self-worth which included academics, appearance, approval from others, competition, family support, God's love, and virtue, which is fairly Christian-centric. Another undesired consequence of developing domains without using theories grounded in fundamental aspects of human nature is the slew of domain frameworks available in the literature, and we are often left to rhetorical persuasiveness rather than objective standards to decide which domain frameworks are more valid than others (cf., Elms, 1975; Kurzban, 2010). Researchers who call for an emphasis on the contingency effects of self-esteem argue that self-worth depends on success in life domains that are important to the self, but without a theoretical model that addresses how people prioritize particular goals over a wide range of many possible goals that can be pursued, current self-esteem research is also silent on how the importance of these domains is calibrated and prioritized for each individual in a systematic way.

In summary, both earlier and later approaches to understanding self-esteem fall short of providing an accurate or holistic account of self-esteem. The early theory of the need for self-esteem as a cause of psychological well-being, self-biased behaviors, and social behavior is initially appealing because it seems coherent and thus "provides an answer that is more

understandable than esoteric claims about genetics, heritability, and diatheses", thereby creating an easy "villain" (Ferguson, Winegard, & Winegard, 2011, p. 15). However, conveniently blaming our lack of self-esteem for everything without a thorough consideration of its underlying psychological mechanisms may be misleading, as it is not clear why, for instance, people need to feel good about themselves to function well in life, why some people who feel good about themselves still exhibit so-called socially undesirable behaviors, or why people prefer to delude themselves through self-promoting and self-enhancing behaviors (cf., Baumeister et al., 2005) . Later approaches contribute some insights to where earlier self-esteem theories may be improved, but these relatively isolated "mini-theories" often elucidate proximate processes, or causes that are closest to or immediately responsible for the positivity of self-views. That is not to say that any of these approaches are invalid, but rather their explanatory power is individually limited. With an understanding of a higher-level ultimate or underlying root cause responsible for the disparate immediate factors observed across different lines of research, the insights gleaned from these various approaches can be integrated to form a more powerful, overarching framework to understand self-esteem.

This dissertation aims to make a theoretical contribution by using two evolutionary-based theories, life history theory and sociometer theory, to suggest how important, unanswered issues concerning self-esteem research might be parsimoniously addressed, including what domains should affect self-esteem, how domains might be prioritized, and how value and self-worth in each domain is managed. Evolutionary theory, which is grounded in biology and the evolutionary processes from which all living organisms (including human beings) are universally bound by, is precisely one such theoretical framework that is well-suited for the task. By addressing both the functional and fundamental aspects of psychology, the evolutionary perspective may strongly benefit our understanding of self-esteem where current perspectives have failed to do so thus far.

3. An evolutionary approach to self-esteem

The evolutionary biologist and Eastern Orthodox Christian Theodosius Dobzhansky (1973) once wrote that "nothing in biology makes sense except in the light of evolution". For example, it is difficult to understand the workings of a stomach (e.g., the working relationship between digestive tracts, stomach acid, and gastric pains) if one is not aware of the adaptive functions of nutrition and hunger. Endeavoring to understand our traits through a non-evolutionary lens often only produces best-guesses of proximate theoretical models. For instance, without an understanding of the evolutionary precursors of sex differences, differences between men and women have often been attributed to the proximately obvious but explanatorily dissatisfactory influence of culture and socialization (cf., Oliver & Hyde, 1993). Questions still remain about why sex differences are generally similar across cultures (Buss, 1989), a phenomenon suggesting that, more than just arising from a random process or socialization, the sexes act the way they do due to another, more fundamental factor at play—their individual, respective reproductive interests as shaped by evolution, such that, across cultures, men and women tend to behave, on average, in accordance with one's biological sex (Buss, 1989; Buss & Schmitt, 1993; Symons, 1979; Trivers, 1972; Miller, 2000). The evolutionary perspective has therefore been employed to great effect in resolving the gaps of many prevailing psychological topics, which exist due to limitations in the explanatory power of their theoretical models (cf., Buss & Kenrick, 1998).

Because evolutionary psychology addresses human psychology at a fundamental, adaptive level according to biological and evolutionary standards that all living organisms must abide by, a firm basis therefore exists from which examinations of various psychological and behavioral phenomena can spring forth. More specifically, the wide range of psychological traits we possess can be systematically examined according to their evolved

function, or what they were designed to help us do. Evolutionary psychology views our psychology and behavior as products of adaptive psychological mechanisms that operate automatically at a subconscious level. These psychological adaptations gave our ancestors an edge in survival and reproduction, allowing them to outreproduce those who did not have these adaptations, and thus the genes that code for these adaptations are passed on to later generations and exist in all modern humans (Tooby & Cosmides, 1992).

These evolutionary problems of survival and reproduction (i.e., specific selection pressures) define the domains that we should be most concerned about at a fundamental level. Like physiological adaptations, the human mind is not a general-purpose computer but instead consists of a rich array of adaptations for solving evolutionarily recurrent problems in specific domains. The evolutionary perspective therefore regards domain-specificity as a central tenet: just like how an eye was designed specifically to see and not to grasp objects, our psychological adaptations are evolved to be highly specific and to deal with problems in specific domains, and are thus not well suited for solving problems in other domains (Cosmides and Tooby, 1994; Hagen, 2001). Domains are defined according to adaptive problems, such as hunger (eating food), social inclusion (having friends), social status (having adequate resource-acquisition potential), mating (finding a copulation partner), and parenting (raising offspring) (Kenrick et al., 2002). The more important the adaptive problem, the more intensely natural selection will improve and specialize the mechanism for solving it, because failure to overcome the adaptive problem will consequently lead to survival and reproductive failure. The human mind thus includes many functionally distinct adaptive specializations that are domain-specific (Tooby & Cosmides, 1992), including self-esteem and self-biased behaviors, which function to promote survival and reproductive success while avoiding failures (i.e., improve fitness). Adaptive goals are essentially the fundamental needs that humans generally desire to meet (although individual differences do influence the

domains that are considered important, which will be discussed further later). While the psychological literature has generated a wide range of valid domains in life that people can be more or less concerned with, evolutionary domain-specificity is based on a functional analysis of the many qualitatively distinct kinds of adaptive problems of survival and reproduction faced by our ancestral predecessors, thereby making it possible to parsimoniously classify a wide range of behaviors within a well-grounded theoretical foundation (Kirkpatrick et al., 2002). These two distinct approaches to domain-specificity can lead to rather different ways of organizing the domains underlying the self. For instance, at a descriptive level, academic domains might be distinguished from athletic domains in a school population, but at a functional, evolutionary level of analysis, these two domains overlap as both can represent contexts for gaining status. The evolutionary perspective is therefore a natural contender for simultaneously addressing the function of self-esteem, the domains that underlie self-esteem, and how the prioritization of domains is calibrated so that survival and reproductive success can be optimized.

While this dissertation strives to address the shortcomings of a grand social psychological theory (self-esteem) using an evolutionary perspective, this effort is certainly not the first of its kind. Recognizing the utility of the adaptationist and functionalist approaches espoused by evolutionary psychology, social psychologists have increasingly examined various social psychological phenomena through an evolutionary lens (e.g., Leary et al., 1995; Baumeister & Leary, 1995; Buss & Kenrick, 1998; Kruger et al., 2007; Kirkpatrick & Ellis, 2001; Ellis et al., 2009). For example, and pertinent to the current dissertation, the social psychologist Mark Leary developed a functional, adaptive model of self-esteem which he termed “sociometer theory”. By exploiting the insight that humans have an evolved fundamental need to belong (Baumeister & Leary, 1995), Leary (2005) argued that rather than there being some fundamental need for self-esteem, self-esteem instead

serves as a sociometer or a psychological gauge which evolved for the purpose of monitoring and increasing one's social, relational, or interpersonal value. Another theory founded on evolutionary principles, life history theory, which can account for individual differences in impulsivity, risk appetite, and preferences for shorter versus longer term rewards (e.g., Ellis et al., 2009; Griskevicius et al., 2011), has also been extensively integrated in the examination of variable personality phenomena such as aggression, conscientiousness, sociosexuality, and risk-taking (e.g., Sherman, Figueredo, & Funder, 2013; Wang, Kruger, & Wilke, 2009), as well as why people prioritize the goals or tasks of particular domains over others (e.g., White, Li, Griskevicius, Neuberg, & Kenrick, 2013).

The current dissertation will draw from these evolutionarily based theories to develop a novel model of self-esteem which extends beyond Leary's socially driven account of the sociometer, by first proposing that the sociometer's work concerns not just social acceptance but various other domains that may be of adaptive value to people depending on the goals they prefer to pursue. Further, the variety of people's self-biased behaviors, which may generally appear to be enacted to maintain self-esteem at a proximate level, are also discussed in terms of their adaptive role as features of the sociometer that enable people to exert effort appropriately to achieve the goals they desire. Life history theory will next be discussed to address how people's childhood developmental circumstances influence the importance of particular adaptive domains such that their goal preferences are calibrated and prioritized. The various domains that social psychologists purport to underlie the self (and thus, have more or less implications for self-esteem) can be determined and mapped according to life history theory, and can potentially also simultaneously account for the gaps identified in the preceding section.

3.1. Sociometer theory

In the reconceptualization of self-esteem from ends to means, Leary et al. (1995) proposed his theory of self-esteem as a sociometer—a psychological gauge that monitors the status of individuals in tackling adaptive life tasks, such as obtaining social inclusion and interpersonal acceptance. This functional model of self-esteem asserts that self-esteem is not a goal in itself to seek, but is instead a psychological readout on one's success at achieving life's adaptive goals. Leary's sociometer work represents one of the most successful functional approaches to self-esteem, amassing a great deal of empirical evidence for his theory (e.g., Leary et al., 1995; Bourgeois & Leary, 2001; Leary et al., 2003; Leary, Haupt, Strausser, & Chokel, 1998; Leary, Cottrell, & Philips, 2001).

From an adaptive standpoint, the function of affective systems is to dispense feelings (i.e., moods and emotions) which push us to engage in fitness-enhancing behaviors, or behaviors that promote better survival and reproduction (Nesse, 1990). Positive emotions motivate the organism to take advantage of environmental opportunities and to recognize when it has succeeded in doing so (Nesse & Ellsworth, 2009). For instance, John's success in defending his doctoral dissertation is accompanied by a strong sense of pride (and perhaps also relief). Such positive feelings signal to him that he has attained an accomplishment in the domain of social status—John is now officially endowed the title of Doctor; John has done something right, adaptively. Accordingly, John and many other people engage in activities ranging from mastering skills (e.g., playing the guitar, studying advanced mathematics, writing books, etc) to finding mates because success or engagement in these activities promise positive feelings at the proximate level, and they are also adaptive goal pursuits at the ultimate, evolutionary level. That is, success at adaptive goal pursuits leads to fitness gains, thereby increasing the likelihood that the organism will survive and reproduce better. Conversely, negative feelings signal either potential, impending failure or failure that has already occurred, which motivate the organism to avoid future harm or repair pre-existing

damage (Nesse & Ellsworth, 2009). For example, the awareness of physical pain associated with car accidents makes John more careful when driving in future, while experiencing shame when John picked up a drink-driving ticket makes him feel the need to make it up to his disappointed parents and repair relations with them.

Self-esteem works similarly. From a functional, adaptive standpoint, negative and positive feelings toward the self are evolved mechanisms specially designed to provide individuals with feedback about one's status in terms of achieving important, adaptive tasks (Kenrick, Li, & Butner, 2003; Kenrick, Griskevicius, Neuberg, & Schaller, 2010). One's status in terms of achieving the tasks within a domain is synonymous with his or her value within that domain. John's positive self-evaluations (or when John experiences a boost to self-esteem) are instances of feedback telling him that he has fared well and thus has value, such as when he receives compliments from a girl he fancies, successfully executes a high-profile task at work, or is invited to an exclusive party. John's negative feelings about himself (or when John's self-esteem takes a hit) tell him that something bad had just happened, such as when his friends deliberately leave him out of a social gathering, when the girl he fancies rejects his advances, or when he fails at carrying out an important task entrusted to him.

The sociometer account of self-esteem differs from the seemingly similar self-regulation and goal pursuit theory in some important ways. Although regulatory models in service of achieving goals (i.e., feedback loop systems; cf., Carver & Scheier, 2002) underlie both theories, self-regulation requires metacognition as part of its theoretical model, or a conscious executive function that manages the self, including the process of guiding one's own thoughts, behaviors, and feelings to reach goals (Baumeister & Vohs, 2003), whereas sociometer theory asserts that any regulation of the self towards adaptive goals has already been figured out through evolution and does not necessitate any conscious awareness. In other words, the sociometer view states that our evolved psychology is inclined towards

making us experience particular feelings that should naturally compel us towards appropriate actions that, regardless of any awareness of this process, are directed toward the accomplishment of important goals. This conceptual difference might be subtle, but it has important theoretical and practical implications. Baumeister and Vohs's (2003) self-regulatory theory will judge, for instance, low self-control (or high impulsivity) to be an undesirable character trait as it hinders long-term goal pursuit. On the other hand, an evolutionary perspective will consider the conditions under which impulsivity might have evolved and benefit the attainment of adaptive goals. People who are impulsive tend to discount the future and have a higher appetite for risk (Baumann & Odum, 2012), but such traits may actually be advantageous in situations where opportunities and resource niches are rare, and people with higher impulsivity might actually thrive better in those environments (Kruger, Wang, & Wilke, 2007; Stevens & Stephens, 2010). Impulsivity, viewed as poor self-control by self-regulation theorists, would thus instead be subsumed under sociometer theory as an adaptive trait, insofar as the sociometer dispenses impulses to seize opportunities it deems as adaptively important. Further, because metacognition isn't necessary in the sociometer model of goal pursuit, by Occam's razor, sociometer theory is the more parsimonious theory (Blumer, Ehrenfeucht, Haussler, & Warmuth, 1987). Sociometer theory makes no assumptions that non-humans cannot have a sense of self-esteem either; if a male chimpanzee with debatable levels of consciousness languishes in the attainment of its adaptive goals (e.g., be part of a coalition, find mates, defeat the alpha male), he is likely to feel low about the self, experience emotions just perhaps as humans would that will encourage it to do something about the situation it is in, and avoid being caught in dire straits eventually. An alpha chimpanzee could very well have high self-esteem.

Importantly, self-evaluations should be determined and accompanied by actual events and circumstances. Any attempt at raising self-esteem without real accomplishments (e.g.,

delusional self-talk or undue compliments) is as good as pushing the gas meter of a car from empty to full without actually refuelling the car. Indeed, the misguided positive psychology movement, especially during the 1970s to 1990s, to shelter and sugarcoat everything so as not to bruise the allegedly fragile egos of those around us can lead to unwarrantedly high self-esteem and narcissism (Baumeister & Boden, 1998; Swann Jr. et al., 2007), and artificially boosting self-esteem has also been found to impair performance in a variety of tasks (Baumeister et al., 2005).

The crux of the original sociometer work on self-esteem is that human beings are a social species and that inclusion in social groups is adaptive. This is generally true as humans typically cannot survive alone; thus the need to belong as a fundamental motive (Baumeister & Leary, 1995) has, over evolutionary time, contributed to the fitness of our species (Buss & Kenrick, 1998). The genes that code for such psychological inclinations to be part of social groups while avoiding ostracism are passed through the generations (Kurzban & Leary, 2001), and modern humans across the world therefore generally seek social acceptance, enjoy being socially included, and care about how others evaluate their social worth (Leary, 2005).

However, the overly narrow focus on social acceptance and inclusion is an artifact of Leary's social psychological background on the sociometer's theoretical foundations. This is problematic if the sociometer is to be conceptualized as an adaptive psychological mechanism. More fundamentally, it is specifically the adaptive benefits provided by living in a group that has driven these effects, not that one belongs in social groups per se. Stated differently, most work on the sociometer has either focused on social inclusion as a proximal mechanism, oversimplified the sociometer as social or relational value, or assumed that all goal pursuits in life are ultimately geared towards improving one's social worth (Knowles, Lucas, Molden, Gardner, & Dean, 2010). As asserted by Leary (2005) himself, it might be pointless or unnecessary to expand the sociometer to include conscientiousness in non-social

domains because "success, achievement, and mastery in *any* domain are more socially valued than failure, non-achievement, and ineptness" (italics mine; p. 98-99). This assertion, however, misses the point that we desire to be socially accepted precisely because being in groups *is* the solution to the adaptive problems associated with our status as relatively physically weak mammals living in exposed areas (Bowles & Gintis, 2011), just as meerkats or verve monkeys are. Social species all suffer from exclusion, and thus our evolved psychology is designed to remind us to be in groups *because* of the adaptive costs of being alone (MacDonald, 2007). In the event that belonging to groups carries more costs than pursuing some alternative goal (or the corollary that pursuing some alternative goal produces more benefits than belonging to groups), a broader view of the sociometer would suggest that one's social value would have less of an influence on their self-esteem than their status towards achieving that other goal, or their worth or value in that other domain. A more fundamental and accurate conception of the sociometer feedback system should consider self-esteem as an adaptive system that evolved to encourage individuals to seek out not just social connections, but also any other adaptive desiderata because of the improvements to fitness that they provide.

Further, while the sociometer perspective establishes the evaluative feedback function of self-esteem, less has been explored about what domains people should generally be concerned about, and what makes people prioritize particular domains over a multitude of others. Life history theory has the potential to plug these research gaps by providing a well-grounded evolutionary framework which can predict organisms' strategic allocation of resources towards the important domains in life, thereby specifying what the sociometer should be sensitive towards for particular individuals.

3.2. Life history strategies

At the heart of life history theory is the question of how organisms, including humans, allocate their finite time, energy, and resources across various fitness-enhancing pursuits. The integration of life history theory into the study of human behavior and psychology is becoming increasingly important and pervasive (e.g., Chisholm 1993; Figueredo et al. 2006; Ellis et al., 2009) as life history theory provides a powerful framework for understanding variations in people's preferences, risk appetites, and a host of other individual differences as a function of their developmental circumstances. From this perspective, all the major life activities that people generally want to partake in—finding a romantic partner, doing well in school, earning money—are proximate manifestations of the pursuit of fundamentally important adaptive goals; that is, survival and reproduction. Variations in people's preferences for particular goals over others therefore signal differences in the strategies sought to enhance fitness. One person might, for instance, prefer to go to college, get a degree, and secure a well-paying job, whereas another person might prefer to forgo school and peddle drugs. Both strategies imply different appetites for risk and differences in temporal preferences for returns, but the intentions of their efforts are similar—to acquire resources. According to life history theory, a person's preferred strategy is dependent on his or her perceptions of harshness, stability, security, risks, and opportunities in the ecology from which he or she grew (Ellis et al., 2009), which calibrates their sense of how opportunities should be seized, how effort should be allocated across various endeavors in life, and the domains that are most relevant to their own survival and reproductive success. Hence, life history offers a systematic and meaningful way to understand the goals that people generally want to pursue and how their preferences and self-views are shaped according to the life domains that those goals belong to.

Although survival and reproduction are often considered the two most fundamental motives of all living organisms that face senescence, survival without reproduction in

evolutionary terms is ultimately pointless (Miller, 2000). Sexually reproducing organisms that survive well but do not mate will not pass on their genes, thus constituting an evolutionary dead-end. Stated differently, the main purpose of survival is to support an organism through to sexual maturity and successful reproduction, after which any additional survival, if not for taking care of offspring or finding surplus mates, is considerable luxury. All sexually reproducing species are therefore faced with two fundamental adaptive problems: investing more in various aspects of survival first—such as increasing ability, knowledge, and status—while delaying reproduction (i.e., somatic effort), or reproducing as soon as possible (i.e., mating effort). As described by Griskevicius and colleagues (2011), "Whereas investing in somatic effort is analogous to building a bank account, investing in reproductive effort is analogous to spending this account in ways that help replicate the bank account owner's genes. […] Just as people do not put money in a bank account for the sake of having a bank account, somatic effort—growth, maintenance, and learning—is not an end in itself. Instead, investment in somatic effort is investment in future reproduction: By growing a larger bank account now, an organism can create more or higher quality offspring in the future" (p. 242). In other words, mating effort is associated with fast reproduction and striving for mating quantity (i.e., sooner and larger number of offspring with less or lower quality investment into each offspring), while somatic effort is associated with slow reproduction and striving for mating quality (i.e., later and fewer offspring but with higher levels of quality investment into each offspring).

In biological reality, organisms live within finite resource budgets and cannot spend more resources than they have available. As a result of this budget constraint, for example, time spent gathering food cannot be spent sleeping, metabolic energy allocated toward intrasexual competition cannot be allocated toward immune function, and effort spent on parenting cannot be spent on acquiring new mates. Against this backdrop, life history theory

was developed to explain how organisms, including humans, prioritize their allocation of finite resources (e.g., time, energy, etc) across the lifetime according to the pace of reproduction they prefer (Charnov, 1993; Stearns, 1992; Baumard & Chevallier, 2015). A fundamental trade-off between reproductive versus somatic effort exists, which can be conceptualized as a trade-off between spending resources on current or *fast* versus future or *slow* reproduction (see Figure 2).

Griskevicius et al. (2011) illustrate these two types of life history strategies by comparing the tenrec with the elephant: "The tenrec, a small mammal from Madagascar, adopts a fast life history strategy: Tenrecs tend to begin reproducing only a few weeks after birth, investing most of their energy in current reproduction and thereby investing little in growth and maintenance for future reproduction. Other species, such as elephants, follow a slower life history strategy; elephants tend to mature more slowly and wait many years before beginning to reproduce. Instead, they invest resources in somatic effort, developing larger and higher quality phenotypes, because doing so historically meant leaving more descendents than did elephants that did not invest as much into somatic effort" (p. 242).

The pace or strategy adopted by an organism is calibrated according to variations in ecological factors which imply different optimal energy allocation strategies (Kozlowski & Weigert, 1987). If the environment signals high likelihood of mortality, opportunities are expected to be scarce, which then makes less sense to invest in an uncertain future; instead, it will be more profitable in evolutionary terms to discount the future, take more risks to attain short-term gains, and aim reproduce as soon or as much as possible while making mate and offspring quality less of a priority. Indeed, organisms that evolved or developed in harsh and unpredictable environments tend to invest less in somatic effort, sexually mature sooner, start finding mates upon reaching sexual maturity, and reproduce quickly (Daan & Tinbergen, 1997). A fast strategy which makes people less choosy in the face of opportunities is adaptive

for organisms living in harsh ecologies because they risk dying from predation or starvation without leaving any offspring if they fail to reproduce in time. In contrast, less harsh and more predictable ecologies increase the payoffs associated with increased somatic investment because they afford their resident organisms more control over their own mortality. Under such ecological conditions, a slow strategy that delays current reproduction and mating effort while focusing on careful somatic effort increases the likelihood that these organisms will survive longer, have high mate value, acquire high quality mates, and produce high quality offspring in the future (Stearns, 1992).

Humans similarly follow this variation in life history strategies. Although humans, when compared with other species, generally have a slow strategy characterized by a long developmental period, heavy investment in a few offspring, and a long expected life span (Kaplan, Hill, Lancaster, & Hurtado, 2000), within-species variation exists as some individuals become sexually active earlier and consequently have more children than others (Ellis, 2004). Demographers have found robust associations between delayed reproduction, such as later marriages and older age at first birth, and various markers of somatic investment, such as reduced child mortality, increased literacy of parents and children, higher socioeconomic status, and family preferences for fewer children (e.g., Westoff, 1992; Engelhardt, & Prskawetz, 2004; Bongaarts, 2002). Multiple studies show that mortality cues significantly influence reproductive timing in human populations. A study comparing different neighborhoods within Chicago found that the 10 neighborhoods with the highest life expectancy had a median age of 27.3 years for mothers giving birth, whereas the median age was 22.6 years for the 10 neighborhoods with the lowest life expectancy (Wilson & Daly, 1997). Similarly, a study that examined the relationship between violent crime and age of reproduction across 373 counties in the United States showed that higher violent crime rates (but not property crime rates) were associated with earlier ages of reproduction (Griskevicius

et al., 2011). A study on the impact of biological father absence, which undermines the quality of family environments in the form of related stressors (e.g., divorce, poverty, conflictual family relationships, erosion of parental monitoring and control), demonstrated that greater exposure to father absence was strongly associated with elevated risk for early sexual activity and adolescent pregnancy in girls (Ellis et al., 2003). Lastly, the general inverse correlation between income and fertility as well as lifespans within and between nations (cf., Weil, 2004) shows that people from poorer environments tend to have shorter lifespans and reproduce more compared to people from richer environments.

An important nuance to the effects of environmental harshness on people's life history strategy is that the preferred pace of reproduction is calibrated specifically during their developmental years and may be resistant to environmental changes later. For instance, experimental studies show that people's childhood developmental circumstances (e.g., childhood household income and socioeconomic status) but not their current circumstances predicted their life history strategy, which can produce different coping reactions in response to the same events (e.g., Griskevicius et al., 2013; White et al., 2013). When participants in these experiments were primed with the same stressors and threats, those who had better childhood developmental circumstances were likely to adopt a "wait and see" approach to reduce risk and uncertainty, such as saving money, investing more in studies or career, and preferring later reproduction, while those with rougher childhoods were likely to "cash in" on risky opportunities, be more impulsive, and prefer earlier reproduction. In other words, childhood developmental circumstances shape a person's strategic approach to life's challenges, and even if he or she relocates to a different location or has a change in

socioeconomic status later in life, their life history strategy is more likely to be consistent with their childhood environment rather than the current one.[1]

In summary, life history theory predicts that individuals who perceive their developmental environment as safe and resource-rich are likely to adopt a slow strategy as they grow up which focuses on delaying reproduction and investing in somatic pursuits, whereas individuals who perceive ostensible cues of danger, instability, or lack of resources in the environment they were raised are likely to discount the future and adopt a fast strategy that focuses on reproducing sooner. Thus, on average, fast strategists likely prioritize the domains and goals associated with short-term gains, sooner reproduction, and high quantity mating, whereas slow strategists likely prioritize the domains and goals associated with long-term gains (in particular somatic efforts to invest in and increase future value of the self), later reproduction, and high quality mating. All the major life goals that people may generally desire can be meaningfully mapped onto the mating versus somatic effort dichotomy at a fundamental level according to life history theory. The proclivity to pursue particular strategies over others therefore has significant implications for whether fast (mating) or slow (somatic) reproductive goals are prioritized (and likewise their associated domains), and also how self-esteem is shaped depending on the successful enactment of preferred life history strategies.

4. An integrated model of life history and sociometer on self-esteem

The evolutionary-based account of self-esteem proposed in this dissertation, which integrates life history theory and sociometer theory, argues that people's self-esteem should

[1] From an evolutionary perspective, this fixedness may be due to the fact that the mobility of ancestral humans was far more limited relative to modern humans, and thus the chances that our evolutionary ancestors would have experienced a change in their surrounding ecology were fairly slim. Given that "our modern skulls house a stone age mind" (Cosmides & Tooby, 1997), we continue to carry this adaptation that calibrates our optimal strategy according to our developmental environment.

fluctuate to the extent that the goals deemed as important to the self are achieved, and that the importance of these goals is calibrated according to perceptions of environmental harshness and stability during their childhood developmental years. As described earlier, a more accurate conception of the sociometer should consider self-esteem as a functional system that compels people to accomplish adaptive tasks because of the improvements to fitness that such accomplishments carry. In addition, because of differences in environmental harshness as well as biologically finite resource budgets, people are pressed to select among various strategies that prioritize the attainment of either faster or slower reproductive goals. Although adaptive goals are likely to produce some amount of fitness gains in general when they are accomplished, they are not equally beneficial to all individuals. Which adaptive tasks and evolutionary domains a person will consider most important depends on their relevance to the pace of reproduction that he or she prefers as a function of his or her developmental environment. Thus, life history theory, as a powerful framework concerning how organisms allocate their efforts across various life goals, can aid in a useful reconceptualization of the domains that underlie the self and offer better predictions of how self-esteem will be affected according to domain prioritization.

Despite its age, Shavelson et al.'s (1976) hierarchical model of the self represents one of the most seminal advancements to our understanding of how self-concepts are formed and structured. In contrast to other domain-focused researchers who have proposed a variety of rather specific domains that people should be sensitive to (e.g., Crocker et al., 2003), Shavelson and colleagues did not lay claim to any specific set of domains, but rather used a non-exhaustive hypothetical set of domains as an example to make the theoretical point that the self-concept is derived from domains of importance, domain-specific outcomes are more strongly related to domain-specific facets of the self-concept, domains can be further divided into smaller subdomains, and that the evaluation of specific behaviors influences the self

depending on the domain category they belong to (Figure 1). Their model illustrates a conceptual framework which can be modified flexibly to either include various other domains that may be important depending on specific individual difference factors, or reorganize these domains according to other theoretical paradigms, such as their evolutionary function. If we were to reconsider these self-concept domains through the evolutionary lens adopted for the current dissertation, what might the self-concept map look like?

Evolutionary psychologists have, across various research endeavors, sought to ascertain the adaptive domains, motives, and goals that underlie human psychology. For instance, Kenrick and colleagues (2002) suggest that there are at least six domains that can be recognized as having a unique bearing on human fitness, including affiliation, status, self-protection, mate search, mate retention, and kin care (see Table 1). Other researchers have identified their own set of domains which are more or less similar or related (cf., Kenrick et al., 2003; Kenrick et al., 2010; Kruger et al., 2007; Morse, Neel, Todd, & Funder, 2015). These domains are argued to be functionally distinct and each comes with its own set of adaptive challenges as well as attendant mechanisms that are responsible for tackling them (Kenrick et al., 2003; Cosmides & Tooby, 1994). For instance, people have evolved psychological mechanisms for competition, but the cues that trigger competition in mating-related domains, such as the presence of attractive same-sex rivals, differ from those in the domains related to status-seeking, such as high-performing peers in school or at work.

Figure 3 illustrates how the examples of general life domains identified by Shavelson and colleagues map onto the evolutionary domains identified by Kenrick et al. (2002) and boil down to a somatic versus mating effort dichotomy. As environmental harshness (e.g., poverty, violence, crime, etc) increases, the future becomes more uncertain and people are more likely to favor immediate over delayed reproduction. Therefore, in terms of the six domains proposed by Kenrick et al. (2002), fast strategists are likely to exert mating effort

and thus prioritize the mate search and mate retention domains, whereas slow strategists are likely to exert somatic effort and thus prioritize the affiliation, status, self-protection, and kin care domains. As predicted by sociometer theory, self-esteem should reflect successes or failures in domains that are important to the self-concept, and thus compared to slow strategists, fast strategists' self-esteem is more likely to be affected by events and circumstances related to the mating domain, such as evaluation by potential mates, their own mate value, and the state of their romantic relationships with current mates. In contrast, compared to fast strategists, slow strategists' self-esteem is more likely to be affected by events and circumstances that signal successes at somatic effort, such as being accepted into social groups, achievement in school or work, and parenting.

This reorganization of domains according to adaptive function can lead to predictions that differ significantly from earlier models of the self. For instance, the significant others and peers who, originally according to Shavelson and colleagues, shape the social domain of the self-concept are, from an evolutionary perspective, possibly tied instead to the domains of mate retention and affiliation. Depending on one's life history, which determines one's stronger preference for either mating or somatic goals, the evaluation of behaviors, events, and circumstances in these two adaptive domains have different implications for self-esteem. In contrast to Shavelson and colleagues' expectation that one's interpersonal success for both significant others and peers will equally influence self-esteem through the social self-concept, the life history-driven framework of the self predicts that significant others and peers will differentially influence one's self-esteem depending on whether one is a fast or slow strategist, whereby significant others play a greater role for fast strategists' self-esteem and peers play a greater role for slow strategists' self-esteem. In addition, the evolutionary perspective emphasizes the importance of carefully assessing the underlying adaptive purpose that a particular effort serves because seemingly similar behavioral efforts can be exerted as

means to different functional ends. For instance, both fast and slow strategists may appear to strive similarly for social status, but whereas slow strategists may most explicitly do so as part of their somatic investment in their own skills and abilities, such as learning and mastery (Deci & Ryan, 2000), fast strategists may instead do so because they recognize that having high social status equates to being more romantically desirable (Buss, 1989), which facilitates mating effort. The mapping proposed in Figure 3 represents but one theoretical way of defining the various self subdomains according to Kenrick and colleagues' set of adaptive domains under the life history dichotomy of mating versus somatic effort; other mappings arguably exist depending on the adaptive functions that are emphasized, but the basic theoretical principle remains the same—that the preferred pace of reproduction determines the domains that have greater implications for self-esteem.

Researchers borrowing from these insights on domain-specificity have provided some evidence that the sociometer for mating domains operates independently of the sociometer for somatic domains. Kavanagh and colleagues (2010) found that rejection or acceptance by members of the opposite sex altered participants' evaluations of their own mate value which was reflected in their mating aspirations (the mating sociometer), and that the causal pathway between either rejection or acceptance and mating aspirations was mediated by changes in global self-esteem. The impact of rejection or acceptance by members of the opposite sex was specific to mating aspirations and did not generalize to levels of aspiration in establishing same-sex relations (the social inclusion sociometer), thereby distinguishing the domain-specificity of the mating sociometer as unique and separate from social inclusion and belonging needs.

Taken together, the integration of sociometer theory and life history theory with self-esteem simultaneously predicts that the effects of goal accomplishment in particular domains, which represents their value in those domains, will affect self-esteem depending on one's life

history. In other words, life history will moderate the effects of domain-specific value and achievements on self-esteem (Figure 4). When a domain is prioritized according to life history strategy, one's overall self-esteem is expected to be positively correlated with value in that domain. The model immediately offers at least three major specific predictions. First, the more that threats to survival exist in the environment in which an individual grows, the more that reproduction will be preferred sooner, and the more that the mating domains and their associated goals (e.g., seeking mates, appearing desirable, outcompeting intrasexual rivals, having high mate value) will be prioritized and weighted heavily over somatic domains. Second, the less that threats to survival exist in an individual's developmental environment, the more that mating quality will be preferred and thus a more patient approach to investing in oneself takes precedence over sooner reproduction, and the more that the somatic domains and their associated goals (e.g., building coalitions, academic achievement, gaining career status) will be prioritized and weighted heavily over mating domains. Third, value in more heavily weighted, prioritized domains will have a greater influence on self-esteem than less heavily weighted, unprioritized domains.

4.1. Self-biased behaviors from an evolutionary perspective

A fundamental, evolutionary approach to self-esteem also allows us to reconsider the various self-biased behaviors enacted by people that seem geared towards pushing for a view of the self that is more positive than warranted. In general, self-esteem researchers have argued that people can, in the service of self-esteem maintenance, either persist in exerting effort to manage value in important domains through self-enhancing and self-protecting behaviors in those domains (Alicke & Sedikides, 2009), or downplay and devalue the importance of domains they fare badly in (Major & Schmader, 1998). Although the current dissertation departs from the view that there is any self-esteem motive, these self-biased

behaviors are still robustly found across various studies (e.g., Kruglanski, 1989; Taylor & Brown, 1988; Sedikides, 1993; Sanitioso & Wlodarski, 2004; Ferrari & Tice, 2000; Jones & Berglas, 1978; Rhodewalt et al., 1991; Schmader et al., 2001) and thus deserve a proper consideration of the adaptive functions that they may serve.

4.1.1. Self-enhancement and self-protection

Findings abound in the self-esteem literature demonstrating people's self-biased motivations to exaggerate their virtues and to minimize their shortcomings, as well as to construe events such that their attributes are placed in the most favorable light (Alicke & Govorun, 2005; Sedikides & Gregg, 2008). These self-biased motives can be referred to as efforts to self-enhance and self-protect. Scholars specializing in people's motivations to enhance and protect positive self-views have argued that "although both self-enhancement and self-protection are part of an overarching desire to feel good about the self, there are important differences. […] Self-enhancement focuses on attaining, maximizing, and regulating positive self-views, whereas self-protection focuses on avoiding, minimizing, and repairing negative self-views. It is often difficult to tease apart the two self-motives empirically, partly because a given behavior (e.g., self-handicapping) can reflect either self-enhancement (e.g., maximizing credit for success) or self-protection (e.g., minimizing blame for failure)" (Hepper, Gramzow, & Sedikides, 2010; p. 782).

From an adaptive standpoint, people enact self-enhancing behaviors to maintain domain value at a high level, and people do so because many features of our complex social world (especially during ancestral times) do not carry objective markers of success. For instance, John may be aware based on social inferences that he is popular, but putting aside modern inventions such as social media "likes", there is no objective quantity or true "score" that exists which can indicate how high his social value is, nor is there any guarantee that his

social value will remain high without sustained effort to maintain his popularity. John must therefore persist in propping up his social value or suss out information that can reaffirm it, such as joining social gatherings, making the effort to chat with strangers on the street, and putting himself in situations that can provide feedback on how well liked he is. Self-enhancing behaviors are found to be typically associated with high self-esteem (Tice, 1991). When assessed with the related literature on approach-avoidance motivation (Elliot & Church, 1997) and regulatory focus (Higgins et al., 2001), self-enhancement has been shown to overlap substantially with approach motivations and promotion focus, both of which emphasize accomplishments rather than safety as well as a greater concern with gains and non-gains rather than losses and non-losses (Braverman & Frost, 2012). Indeed, people with higher self-worth have greater confidence to approach situations and capitalize on opportunities that further reinforce their high self-regard, such as "selecting situations in which they are likely to excel, and […] promoting their virtues when there is no fear of contradiction" (Alicke & Sedikides, 2009; p. 23). Domain self-enhancement is therefore an adaptive behavior for people who have high value in the domains they prioritize, and this comprises of actions that strive to promote the self in those domains and approach situations that can elevate or continue to maintain high domain value.

In contrast, research shows that self-protection is associated with low self-esteem, and people with low domain value in their prioritized domains are likely to enact self-protective behaviors to defensively protect and repair domain value (Tice, 1991). Self-protection is related to avoidance motivation and having a prevention focus, whereby self-protecting individuals engage in "retreating from threatening situations, making excuses designed to deflect negative self-implications, misremembering unfavourable information about the self, avoiding situations that threaten failure, and evaluating other people and groups unfavourably to maintain relatively positive self-views" (Alicke & Sedikides, 2009; p. 23). Thus, self-

protecting individuals are still concerned with performance but are primarily driven to avoid losses rather than achieve gains, and have a general desire to prevent the occurrence of undesirable outcomes in life domains they consider important (Braverman & Frost, 2012). Adaptively, self-protection is a crucial behavior for people with low value in prioritized domains because they want to prevent their value from sliding further. For example, if John considers mating goals to be important but repeatedly receives feedback that he has low mate value (e.g., rejection from potential mates or the inability to attract the attention of the opposite sex), John may obsess over covering up his flaws, ensuring that his pickup lines are perfect, or being very accommodating to his dates to decrease the chances that he will be rejected in future. Importantly, the avoidance motivation of self-protection does not imply that people want to avoid the domain altogether when they self-protect. Instead, because the domain is important, people want to avoid racking up further losses in the domain, and thus will behave more carefully in their approach to domain-relevant situations and compensate to buffer against possible further failures.

4.1.2. Devaluing of domains

Alternatively, some self-esteem researchers have emphasized domain devaluation as a means to maintain self-esteem. Domain devaluation is a defensive disengagement of self-esteem from one's outcomes in a domain such that self-esteem is not contingent upon one's successes or failures in that domain (Major & Schmader, 1998). For instance, African American students face negative cultural stereotypes that portray them as less intelligent than students of other ethnic groups, and these are compounded by statistics suggesting that African Americans fare more poorly than others in academic achievement (Steele, 1997). Although it might be anticipated that such negative stereotypes and academic outcomes would pose a self-esteem threat to African American students, on the contrary, research finds

that their levels of self-esteem and academic self-concepts are on par with students from other ethnic groups (e.g., Crocker & Major, 1989; Graham, 1994). One suggested way that African American students cope with academic threats is to disengage their feelings of self-worth from their academic outcomes (Major & Schmader, 1998). Therefore, through downplaying the importance of particular domains, performance in those domains have less of a bearing on self-evaluations, and hence individuals can protect themselves from the threat or harm of low value in those domains to their overall self-esteem.

An unanswered question is why some people persist in exerting effort in poorly performing domains while others resort to devaluing those domains. The current life history and sociometer model of self-esteem provides a straightforward and clear answer: based on the prioritization of either a faster or slower strategy due to developmental circumstances, some domains have been calibrated to be adaptively too critical to devalue, and thus persistence is the end outcome. In the event that an individual has low value in an important, prioritized domain, careful domain-specific self-protective behaviors are likely to occur as he or she tries to repair value in that domain. Conversely, when value is low in a domain that is considerably unimportant and thus already unprioritized, that domain can be safely unhinged from self-worth. Although self-esteem scholars regard such a behavior as geared towards preserving positive self-views, an evolutionary perspective regards the motivated devaluation of poor performance domains as serving an adaptively functional purpose, specifically the optimization of the allocation of effort towards more important domains and goal pursuits. If a domain is considered unimportant, feedback denoting low value will lead to a devaluation of the domain such that time and energy can be conserved and channelled towards other domains carrying greater priority, thereby reducing the likelihood that effort will be wasted on unimportant goals. The life history perspective therefore extends the domain devaluation and psychological disengagement literature by arguing that not all domains are equally apt to

be devalued within the general scope of maintaining self-esteem, while providing an important specification on why, in the face of threats to self-worth, some domains will be abandoned while others will elicit persistence.

4.2. Summary

The current work strives to make a theoretical contribution by using a fundamental, adaptive perspective to suggest how important, unresolved issues concerning self-esteem research might be parsimoniously addressed. To this end, an evolutionary-based model of self-esteem was developed which can potentially advance our understanding of self-esteem beyond previous approaches, including the functional sociometer perspective, by addressing the adaptive nature of self-esteem and self-biased behaviors, and by incorporating life history theory to enable predictions about which domains have stronger implications for self-esteem. In particular, life history theory was recognized as a way to address what domains should affect self-esteem, how domains might be prioritized, and how domain prioritization affects the exertion of effort to manage value in those domains. To a large extent, other classifications of life domains are also expected to map meaningfully onto the mating versus somatic dichotomy. This novel model of self-esteem can potentially unify the current "mini-theory" approaches that other researchers have taken to tackle the issues in self-esteem research.

Figure 4 presents the basic interaction predicted by proposed model and Figure 5 illustrates the model's overall predictions of the various effects of life history on self-esteem and self-biased behaviors. Specifically, the model predicts that childhood developmental circumstances influence people's preferred pace of reproduction such that harsher childhood environments produce fast strategists who prioritize the mating domains, while stabler childhood environments produce slow strategists who prioritize the somatic domains. Hence,

mating goals will have greater implications for fast strategists' self-esteem whereas somatic goals will have greater implications for slow strategists' self-esteem. Specifically, value in the mating domain is expected to have a stronger positive relationship with self-esteem for fast strategists than for slow strategists, whereas value in the somatic domain is expected to have a stronger positive relationship with self-esteem for slow strategists than for fast strategists.

Efforts by individuals to self-enhance or self-protect in particular domains reflect the importance of the domains to those individuals and the mechanism of the sociometer to manage value in those domains, although which specific method is used to manage value depends on whether domain value is high or low. On average, it is expected that, *if* the domain is prioritized and thus weighted heavily, high value leads to more self-enhancement while low value leads to more self-protection.

If a domain is unprioritized according to life history, low value in that domain will lead to a devaluation of the domain such that, as value decreases, so will the perceived importance accorded to the domain.

On average, having high value in a domain that is unprioritized may produce a moderate effect on self-esteem, because for self-serving purposes, high value even in unimportant domains may still lead to positive feelings about the self. For instance, high self-esteem fast strategists (i.e., fast strategists with high mate value) who do well academically may feel good about themselves with the knowledge that they can excel at school even if they don't take it seriously, insofar as their current mating goals are met. However, fast strategists who languish in accomplishing their mating goals are unlikely to give much weight to academic achievement, preferring to focus more effort towards self-protection in mating instead. Thus, on the whole, strong effects of value in unprioritized domains on self-esteem are not anticipated.

While the contribution made by this dissertation is primarily intended to be theoretical, two empirical studies are offered as an introductory investigation of the model. The findings attained through this investigation, although neither extensive nor exhaustive, may provide useful insights into the validity of the proposed model and elucidate avenues for future studies guided by the model.

5. Overview of studies

The current dissertation examined the propositions of the integrated life history and sociometer model of self-esteem through two survey studies. The first study represented a preliminary test of one of the basic propositions of the model that fast strategists, due to their prioritization of the mating domain, will have a stronger positive relationship between their mate value and self-esteem than slow strategists.

The second study expanded on Study 1 by including academic achievement in the analyses. This enables a further test of the model to determine if the positive relationship between academic achievement (which serves as a good exemplification of somatic domain value) and self-esteem is stronger for slow strategists than for fast strategists, and to see if the findings from Study 1, whereby the positive relationship between mate value and self-esteem is stronger for fast strategists than for slow strategists, is replicated. In addition, the relationship between self-biased behaviors (self-enhancement, self-protection, and devaluation of domains) with domain-specific value was also assessed.

6. Study 1

Study 1 provides a preliminary test of the basic propositions offered in the integration of life history theory and sociometer theory. According to the model in Figure 4, it is expected that life history strategy moderates the effects of domain-specific value on global

self-esteem. As harsher developmental environments tend to produce fast strategists who, compared to slow strategists, are likely to weight mating and reproduction more heavily over other domains, it is hypothesized that childhood developmental circumstances will moderate the effects of mate value on global self-esteem, such that the positive correlation between mate value and global self-esteem will be stronger for people with harsher and less stable childhood developmental circumstances relative to people with less harsh and stabler childhood developmental circumstances (Figure 6).

6.1. Method

6.1.1. Participants and procedure

Participants were recruited from a large Singapore university through the subject pool system and 135 Singaporean undergraduates participated. Data from 15 participants were excluded from the analyses either for incomplete responses to the questionnaire or for having exclusively homosexual mate preferences (i.e., they were not attracted to the opposite sex at all). The final sample size of 120 was equally comprised of males and females with an average age of 22.2 years, and 91.6% were ethnic Chinese.

Upon arrival at the psychology laboratory, participants were ushered to private computer terminals. When all participants within a session had arrived, they were then briefed on the objectives of the study using the pretext that the experimenters were generally interested in people's psychological attitudes and life experiences. Participants were given up to 30 minutes to complete the questionnaire containing all the measures of interest, and the items within each cluster were presented in random order. Within the questionnaire, three measures were used to assess participants' life history (childhood family income, childhood family harmony, and quality of relationship with biological parents), followed by measures

assessing mate value and global self-esteem. After a participant completed the surveys, he or she was debriefed, thanked, and paid S$5 for their participation.

6.1.2. Questionnaire

Childhood family income. Griskevicius et al. (2011) used childhood family income as a proxy for childhood socioeconomic status, and their study found that childhood family income predicted people's life history strategy. Accordingly, for the current study, participants were asked to estimate their maternal monthly salary and paternal monthly salary when they were between the ages of 6 to 10. Both parents' monthly earnings were summed to form the childhood family income score.

Subjective childhood family harmony. Participants were asked to recall their childhood experiences (from earliest memory to the age of 12) and indicate how harmonious their family was during that developmental period using a 5-point scale (1=Not at all harmonious; 5=Very harmonious).

Quality of relationship with biological parents. Participants were asked to rate their agreement with two statements pertaining to relationship quality with biological parents taken from Figueredo et al.'s (2006) mini-*K* scale, which was designed to predict people's life history strategy (the mini-*K* was not used in this study because of known problems with the scale as reported by other researchers (cf., Sherman et al., 2013; Dunkel et al., 2015) as well as the lack of cross-cultural validity). The statements are "While growing up, I had a close and warm relationship with my biological mother" and "While growing up, I had a close and warm relationship with my biological father", and participants responded on a 7-point scale (-3=Disagree Strongly; +3=Agree Strongly).

Mating importance. The importance that participants place on mating was used as a "manipulation check" to determine if childhood developmental circumstances indeed affect

people's prioritization of mating. This was assessed using an adapted version of Ferris et al.'s (2010) 6-item measure, which assessed the importance that people placed on work performance to their self-concept. A list of statements representing the mating domain was created and sample statements include "Being attached is better than being single" and "I feel better about myself when I know I can attract the attention of the opposite sex". Statements from Ferris et al.'s (2010) original measure as well as statements adapted for assessing participants' perceived importance of other social domains to serve as filler items. Participants then rated the extent to which they agreed with these statements on a 7-point scale (1=Disagree Strongly; 7=Agree Strongly). Responses were averaged into a mating importance composite, α = .70 (see Appendix 1).

Mate value. In accordance with researchers who have examined the mating sociometer (e.g., Kavanagh et al., 2010; Kirkpatrick et al., 2002), the 9-item mate value scale from Kirkpatrick et al. (2002) was used as a measure of participants' mate value. Filler items from Spivey's (1990) social value measure were also added. Participants rated the extent to which they agree with various statements such as "I receive many compliments from members of the opposite sex" and "After I date someone, they often want to date me again" on a 7-point scale (1=Disagree Strongly; 7=Agree Strongly). Responses were averaged into a mate value composite, α = .89 (see Appendix 2).

Global self-esteem. Global self-esteem was assessed with the 10-item Rosenberg (1965) self-esteem scale, which is the most validated and commonly used measure of self-esteem (Robins, Hendin, & Trzesniewski, 2001). Participants indicated the extent to which they agreed with statements such as "I take a positive attitude toward myself" and "I wish I could have more respect for myself" on a 7-point scale ranging from 1 (strongly disagree) to 7 (strongly agree). Responses were averaged into a global self-esteem composite, α = .89 (see Appendix 3).

6.2. Analysis and Results

6.2.1. Descriptive statistics and zero order correlations

The descriptive statistics for all the measures used are presented in Table 2 and the zero order correlations among all variables are presented in Table 3. A main effect of sex on global self-esteem was found whereby the global self-esteem of males (M=5.05, SD=1.0) was significantly higher than the global self-esteem of females (M=4.54, SD=.87), t(118)=2.95, p=.004, which is consistent with existing research on sex differences in self-esteem (e.g., Kling, Hyde, Showers, & Buswell, 1999; Trzesniewski, Donnellan, & Robins, 2013). No other demographic effects were found.

6.2.2. Main analyses

Prior to the interaction analysis, the independent variables were first centered, specifically childhood developmental circumstances and mate value. Each variable representing the construct of childhood developmental circumstances was individually analyzed against mate value. To examine the two-way interaction, centered childhood developmental circumstances and centered mate value were entered in the first step of the regression analysis, and the two-way interaction terms between these independent variables were entered in the second step. The dependent variable was global self-esteem. There was a significant interaction between subjective childhood family harmony and mate value on global self-esteem, b=-.17, t(116)=-2.39, p=.019; all other measures of childhood developmental circumstances did not interact significantly with mate value.

Subjective childhood family harmony was indeed negatively correlated with mating domain weightage, r(118)=-.59, p<.001, such that lower subjective childhood family

harmony is associated with more importance accorded to mating. When participant sex was added as a covariate, the interaction effect was still significant, b=-.14, t(115)=-1.95, p=.005.

Simple slopes analysis for the significant interaction between subjective childhood family harmony and mate value showed that the mate value of participants with lower subjective childhood family harmony was predictive of global self-esteem, b=.54, t(116)=4.00, p=.00, while the mate value of participants with higher subjective childhood family harmony was not, b=.13, t(116)=1.29, p=.20 (Figure 7). This result is consistent with the prediction as illustrated in Figure 5. Hence, based on subjective childhood family harmony, the hypothesis was supported as mate value influenced global self-esteem for individuals with harsher childhood conditions, but not for individuals with less harsh childhood conditions.

6.3. Summary and Discussion

The results of Study 1 supported the proposed model (see Figure 4), thus providing preliminary evidence that childhood developmental circumstances in the form of subjective childhood family harmony can influence how adaptive domains are weighted. Because those who had more unharmonious childhood family experiences (fast strategists) valued and prioritized the mating domain more than those who had more harmonious childhood family experiences (slow strategists), the self-esteem of people with less harmonious childhood family experiences was more sensitive to mate value than the global self-esteem of people with more harmonious childhood family experiences.

Although promising, some limitations to Study 1 exist. First, Study 1 examined the effects of people's developmental environments on the mating domain only. It was assumed that fast strategists would weight the mating domain more heavily while slow strategists would prioritize other non-mating domains. However, as the effects of other forms of

domain-specific value or accomplishments on self-esteem were not examined, Study 1 cannot confirm that slow strategists do indeed prioritize other domains more than mating compared to fast strategists. A more comprehensive test should examine the interactive effects of developmental circumstances with the mating domain and a non-mating domain that represents somatic investment motives.

Second, contrary to what was found in Griskevicius et al. (2011), childhood family income was unrelated to life history strategy in Study 1. This is likely due to the use of a sample comprising Singaporean undergraduate students, which is at high risk of range restriction. Singaporeans, as a subgroup of the broader cultural group of East Asians, tend to exhibit traits associated with having slower strategies, such as low childhood mortality, long lifespans, high literacy rates, and low fertility (e.g., Jones, 2007; Retherford & Ogawa, 2006; Weil, 2004; Westley, Choe, & Retherford, 2010; Rushton, 1995), and this is further compounded by the likelihood that university students have wealthier and more stable family backgrounds. Indeed, as shown in Table 2, the sample's average monthly family income during childhood was rather high, and thus the lack of participants who grew up in low income families could be a reason why income was not found to be related to life history strategy. In addition, although Study 1's predictions were supported, the findings hinge on only a single item, subjective childhood family harmony. Therefore, while these findings are promising, a further study assessing a sample that contains greater demographic variation with more items assessing participants' life history and developmental environment will provide stronger support.

Finally, the model offered predictions of the effects of domain-specific value on various self-biased behaviors, which was not examined by Study 1. Alongside addressing the aforementioned limitations of Study 1, the further study can also assess the validity of the

predicted relationships between self-esteem, domain-specific value, and domain-specific self-biased behaviors.

7. Study 2

The second study was designed not only to replicate the findings obtained in Study 1 but also to expand the predictions to cover slow strategists' preferences more comprehensively. If slow strategists prefer delaying reproduction to focus on somatic investments, they are thus also likely to prioritize domains that allow them to build on their status and abilities more gradually, which may eventually enable them to find higher quality mates or raise higher quality offspring later.

One such somatic investment domain that has been argued to be prioritized by slow strategists is the academic domain (Kaplan & Gangestad, 2005). Academic achievement is especially ideal for the current investigation because it nicely exemplifies somatic effort—a critically important activity that is done for the sake of increasing one's value ultimately for the purpose of reproduction (specifically high quality reproduction). Academic achievement is an endeavor that requires long-term effort and conscientiousness such that current efforts lead to later payoffs in terms of increased knowledge, skills, and abilities. Such somatic increments, while valuable in and of themselves, are also fundamentally important because they promote access to more prestigious and better paying occupations. In turn, these can boost social status, resource acquisition ability, and future mate value, which can increase one's likelihood of acquiring desirable, high quality mates and raising high quality (but fewer) offspring. Indeed, studies have found that people raised in wealthier environments tend to pursue a slower trajectory to reproduction by delaying starting a family while valuing education and academic achievement (Doyle & Weale, 1994; Weil, 2004), which are antithetical to the faster reproductive trajectory of people raised in poorer environments

(Griskevicius et al., 2011). Further, the academic domain has been used in other studies that have examined self-esteem domains (e.g., Rosenberg et al., 1995; Shavelson et al., 1976; Marsh & O'Neill, 1984; Graham, 1994). Study 2 will therefore examine the effects of academic achievement in conjunction with mate value on self-esteem, whereby it is expected that mate value is more strongly associated with fast strategists' self-esteem, and academic achievement is more strongly associated with slow strategists' self-esteem.

In addition, Study 2 will examine the various domain-specific self-biased behaviors, as functional processes of adaptive self-esteem to manage domain-specific value. Specifically, Study 2 will examine whether domain-specific value is positively correlated with domain-specific self-enhancement (i.e., people with high value in a prioritized domain are likely to self-enhance in that domain), domain-specific value is negatively correlated with domain-specific self-protection (i.e., people with low value in a prioritized domain are likely to self-protect in that domain), and domain-specific value is positively correlated with perceived importance of the domain (i.e., people with low value in an unprioritized domain are likely to devalue that domain). It is not immediately certain whether people with high value in an unprioritized domain will self-enhance in that domain, although based on the view that people may co-opt success in another domain to increase their overall worth, a positive correlation may be expected.

In summary, Study 2 will examine the theoretical predictions as outlined in Figure 7. When a domain is prioritized according to life history strategy, self-esteem is expected to be positively correlated with value in that domain. Value in an unprioritized domain may be correlated with self-esteem, but this effect is expected to be smaller than the relationship between self-esteem and value in a prioritized domain (Figure 8). As domain prioritization increases people's motivation to manage value in those domains, high domain value elicits domain-specific self-enhancing behaviors to maintain or increase domain value, while low

domain value elicits domain-specific self-protective behaviors to prevent domain value from decreasing further and to repair low domain value (Figure 9). In contrast, as there is low motivation to manage value in unprioritized domains, low domain value is expected to elicit domain devaluation so that effort will not be unnecessarily expended on goals that are not deemed crucial to one's calibrated adaptive strategy. As a result, people are expected to downplay the importance of unprioritized domains in which they fare poorly, self-esteem levels are maintained, and efforts to repair value will not be exerted (Figure 10).

7.1. Method

7.1.1. Participants and procedure

Participants for Study 2 were recruited from the United States on Mechanical Turk (MTurk) for US$1 (cf., Buhrmester, Kwang, & Gosling, 2011). A total of 422 people responded to the call for participants. Responses were excluded if they were incomplete, did not have unique IP addresses, failed the attention checks embedded in the questionnaire, did not submit the completion code, or were provided by individuals who were exclusively homosexual. After exclusions, the final sample comprised 218 participants (44% male) between the ages of 18 to 35 (M = 24.8, SD = 3.03).

Upon successfully signing up to participate in the study on MTurk, participants then clicked on a link which directed them to the online questionnaire. Participants were briefed about the nature of the study, instructed to follow the guidelines carefully (e.g., to take note of the attention checks and the completion code), and asked for their consent to participate. After participants read the briefing and gave their consent to participate, they completed a series of measures where the items within each cluster were presented in random order and were debriefed and thanked upon completion.

Within the questionnaire, three measures were used to assess participants' life history, namely subjective childhood socioeconomic status, subjective childhood family harmony, and childhood family income. Similar measures used in Study 1 for mate value and global self-esteem were also employed in Study 2. As Study 2 aims to examine ability within the academic domain as a form of somatic domain performance, participants were asked to indicate their academic grade point average (GPA). Measures capturing the importance that participants placed on the mating and academic domains (i.e., valuation of domains) were included in the questionnaire so that domain (de)valuation could be examined. Finally, a set of items developed to tap participants' self-enhancement and self-protection behaviors in each domain (i.e., domain-specific self-biased behaviors) were also included. Factor analyses were conducted to determine the final set of self-enhancement and self-protection items to be used in the analysis of the predictions proposed for Study 2 (see Figures 5, 6, 7, and 8).

7.1.2. Questionnaire

Subjective childhood socioeconomic status. Following Griskevicius et al. (2011), participants rated their agreement with three statements concerning subjective childhood socioeconomic status (e.g., "I felt relatively wealthy compared to the other kids in my school") using 7-point scales from strongly disagree (1) to strongly agree (7). Responses were averaged into a subjective childhood socioeconomic status composite, $\alpha = .84$ (see Appendix 4).

Subjective childhood family harmony. As Study 1 relied only on one item, specifically participants' self-reported perceptions of family harmony during childhood, Study 2 sought to improve this measure by combining the item for childhood family harmony with items pertaining to participants' perceptions of their relationship quality with biological parents

(taken from Figueredo et al., 2006; see Study 1 of this dissertation). Responses were averaged into a subjective childhood family harmony composite, α = .72 (see Appendix 5).

Childhood family income. Childhood family income has been shown to be predictive of life history strategy in other studies (e.g., Griskevicius et al., 2011; White et al., 2013) and serves as an objective marker of childhood circumstances than self-reported perceptions. Participants indicated their childhood family income using an 8-point scale ranging from $15,000 or less (1) to $150,000 or more (8) (see Appendix 6).

Valuation of domains. To assess whether participants valued or devalued poorly performing domains, the scale used in Schmader et al.'s (2001) study on devaluation and psychological disengagement was adapted to capture the importance that participants placed on the tasks and goals in the mating domain (e.g., "Being in a relationship is a significant part of who I am") and academic domain (e.g., "Doing well on intellectual tasks is very important to me"), using 7-point scales from strongly disagree (1) to strongly agree (7). Responses were averaged into a mating importance composite, α = .70, and academic importance composite, α = .86 (see Appendix 7).

Domain-specific value. Participants were assessed for value in specific domains, or how well they fared in the mating and academic domains. Mate value was measured using the same mate value scale from Study 1. Responses were averaged into a mate value composite, α = .90 (see Appendix 2). Value in the academic domain, or academic performance, was assessed by asking participants to provide their current or most recent GPA, which is typically scored out of 4. In the event that a participant attended a school that used a different academic grading system (e.g., the Cumulative Average Point (CAP) which is scored out of 5), he or she was instructed to convert the score such that it would be scored out of 4 (e.g., a CAP score of 4.5 would be equivalent to a GPA score of 3.6).

Global self-esteem. Global self-esteem was measured with the same Rosenberg (1965) self-esteem scale used in Study 1. Responses were averaged into a global self-esteem composite, α = .93 (see Appendix 3).

Life satisfaction. Self-esteem and life satisfaction are related under the broader construct of subjective well-being, but there are also important conceptual differences between them (e.g., Diener & Diener, 1995; Kwan, Bond, & Singelis, 1997). In particular, feeling satisfied does not equate to feeling esteemed. Thus, participants' life satisfaction was also assessed to determine if there are differences in the relationships between self-esteem factors and life satisfaction factors, and Diener, Emmons, Larsen, and Griffin's (1985) 5-item satisfaction with life scale was used. Sample items include "In most ways, my life is close to my ideal" and "So far I have gotten the important things I want in life", and participants responded using 7-point scales from strongly disagree (1) to strongly agree (7). Responses were averaged into a life satisfaction composite, α = .90 (see Appendix 8).

Domain-specific self-biased behaviors. Items were developed to capture the self-biased behaviors expected of low and high self-worth, specifically self-enhancing and self-protecting behaviors in both the mating and academic domains. To develop these items, the literature on behaviors related to self-esteem was consulted, and insights from studies that measured self-enhancing and self-protecting behaviors were gleaned. Studies show that self-enhancement is related to beliefs that the self is better than average (Brown, 2012), confidence in one's worth and abilities (Judge & Bono, 2001), and narcissistic attitudes (Campbell et al., 2002). In terms of behavior and motivation, self-enhancement is associated with a preference to approach ambiguous situations because they present opportunities that can be exploited to promote a positive image of the self (Alicke & Sedikides, 2009). The self-enhancement items developed therefore comprised components associated with narcissism (e.g., believing that the self is better than others; Brown, 2012), approach motivation (e.g., the

desire to increase one's accomplishments; Elliot & Church, 1997), and promotion focus (e.g., having a greater regard for potential success rather than failure; Higgins et al., 2001). Conversely, self-protection is associated with beliefs that the self fares poorly in relation to others (Leary, 2005). Behaviorally, low self-regard is related to defensiveness to prevent the view of the self from getting worse and compensatory behaviors to repair damage to self-worth (e.g., Ferrari & Tice, 2000; Kernis, Grannemann, & Barclay, 1992), as well as avoidance of failure and prevention of poor performance (Alicke & Sedikides, 2009). The self-protection items developed thus comprised components associated with self-handicapping (e.g., making excuses for poor performance; Tice & Baumeister, 1990), avoidance motivation (e.g., a preoccupation with avoiding losses rather than achieving gains; Elliot & Church, 1997), and prevention focus (e.g., following expectations, norms, and rules carefully so that mistakes won't be made; Higgins et al., 2001). Twelve items each for the four domain-specific self-biased behaviors were developed, resulting in a total of 48 items, and a confirmatory factor analysis was conducted to determine the items that fit a four-factor structure. Responses to the finalized items in the revised measure after the confirmatory factor analysis were averaged into a mating self-enhancement composite, α = .73, academic self-enhancement composite, α = .64, mating self-protection composite, α = .66, and academic self-protection composite, α = .79 (see Appendix 9).

7.2. Analysis and Results

7.2.1. Confirmatory factor analysis for domain-specific self-biased behaviors

Mating self-enhancement, academic self-enhancement, mating self-protection, and academic self-protection were theorized to be conceptually distinct variables. Items in the

domain-specific self-biased behaviors measure were thus subjected to confirmatory factor analyses to determine if they conformed to a four-factor model structure.

The initial fit indices for the four-factor model implied a poor fit, $\chi^2(1169)=2.38$, $p<.01$, CFI=.61, RMSEA=.08. To improve on the model fit, modification indices were examined and covariances were added between the error terms within the same factor that produced the greatest parameter change. In addition, items with high standardized residual covariances and non-significant standardized regression coefficients were removed. A total of 29 items were removed (7 from the mating self-enhancement subscale, 6 items from the academic self-enhancement subscale, 8 items from the mating self-protection subscale, and 8 items from the academic self-protection subscale). After making the modifications, the final measure consisted of 19 items and the fit indices showed a good fit for a four-factor model, $\chi^2(144)=1.65$, $p<.01$, CFI=.92, RMSEA=.05.

The items retained in the finalized 19-item measure of domain-specific self-biased behaviors are indicated with ticks in Appendix 9. The finalized items were used for subsequent analyses in this study.

7.2.2. Descriptive statistics and zero order correlations

The descriptive statistics for all the measures used are presented in Table 4. As the range of scores for mate value and GPA is not equivalent and therefore not directly comparable, a *z*-standardized transformation was applied to both variables for subsequent analyses. Table 5 presents the inter-correlations among variables and reveals some interesting observations.

First, mate value is positively correlated with mating self-enhancement ($r=.39$, $p<.01$) and importance placed on the mating domain ($r=.17$, $p<.05$), while negatively correlated with mating self-protection ($r=-.19$, $p<.05$), which is consistent with the predictions that higher

domain value is related to self-enhancement while lower domain value is related to domain devaluation or self-protection. On the other hand, while GPA is similarly positively correlated with academic self-enhancement (r=.25, p<.01) and importance placed on the academic domain (r=.48, p<.01), GPA is also unexpectedly positively correlated with academic self-protection (r=.32, p<.01). This implies that people who generally care about academic achievement are likely to consider it important, engage in behaviors that will promote achievement while also being careful to prevent failure, and thus subsequently have high GPAs. Intriguingly, academic self-enhancement is positively related to mate value (r=.18, p<.01) while mating self-enhancement is negatively related to GPA (r=-.21, p<.01), suggesting that the motivations or behaviors in particular domains may have consequences for performance in other domains.

Correlations with global self-esteem are mostly consistent with the prediction that high self-esteem is associated with self-enhancement while low self-esteem is associated with self-protection. Global self-esteem was positively related to mating self-enhancement (r=.29, p<.01) and academic self-enhancement (r=.27, p<.01) while negatively related to mating self-protection (r=-.29, p<.01). However, global self-esteem was unrelated to academic self-protection (r=-.11, p=.09). Global self-esteem was also positively correlated with life satisfaction (r=.63, p<.01). Unsurprisingly, mate value (r=.63, p<.01) and GPA (r=.63, p<.01) both positively contributed to global self-esteem, as high value in those domains are likely to promote good feelings about oneself. Global self-esteem was also positively correlated with subjective childhood family harmony (r=.35, p<.01) but not the other two indices of socioeconomic status during childhood (ps>.37), suggesting that childhood wealth does not underlie how positively one views the self.

As expected, the valuation of domains is related to self-biased behaviors such that people who placed high importance in a domain also exerted more self-enhancing and self-

protecting efforts in that domain (*p*s<.05). People who valued the mating domain highly were also likely to exert less academic effort (*p*s<.01), thus demonstrating the allocation of effort away from the domain that is regarded as less important. It is notable that people who valued the academic domain highly did not necessarily refrain from mating efforts (*p*s>.62), which indicates that mating goals are not unimportant for people who value the academic domain, but are simply prioritized less highly than academic goals.

Finally, sex was related to self-esteem (r=-.22, p<.01) as per Study 1, but sex was not related to life satisfaction (r=-.03, p=.69), suggesting that, on average, even if the sexes share similar levels of contentment with life, females still feel less positive about the self than males do. Compared to males, females were more concerned with academic achievement (r=.21, p<.01) and thus also had better academic performance (r=.29, p<.01). Although the sexes did not differ in terms of their academic self-enhancement (r=.06, p=.42), females were more likely than males to engage in academic self-protective behaviors (r=.23, p<.01), which might indicate greater academic conscientiousness and account for their higher GPA scores. Males were more likely than females to self-enhance in mating (r=-.19, p<.01) whereas females were more likely to self-protect in mating (r=.17, p<.05). This appears somewhat consistent with findings from the literature on sex differences in mating psychology whereby men tend to be opportunistic whereas women tend to approach mating situations cautiously (e.g., Clark & Hatfield, 1989; Haselton & Buss, 2000).

Summarily, the basic inter-correlations of variables are consistent to some extent with the predictions derived in Study 2. Unexpected relationships revolved primarily around variables from the domain-specific self-biased behaviors measure, in particular the academic self-protection subscale. These will be addressed in further detail later.

7.2.3. Main analyses

The focal point of Study 2 is to determine if people's life history strategy, as theorized to be calibrated by childhood developmental circumstances, moderates the domain-specific effects of mate value and GPA on various indices of self-esteem and other self-esteem-related outcomes. Using a repeated measures within-subjects design, multiple three-way interaction analyses of the main independent variables (childhood developmental circumstances × domain × value) were conducted to examine the predictions as shown in Figures 6, 7, and 8. All independent variables were centered and continuous variables were dummy coded. The interaction effects of each variable representing childhood developmental circumstances (subjective childhood socioeconomic status, subjective childhood family harmony, and childhood family income) and domain-specific value on global self-esteem, life satisfaction, domain importance, and domain-specific self-biased behaviors were tested and the results are presented in Table 6.

None of the three-way interactions were found to be significant, *p*s>.26. Although the main analyses did not appear to support the predictions derived in Study 2, supplementary interaction analyses were conducted to further explore the relationships between the variables. In each set of supplementary analyses, one factor (either childhood developmental circumstances, mate value, or GPA) was removed so that relationships that are otherwise rendered too complex and thus obscured by additional factors may be identified. In particular for the analysis of the moderating effects of life history on the relationship between domain-specific value and self-esteem, dropping one domain factor is essentially an analysis of one domain factor while controlling for the other domain factor (e.g., dropping GPA from the interaction analyses means that the effects of mate value on self-esteem as moderated by childhood developmental circumstances can be examined independently of GPA). Further, other unexpected patterns of results that are relevant to the themes broached by the current dissertation may also be uncovered, which may open avenues for follow up studies.

7.2.4. Supplementary analysis 1: childhood developmental circumstances × mate value

For the first set of supplementary analyses, the academic domain value factor, GPA, was removed. The analyses conducted to see if childhood developmental circumstances moderate the effects of only mate value on the self-esteem indices of global self-esteem and life satisfaction are essentially similar to that of Study 1. In addition, further interaction analyses were conducted to determine whether childhood developmental circumstances moderate the effects of mate value on mating self-enhancement, mating self-protection, and valuation of the mating domain.

Table 7 presents all analyses of the interaction effects of childhood developmental circumstances and mate value. Amongst all the interaction analyses conducted, childhood family income moderated the effects of mate value on the valuation of the mating domain, b=.06, t(213)=1.82, p=.08, and mating self-protection, b=.08, t(213)=2.12, p=.04.

Simple slopes analysis for the two-way interaction effect of childhood family income and mate value on the importance of the mating domain showed that, with declining mate value, people who were raised in richer conditions were likely to devalue the mating domain, b=.26, t(213)=2.96, p<.01, while people in poorer conditions, regardless of mate value, did not devalue the mating domain, b=.05, t(213)=.60, p=.55 (Figure 11).

Simple slopes analysis for the two-way interaction effect of childhood family income and mate value on mating self-protection showed that, indeed, as slow strategists who were raised in richer conditions are apt to devalue the mating domain when their mate value is low, slow strategists generally did not expend self-protective efforts in mating, b=-.03, t(213)=-.34, p=.37. In contrast, fast strategists consistently prioritize the mating domain, and in the face of poor mating performance, fast strategists increase their mating self-protective efforts, b=-.35, t(213)=-3.44, p<.001 (Figure 12).

In sum, Study 1 was not replicated as childhood developmental circumstances failed to moderate the effects of mate value on self-esteem, but support was found for the prediction that, when faced with mating setbacks and low mate value, fast strategists continue to value the mating domain and persist with self-protective efforts, whereas slow strategists devalue the mating domain and likely allocate effort elsewhere other than repairing mate value.

7.2.5. Supplementary analysis 2: childhood developmental circumstances × GPA

For the second set of supplementary analyses, the mating domain value factor, mate value, was removed. Similar to Supplementary Analysis 1, analyses of the two-way interaction effects of childhood developmental circumstances and GPA on self-esteem and academic behavioral outcomes were conducted, and all analyses are presented in Table 8.

Amongst all the interaction analyses conducted, childhood family income moderated the effects of GPA on academic self-enhancement, b=.08, t(213)=1.75, p<.01, and academic self-protection, b=.17, t(213)=3.29, p<.01. In addition, subjective childhood family harmony moderated the effects of GPA on academic self-protection, b=.22, t(213)=3.11, p<.01, as well as the valuation of the academic domain, b=.20, t(213)=2.34, p=.02.

Simple slopes analysis for the two-way interaction effect of childhood family income and GPA on academic self-enhancement showed that, as predicted, the positive correlation between GPA and academic self-enhancement was stronger for slow strategists, b=.53, t(213)=3.64, p<.01, compared with fast strategists, b=.22, t(213)=2.06, p<.05 (Figure 13).

Simple slopes analysis for the two-way interaction effect of childhood family income and GPA on academic self-protection showed that the positive correlation between GPA and academic self-protection was stronger for slow strategists, b=.98, t(213)=5.82, p<.01, compared with fast strategists, b=.31, t(213)=2.49, p<.05 (Figure 14). Although it was originally predicted that GPA should have a negative correlation with academic self-

protection rather than a positive correlation, given that the pattern of results for academic self-protection was found to be similar to academic self-enhancement as shown in the zero order correlations described earlier, it may now be expected that self-enhancement and self-protection in the academic domain will exhibit similar findings.

Simple slopes analysis for the two-way interaction effect of subjective childhood family harmony and GPA on academic self-protection showed that GPA had a significant positive correlation with academic self-protection for slow strategists, b=.39, t(213)=2.76, p<.01, but was unrelated to academic self-protection for fast strategists, b=.13, t(213)=1.31, p=.19 (Figure 15). In this instance where subjective childhood family harmony was the independent variable, GPA had no effect on the behavior of participants who grew up in less harmonious families, thus suggesting that fast strategists may not be particularly affected by or concerned with their academic performance.

Simple slopes analysis for the two-way interaction effect of subjective childhood family harmony and GPA on the importance of the academic domain showed that the positive correlation between GPA and academic importance was stronger for participants who were raised in more harmonious familial environments, b=.98, t(213)=5.82, p<.01, compared with participants who were raised in less harmonious familial environments, b=.31, t(213)=2.49, p<.05 (Figure 16). This finding somewhat runs counter to what was expected as it suggests that slow strategists are more likely to devalue the academic domain with decreasing GPA than fast strategists, although the difference between their strength of domain devaluation is small.

Although the two-way interaction effect of childhood family income and GPA on academic self-enhancement seems to support the prediction that GPA as a form of domain value would correlate positively with self-enhancement, especially for slow strategists who prioritize the academic domain more than fast strategists, the rest of the results cast some

doubt on the validity of the measures associated with the academic domain. These findings appear to suggest that academic self-enhancement and academic self-protection reflect motivations to do well academically which contribute to better GPA scores, rather than the initial reverse prediction that GPA would drive academic self-enhancement or self-protection. These will be addressed in further detail later in the discussion.

7.2.6. Supplementary analysis 3: Domain-specific value × Domain-specific self-biased behaviors

As this dissertation attempted to explore and develop a novel set of measures for the purpose of assessing domain-specific self-biased behaviors, an examination of the measures' effectiveness in capturing the types of behaviors expected of domain-specific value can allow for a better interpretation of the various results found earlier. Additionally, any particular subscales of the measure that fail to produce expected results can be identified and improved upon in future work.

The third set of supplementary analyses therefore examined the interaction effect of domain-specific value on various domain-specific self-biased behaviors. Through this analysis, it can be determined if domain-specific value uniquely predicts the outcomes as proposed by Study 2 when independent of life history strategy (for instance, increasing mate value should predict increasing mating self-enhancement and decreasing mating self-protection while having no relationship with academic domain behaviors). The pattern of results for the simple slopes analysis should mirror those already found in the zero order correlations, but finding significance for the overall interaction effect will serve as a means to confirm that these domain-specific self-biased behaviors indeed exert effects on domain-specific value that are independent of each other. Further, the simple slopes analyses can

provide a quick and visually compelling sense of the relative strength of the relationships between variables.

To run the interaction analysis, the life history factor, childhood developmental circumstances, was removed, while the type of self-biased behaviors by domain was used as an independent variable. Behavioral tendency (i.e., participants' reported likelihood of enacting those behaviors) was used as the dependent variable. The expected pattern of results as initially determined from the theoretical review for Study 2 is illustrated in Figure 17, although the findings attained from the subsequent analyses so far indicate that the results are unlikely to conform to what was initially predicted.

A significant interaction effect was found, b=.29, p<.01, and Figure 18 illustrates the pattern of results after conducting the simple slopes analyses. With childhood developmental circumstances excluded, although there some mixed results, some promising effects are also apparent. Among the relationships that are consistent with the predictions of Study 2, mate value was positively correlated with mating self-enhancement, b=.34, p<.01, and negatively correlated with mating self-protection, b=-.21, p<.01, and GPA was positively correlated with academic self-enhancement, b=.22, p<.01. The domain-specific self-protective behaviors also had null effects with the domain they were expected to be unrelated to. GPA was unrelated to mating self-protection, b=-.02, p=.84, and mate value was unrelated to academic self-protection, b=.10, p=.19.

One interesting finding that goes against the initial predictions is the stronger positive relationship between academic self-protection and GPA, b=.45, p<.01, than that of academic self-enhancement and GPA, which signals that people who are more self-protective have a competitive edge over people who are more self-enhancing in their studies. Lastly, the unexpected results that mate value positively correlates with academic self-enhancement,

b=.16, *p*<.01, and GPA negatively correlates with mating self-enhancement, *b*=-.22, *p*<.01, which were also discussed in the section on zero order correlations, emerged as well.

7.2.7. Supplementary analysis 4: Interaction effects by sex

Finally, in light of the sex differences identified in the zero order correlations, interactions with sex were examined. Various three-way interactions were conducted to determine if sex moderated the interactive effects of childhood developmental circumstances and domain-specific value on global self-esteem, life satisfaction, valuation of domains, and domain-specific self-biased behaviors, as well as two-way interactions to examine whether sex moderated the effects of either childhood developmental circumstances or domain-specific value on the key dependent variables. Interaction analyses were also conducted to assess whether sex moderated the effects of GPA on mate value as well as mate value on GPA. None of the interactions were significant, *p*s>.14.

8. Summary and Discussion

Study 2 did not elicit any moderating effects of life history strategy on the relationship between domain-specific value and self-esteem, and also failed to replicate the results of Study 1 where childhood family harmony (or any other proxies for life history strategy) moderated the relationship between mate value and self-esteem. Thus, one major component of the theoretical underpinnings of this dissertation, specifically the effects of life history strategy on self-esteem where Rosenberg's (1965) global self-esteem scale was used, was unsupported. Although at first glance this result seems disheartening, a rich set of findings and other insights were also attained from the wide range of analyses conducted in Study 2, which may be instructive for future research.

Self-esteem aside, Study 2 developed a set of items to measure domain-specific self-biased behaviors, which are argued to serve the adaptive role of self-esteem as a sociometer. Confirmatory factor analyses confirmed the four-factor structure of the finalized 19-item measure. Additional analyses of the moderating effects of life history strategy and each domain alone (either the mating or academic domain, but not both at the same time) on these various behavioral outcomes yielded some interesting findings. First, consistent with Study 2's predictions, decreasing mate value was associated with decreasing valuation of mating for slow strategists but not for fast strategists, which demonstrates that slow strategists devalue mating to downplay the implications of low mate value but fast strategists prioritize the mating domain regardless of mate value. Further, because fast strategists maintain a high level of regard for the mating domain, they increase their mating self-protective efforts when faced with threats to mate value. Conversely, slow strategists' mate value has no bearing on whether they will expend self-protective effort in mating. No results were found for mating self-enhancement, and thus the life history variables did not moderate the effects of mate value on mating self-enhancement.

Second, childhood family harmony and income moderated the effects of GPA on academic self-enhancement, academic self-protection, and valuation of the academic domain. The interaction effect of childhood family income and GPA on academic self-enhancement conformed with the expectation that GPA should have stronger implications for academic self-enhancement for slow strategists rather than for fast strategists. However, the pattern of results with the other interactions are also unexpectedly similar (i.e., GPA was also positively correlated to academic self-protection, which is inconsistent with predictions), and thus, when taken together, the overall picture implies a story that is different from the high-value=self-enhancement versus low-value=self-protection narrative. One possible explanation is that although academic self-enhancement and academic self-protection were developed with the

intention of making them antithetical to each other, people who do well in school may still engage in both behaviors, despite their different underlying motives. For instance, John may engage in academic self-protection (regardless of his current academic standing), which is driven by wanting to avoid doing poorly in school, being conscientious, and making his work as error-free as possible. These will likely increase the odds that John will do well academically. As John achieves stellar academic grades, he may also exhibit academic self-enhancement behaviors, such as being motivated by compliments about his intellect and showing off his academic ability. Academic self-enhancement and self-protection may therefore be similarly associated with good academic performance. This alternative explanation is additionally bolstered by the finding that these same interaction patterns also occur for the importance placed on the academic domain, which shows that people who self-enhance and self-protect in the academic domain typically care a lot about academic achievement as well. Taken together, rather than GPA acting as a form of domain-specific value or feedback that triggers domain-specific self-biased behaviors, which the theoretical model posited by Study 2 is inclined to suggest, academic performance in this case could simply be primarily due to whether people are concerned enough with the academic domain (valuation of the academic domain was unexpectedly unrelated to any of the life history strategy markers). Curiously, these positive relationships between GPA and various academic behaviors are stronger for slow strategists compared to fast strategists, including the importance placed on the academic domain. This means that poor academic performance is especially related to devaluation of the academic domain for slow strategists, but not as much for fast strategists. Given the correlational nature of this study, it is not possible to confirm the directions of this effect. Perhaps, it might also be the case that when slow strategists decide to prioritize academic achievement, they are more likely to also accomplish what they prioritize.

8.1. Sociometer effects of self-esteem and domain-specific value

When life history strategy as a moderator was dropped from the analyses on self-esteem, all subsequent analyses are essentially examinations of self-esteem's adaptive role as a sociometer responding to domain-specific value. The two domain-specific forms of value used in Study 2—mate value and GPA—indeed correlated with self-esteem, as did most of the domain-specific self-biased behaviors, and some of the effects found were in line with predictions. In general, low value, be it in the form of self-esteem, mate value, or GPA, tended to induce self-protective behaviors, while high value tended to induce self-enhancing behaviors. This pattern of results was especially consistent with predictions for the mating domain, whereby mate value was positively correlated with mating self-enhancement and negatively correlated with mating self-protection. Almost similarly, self-esteem was positively correlated with both mating and academic self-enhancement and negatively correlated with mating self-protection, but did not correlate with academic self-protection. GPA was indeed positively correlated with academic self-enhancement but, unexpectedly, also with academic self-protection.

These unexpected findings pertaining to the academic self-protection subscale signal that the items used for academic self-protection may not capture the self-protection construct adequately. A closer look at the finalized items indeed unearths some items that may carry a degree of ambiguity or exhibit a ceiling effect. For instance, "I want to avoid doing poorly in school" is a statement that most people will likely agree with, and thus may fail to tap on individual differences in academic domain value or any other characteristics. This subscale should be improved for use in future research on similar topics.

The pattern of results for participants' valuation of domains in relation to self-biased behaviors was generally consistent with predictions. People who valued a domain highly

exerted more self-enhancing and self-protecting efforts in that domain, and thus people who valued the mating domain highly were also likely to exert less academic self-enhancement and self-protection. Notably, while people who valued the academic domain highly exerted more academic self-enhancement and self-protection, they did not necessarily refrain from mating efforts, which is consistent with the view that mating goals are only delayed, but never deprioritized (Griskevicius et al., 2011; Miller, 2000).

An interesting unexpected finding is that academic self-enhancement positively correlated with mate value whereas mating self-enhancement negatively correlated with GPA. One possible implication for this observation is that the motivations or behaviors in particular domains may have consequences for performance in other domains. For instance, if John has high mate value (e.g., John is generally competent in his abilities, funny, attractive, etc.), he might have the confidence to self-enhance in domains unrelated to mating, which may contribute further to his current mate value if done right. Some of the items in the academic self-enhancement subscale may also be related to high mate value, such as "I am motivated and encouraged when others compliment my academic ability." On the other hand, Jim, who is on the Dean's list, may have got there because he has more motivation to study than to "enjoy flirting when given the opportunity." This shows that the task demands of each domain may be distinct in some cases and also overlap in others depending on the motives and goals of the domain (Cosmides & Tooby, 1994; Kirkpatrick et al., 2002).

8.2. Effects of sex

Lastly, some basic sex differences were found. Consistent with previous research, females tend to have lower self-esteem than males (Kling et al., 1999; Trzesniewski et al., 2013), but no sex differences were found for satisfaction with life. Thus, despite similar levels of gratitude, fulfilment, or happiness with life, on average, females have lower self-

regard than males, indicating that self-esteem and life satisfaction, although related as indices of subjective well-being, are conceptually distinct (Diener & Diener, 1995). This is also in spite of the finding that females had better academic performance than males, and GPA scores were positively correlated with self-esteem (i.e., despite the boost that GPA can give to self-esteem, females who scored higher than males for GPA did not experience this self-esteem boost). The sexes did not differ in terms of their academic self-enhancement, but females were more likely than males to engage in academic self-protection, which might account for their superior academic performance. This is consistent with research demonstrating that females are, on average, more self-disciplined than males, which can contribute to higher grades earned in school (Duckworth & Seligman, 2006).

Males were more likely than females to engage in mating self-enhancement whereas females were more likely to engage in mating self-protection. Thus, men were more likely than women to agree to statements such as "I am motivated by the thought of 'scoring' a very attractive mate one day" or relishing the opportunity to get to know more members of the opposite sex, while women were more likely to agree to statements such as "I try my best to conceal or make up my flaws either with cosmetics or dressing well" and worry about how they look to potential mates. These are consistent with mating and sex differences research showing that men tend to be opportunistic and open to sexual advances whereas women tend to approach mating situations cautiously (e.g., Clark & Hatfield, 1989; Haselton & Buss, 2000). Some of the mating self-enhancement and mating self-protection items may be more pertinent to a particular sex, such as a stronger concern for one's own physical attractiveness for women (Buss & Schmitt, 1993). More sex-neutral items should be included into future developments of the domain-specific self-biased behaviors measure.

9. General Discussion

Self-esteem occupies a central space in psychological research. Despite this esteemed position, self-esteem research has increasingly raised more questions than it has answered, at one point even leading many astray with the notion that people have a need for self-esteem (Swann Jr. et al., 2007; Baumeister, Smart, & Boden, 1996; Baumeister et al., 2003; Scheff & Fearon, 2004). Recent self-esteem studies have taken significant strides towards resolving the equivocal findings abound in the literature, such as the insight that predictor-outcome measures should be matched (Swann Jr. et al., 2007), that domain-specific facets underlie self-esteem (Rosenberg et al., 1995), and self-esteem is contingent on factors that are important to the self-concept (Ferris et al., 2010). However, these only address the proximal aspects of self-esteem, while the lack of a solid, functional theory of self-esteem means that these various aspects of self-esteem scholarship, such as the relationship that self-esteem should have on various psychological and behavioral outcomes or the domains that should underlie self-esteem (as well as what domains should be valued) still remain haphazardly developed and disparate.

In the current dissertation, it was recognized that the various aforementioned problems with self-esteem research exist. A large extent of the contribution that this work made was therefore theoretical: the evolutionary-based sociometer and life history theories were integrated to parsimoniously address these issues and tie together various streams of disparate but related research areas, which addressed at least four main issues with self-esteem—the adaptive nature of self-esteem, domains that underlie self-esteem, the prioritization of domains, and when abandonment of effort or exertion (self-biased behaviors) will happen—by integrating sociometer theory with life history theory and developing a measure to assess various self-biased behaviors. In particular, life history theory was raised as a means to address what domains should affect self-esteem and how domains might be prioritized, as well as how other classifications of life domains (and goals) should map onto

the mating versus somatic effort dichotomy. In short, it was argued that life history should calibrate the sociometer to be sensitive to either fast (mating) or slow (somatic) goals, and the sociometer should dispense the desire to self-enhance when doing well and self-protect when doing poorly in a prioritized domain, while reallocating effort away from poorly performing, unprioritized domains by devaluing them.

While the aim of this dissertation was to make a primarily theoretical contribution, two empirical studies were also offered as a preliminary attempt at examining the proposed model. Although the empirical studies served more of an introductory rather than extensive or exhaustive investigation of the model, some useful insights were gleaned. The preliminary findings from Study 1 were promising as they supported the prediction that life history strategy as shaped by childhood developmental circumstances moderated the effects of mate value on global self-esteem. According to what was theorized in line with the life history paradigm, participants who were raised under less harmonious family conditions may perceive their environment to be less stable and develop a faster strategy, which is associated with prioritizing reproductive and mating goals. Thus, compared to slow strategists who had more harmonious family conditions as they grew up, fast strategists were especially sensitive to their mate value (assessed in terms of how they felt the opposite sex or potential mates evaluated them), as value in the mating domain had stronger implications on the goals prioritized by fast strategists. This in turn had a greater effect on fast strategists' self-esteem than slow strategists' self-esteem.

Following from Study 1's findings as well as limitations, Study 2 was designed to test the robustness of the integrated model of life history and sociometer theory and extend the findings further. Specifically, Study 2 added the academic domain, which has been used and examined before in other studies related to self-esteem (e.g., Shavelson et al., 1976) and life history (Kaplan & Gangestad, 2005; Doyle & Weale, 1994), to represent a domain that slow

strategists would value, and then compared the interactive effects of the three key independent variables—childhood developmental circumstances, mate value, and GPA—on self-esteem. Further, a domain-specific self-biased measure was developed for Study 2 so that different behavioral strategies in response to having either high or low domain value could be measured. A confirmatory factor analysis was conducted to determine the final set of items representing the subscales for mating self-enhancement, academic self-enhancement, mating self-protection, and academic self-protection. The effects of those independent variables were also tested on the domain-specific self-biased behaviors and valuation of domains to assess either persistence or termination of effort in those domains.

Study 2 did not manage to replicate the effects of life history strategy and domain-specific value on self-esteem that were found in Study 1, and also did not find any moderating effects of the variables presumably representing life history strategy on the relationships between mate value and GPA on self-esteem. In other words, life history effects on self-esteem were not found. However, some results that are consistent with predictions were found, in particular for the mating domain. When slow strategists have low mate value, they were likely to devalue the domain and avoid expending self-protective mating effort. In contrast, when fast strategists have low mate value, they were more likely to exert more mating self-protective efforts, and how much they valued the mating domain was unrelated to their mate value. The predicted effects of value (i.e., high or low worth) on behavior were mostly supported, where high value was associated with self-enhancement and low value was associated with self-protection. However, academic self-protection was not associated with self-esteem, and was also instead associated with having higher academic performance, which is contrary to what was expected.

Further supplementary analyses showed that variables within the academic domain were strongly associated such that GPA, academic self-enhancement, academic self-

protection, and importance of the academic domain were all positively correlated. This indicates that being concerned with academic goals, conscientiousness, and academic performance are closely linked for the participants in Study 2 and the measure used could not distinguish between self-enhancement and self-protection in the academic domain. Life history variables (subjective childhood family harmony and childhood family income) had a moderating effect on the academic domain such that the relationship between exerting academic effort and GPA was greater for slow strategists than for fast strategists. Interestingly, people who engaged less in mating self-enhancement did better at school, while people who have higher mate value were more likely to self-enhance in the academic domain. This indicates that each domain may have both distinct as well as overlapping motives, which may be difficult to tease apart especially for survey studies. Finally, some basic sex differences were found, but further analyses of participant sex did not significantly affect the interactions between variables of interest in this study and were not further explored.

Another potentially significant contribution from the current work is the development of the domain-specific self-biased measure, which comprised of self-enhancement and self-protection in the mating and academic domains. Prior to this endeavor, the extant literature scarcely offered any scales that could be used to assess self-enhancement or self-protection. Hepper et al. (2010) developed a measure of self-enhancement which is presented to participants as a survey that purportedly asks them about their "patterns of everyday thought and behavior" and how often such thoughts cross their mind. Sample items include, "Thinking that traits are positive if you have them", "Associating yourself with people who are successful – but not more successful than you", and "When you do poorly at something or get bad grades, thinking it was due to the situation, not your ability". While this measure is aimed at indirectly capturing participants' tendency to engage in self-enhancement and self-protection as they innocuously think about their own cognitive processes, the scale items still

appear to carry a high risk of social desirability bias. Although attempting to develop a measure for use immediately to test a model as complex as that in Study 2 is perhaps ambitious, the relevant literature was carefully consulted so that the items developed were as theoretically sound as possible.

In summary, the current work primarily contributed a novel theoretical model of self-esteem based on evolutionary principles and also provided some preliminary empirical findings. Results from Study 1 supported the prediction that fast strategists' self-esteem hinges on mate value, and results from Study 2 supported the prediction that fast strategists consistently care about the mating domain and would increase effort to repair low mate value, unlike slow strategists who would care less. Study 2 also provided support for sociometer theory by showing that self-reported romantically desirable individuals engaged in behaviors that could maintain, reaffirm, or increase their desirability, while self-reported romantically undesirable individuals engaged in behaviors that sought to avoid being rejected and were careful in their approach to potential mates. Taken together, the findings provide some support for a model of self-esteem that is driven by life history and sociometer effects.

9.1. Issues, limitations, and further research

The findings should be interpreted with caution as various issues exist with the study design and measures used. First, it is not immediately clear why life history and domain-specific value effects on self-esteem were found in Study 1 but not Study 2. The result in Study 1 might have been found due to Type 1 error, although a sample size of 120 is considerably large. Care was taken to consult the relevant literatures on self-esteem and life history and the measures employed in this study were taken directly from those used in published papers. Indeed, the 10-item Rosenberg (1965) global self-esteem measure is the most widely used measure of self-esteem (Robins et al., 2001) and various experiments that

examined life history strategy have used scales that tap on people's childhood socioeconomic status as a proxy for their life history strategy (e.g., Griskevicius et al., 2011; White et al., 2013). The results found with these measures paint a complicated picture. A promising result was conjured from Study 1, although the measure that produced this result was a novel single item that was created and added to increase the number of measures that could tap on the latent life history construct. Income in Study 1 might not have worked because the sample was acquired from a Singaporean university, whereby undergraduate students tend to come from families with middle to upper levels of socioeconomic status. Thus, range restriction from the lack of low income families might have rendered income invalid as a measure for Study 1. In Study 2, measures of childhood income were the most promising among all other measures of childhood developmental circumstances, although the overall findings are still not robust. Nonetheless, the theoretical premises of the life history and sociometer model of self-esteem are sound and, given the immense potential of this model for resolving the multiple issues present in current self-esteem research, further research on life history, domain prioritization, and domain-specific self-esteem is still warranted.

Both Study 1 and 2 utilized surveys and were correlational in nature. A problem with establishing causality is therefore inherent in the current investigation. For instance, although it is assumed based on sociometer theory that domain value serves as feedback which induces behaviors that promote even higher value or preserve it, it was not possible to determine whether domain value caused the self-reported behaviors or whether it was the other way around. Although the results for the mating domain panned out nicely, the academic domain was more complicated. Academic self-enhancement, academic self-protection, valuation of the academic domain, and GPA were all positively correlated, signalling the possibility that people who believed in the importance of academic achievement and engaged in academically conscientious or achievement-driven behaviors will end up having higher GPA

scores. The current study therefore cannot tell whether academic self-protective behaviors cause better academic performance or vice versa, and further studies of a correlational nature will not be able to resolve this either. Instead, studies that give fast and slow strategists actual feedback on academic performance are needed to see how their responses differ. Indeed, previous self-esteem studies have experimentally utilized information that threatens how participants view themselves, such as manipulating rejection (Bourgeois & Leary, 2001; Leary et al. 2003) or priming participants with low self-worth through imagining various rejection contexts (Leary et al., 1998). Thus, further research should use experimental methods to manipulate evaluative feedback and test the premises of causality in the current dissertation. One interesting manipulation that could be employed, in particular to affect mate value or tweaked to be relevant to other important domains, is to provide seemingly authentic but bogus feedback. In their study of the mating sociometer, Kavanagh et al. (2010) gave participants the pretext that a professor had been employed by a commercial dating service as a consultant to assess how people use information to decide whom they want to date. Participants were then told that they had to evaluate three other participants (confederates) and be evaluated, with the opinions collected on evaluation sheets. Participants received bogus feedback that was aimed at either raising or hurting their mate value. Likewise, further research can simulate the collection of biometric data that would purportedly give "objective" information about attractiveness when compared to a database of other people's data, and then provide evaluative feedback that would affect how they feel about themselves. Some Institutional Review Boards may have concerns about participants' well-being after receiving such negative feedback, so other types of less directly evaluative feedback are possible as well, such as the manipulation of intrasexual competition in the environment (e.g., priming the presence of many attractive opposite sex individuals). In addition to dealing with the issue of causality, using naturalistic experiments also reduces various biases associated with self-

reports, such as social desirability bias, and also increases the authenticity of the responses. In this context, state self-esteem scales could also be used to capture more fine-grained fluctuations and changes in self-esteem (e.g., Molloy, Ram, & Gest, 2011).

Although the domain-specific self-biased behaviors measure was subjected to a confirmatory factor analysis and showed some usefulness as an outcome variable in Study 2, it is still rudimentary in its current form. In particular, the academic subscales did not seem to effectively distinguish between more promotional versus more defensive approaches to academic achievement. More items should be developed that can capture the subcomponents of self-enhancement and self-protection better as guided by the approach-avoidance motivation and regulatory focus literature. However, as warned by Hepper et al. (2010), it is often difficult to tease apart self-enhancement and self-protection as "a given behavior (e.g., self-handicapping) can reflect either self-enhancement (e.g., maximizing credit for success) or self-protection (e.g., minimizing blame for failure)" (p. 782). Interestingly, differentiation of the two self-biased behaviors was successfully achieved for the mating subscales in Study 2, so this problem of indistinguishability could be an artifact of the domain's characteristics where the distinction between defensive versus promotional approaches are higher or lower. On closer scrutiny, tasks that can always benefit from careful approaches and due diligence are likely to inherit this distinguishability problem, such as preparing for examinations or a job interview. In contrast, activities where being too careful can incur costs are likely to elicit a strong distinctiveness between enhancement versus protection strategies, such as making friends or traveling. Another related interesting finding in Study 2 is that high mate value individuals tended to self-enhance academically, while high GPA individuals exhibited less mating self-enhancement. This also suggests that certain domains have goals that can be achieved by doing well in other domains, such as mating and possibly other social domains, while some domains have goals that are distinct from other domains and require a strict

allocation of focus and energy to accomplish attendant tasks. Taken together, these suggest interesting avenues for future research in terms of identifying the unique characteristics of domains that create such effects. Nonetheless, the development of the domain-specific self-biased behaviors measure in Study 2 serves as a good start to dealing with the lack of useful self-enhancement and self-protection scales in the literature, and future work to improve the measure can potentially pay rich dividends.

Relatedly, further research should also examine other evolutionary domains that can represent fast or slow strategic interests. Mate value and academic achievement are but two ways through which success in the two major strategies proposed by life history theory are gauged. Studies on people's life history strategies suggest that one major distinction between fast and slow strategists is their preference for short-term versus long-term payoffs across various activities (e.g., White et al., 2013). Therefore, aside from reproductive goals, fast strategists may also prefer activities that carry some degree of impulsivity, such as dangerous sports, gambling, or anything that whets the risk appetite. Conversely, slow strategists may prefer activities that allow them to invest effort into something over time—raising a child, growing a tree, working on a large and intricate painting, investing in a long-term stock—and watch it bear fruit later, slowly but surely. Both sets of activities certainly represent gains if accomplished successfully, albeit what it takes to achieve success relies on very different appreciations of timeframe. Thus, besides simply increasing or improving the subscales for the current mating and academic self-biased behaviors, items can be developed for more domains so that a wider range of activities, preferences, and outcomes can be tested. Given the current study's inability find results for the slow, somatic domain, further research should be conducted to test other possible somatic, long-term oriented goals, such as career motives and parenting.

Finally, it must be noted that life history theory, though very grand and well-established within the evolutionary biology literature (and gaining traction in the psychological literature), is but one way to describe all the life domains and is arguably also subject to some of the criticisms raised in the current work that were levelled against other domain-focused self-esteem research efforts. Specifically, other frameworks of domain-specific self-esteem were criticized in this dissertation for basing their development on haphazard, non-evolutionary, and non-fundamental principles, but the selection and development of domains is often dependent on the theoretical emphasis preferred and thus life history theory cannot, at this point, claim to be above this criticism yet as it was also similarly adopted for the purpose of emphasizing a particular theoretical view. In fact, through the use of life history theory, all major life domains were condensed under two major reproductive strategies, which some readers may criticize as rather narrow. In its defense, its adoption was in response to the lack of focus among current approaches on the fundamental nature of domains, which has frustratingly led to a multitude of self-important domain frameworks and very little theoretical advancement due to the lack of consensus for basic standards from which these domain frameworks could be usefully assessed. Biological and evolutionary factors are as reasonable starting points to address these issues as all living organisms are inescapably subject to the influence of these fundamental factors, thus the evolutionarily based framework of life history theory served as a meaningful way to address current domain-specific approaches to self-esteem. As the application of life history theory to the study of self-esteem is fairly novel, more research must be conducted to establish its validity (or perhaps superiority) in predicting outcomes associated with self-esteem. At the same time, research on self-esteem should not be closed off to other possible theoretical approaches that may fruitfully contribute to our understanding of domain-specific facets of self-esteem.

9.2. Conclusions

The current dissertation identified a few issues with the self-esteem literature and proposed a novel and theoretically compelling evolutionary approach to resolve those issues. The integrated life history and sociometer model of self-esteem developed and tested in the current work has the potential to simultaneously resolve a wide range of problems with self-esteem that still occur until this day. Although the theoretical model only found partial support with two non-exhaustive empirical studies, the current dissertation lays the groundwork for future research which can prove fruitful.

The important theoretical contribution of this extension of self-esteem is that an incorrect understanding of self-esteem can cause people to adopt detrimental approaches to feeling good about the self. For instance, baseless self talk or receiving unwarranted compliments can promote narcissism or inauthentic and fragile self-esteem (Baumeister et al., 2003; Baumeister et al., 2005; Scheff & Fearon, 2004), and also produce toxic behaviors such as entitlement and aggression (Baumeister & Boden, 1998). Self-esteem needs to be built upon actual accomplishments in life, and as the current dissertation strives to elucidate, self-esteem should be regarded not as a goal in itself, but instead as an adaptive psychological mechanism designed to sensitize us to the things that are important in life and push us towards achieving tasks that should be adaptively beneficial to us, such as finding mates or achieving higher social status. In addition, not all goals are equally desired by everybody. Achievements in a domain can contribute to self-esteem very differently for two people with distinct life strategies. A fast strategist who suddenly finds herself pregnant might be excited at the prospect of motherhood while a slow strategist in the same situation might feel despair that she will not be able to focus on her long-term career plans. The current dissertation therefore highlights the importance of understanding what underlies the self-concept and how

the self-concept is shaped, and at the time of this writing, there hasn't been a more compelling potential theory available other than life history theory. Taken together, both sociometer and life history theories enable us to understand self-esteem from a functional perspective, and if we know the ultimate reasons for our thoughts and actions, it is certainly easier to know what to do about how we feel and the goals we want.

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11. Figures

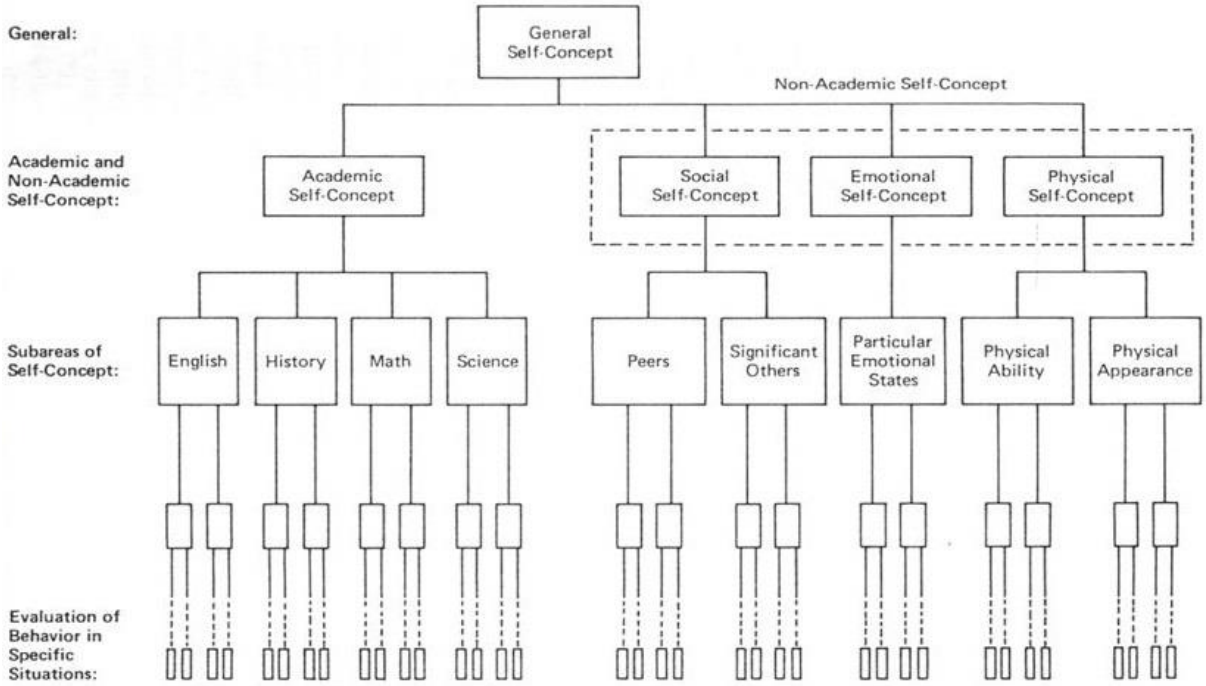

Figure 1: Hierarchical model of the self (Shavelson et al., 1976).

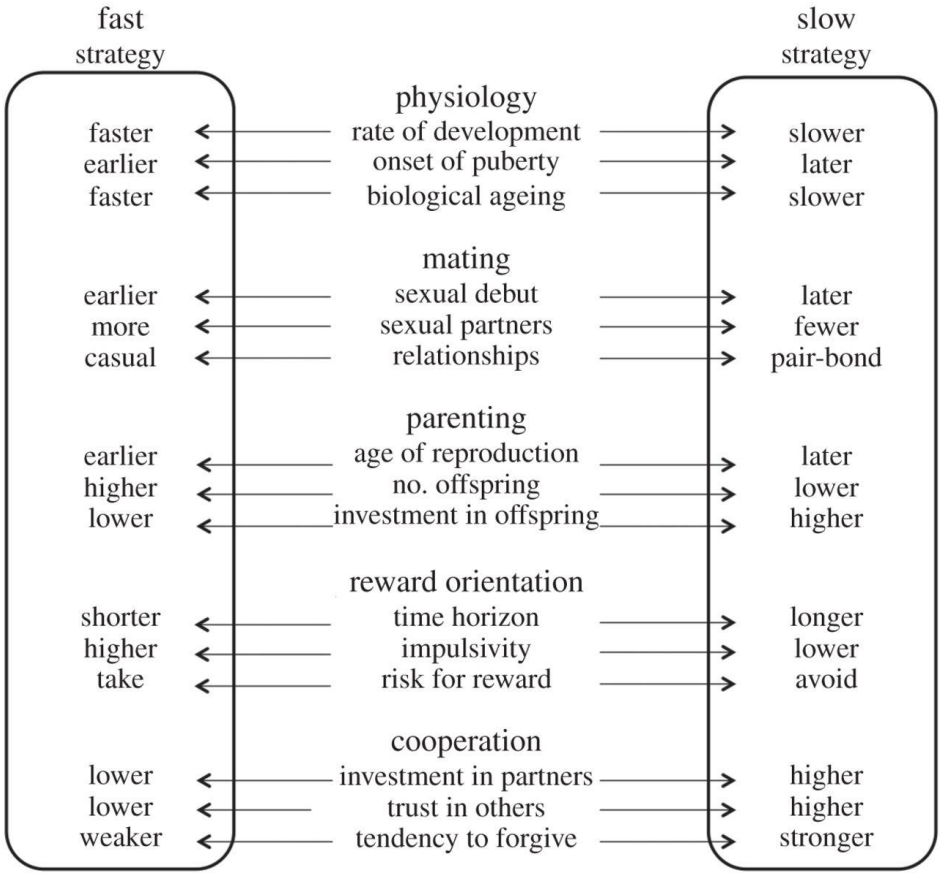

Figure 2: Illustration of behaviors associated with fast and slow life-history strategies (Baumard & Chevallier, 2015).

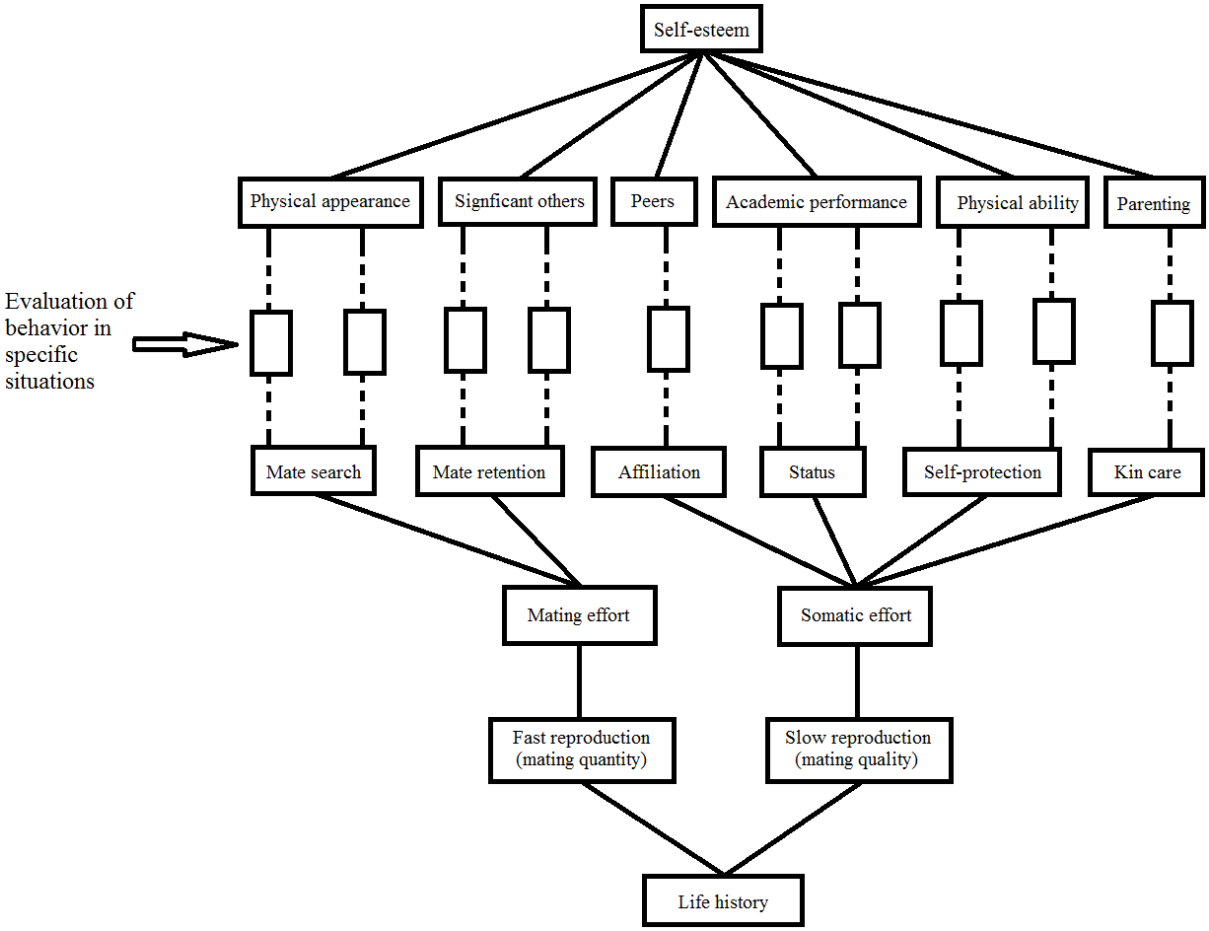

Figure 3: Non-exhaustive illustration of the mapping of Kenrick et al.'s (2002) evolutionary domains as prioritized by life history onto Shavelson et al.'s (1976) domains underlying the self.

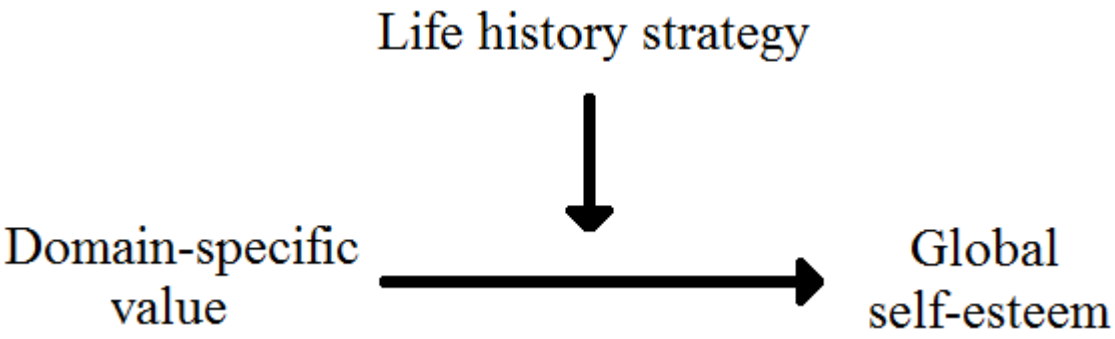

Figure 4: Integrated model of life history theory and sociometer theory on global self-esteem.

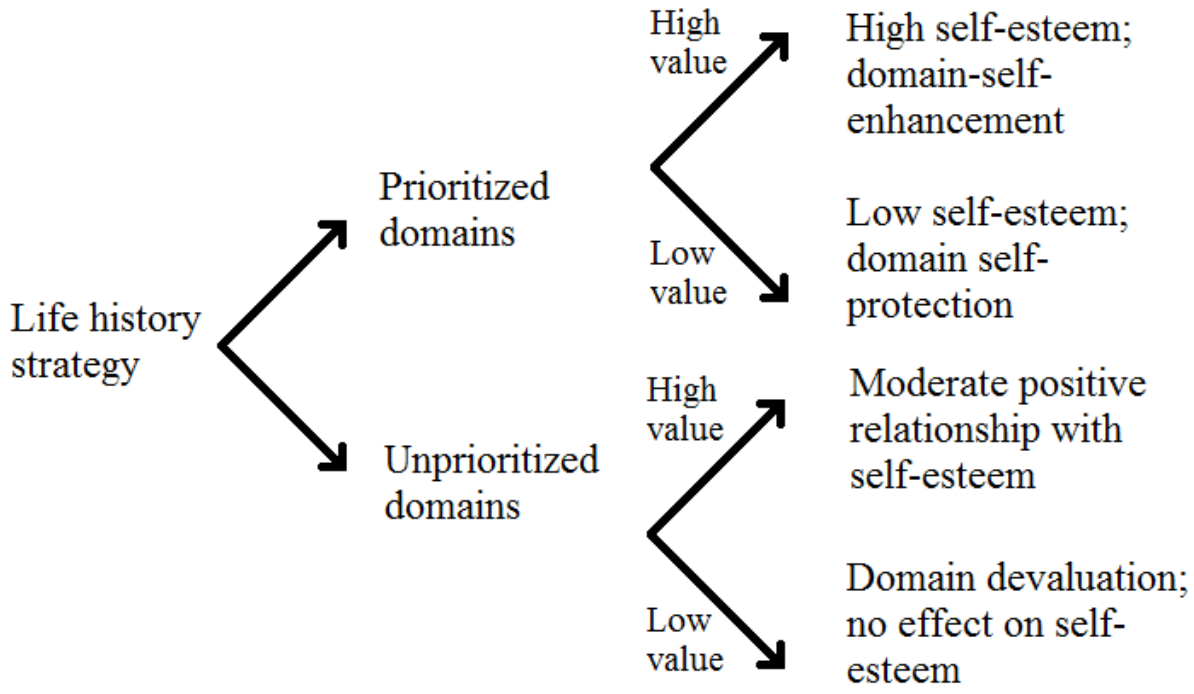

Figure 5: Model of self-esteem and self-biased behaviors predicted by the interaction between life history strategy and domain-specific value.

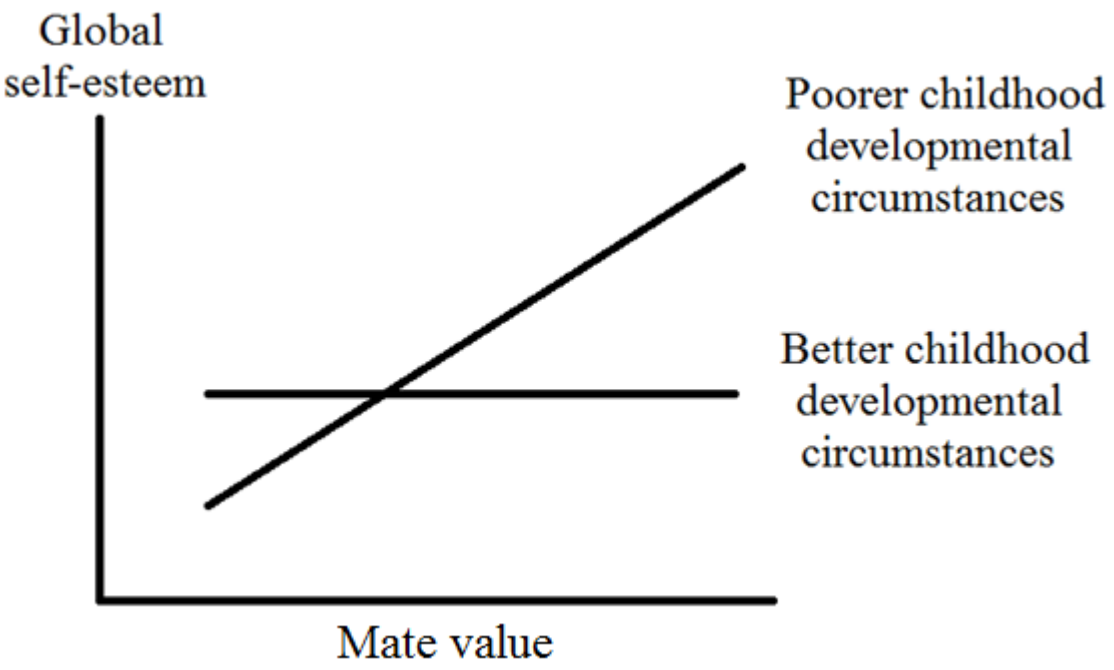

Figure 6: Expected two-way interaction outcome of Study 1.

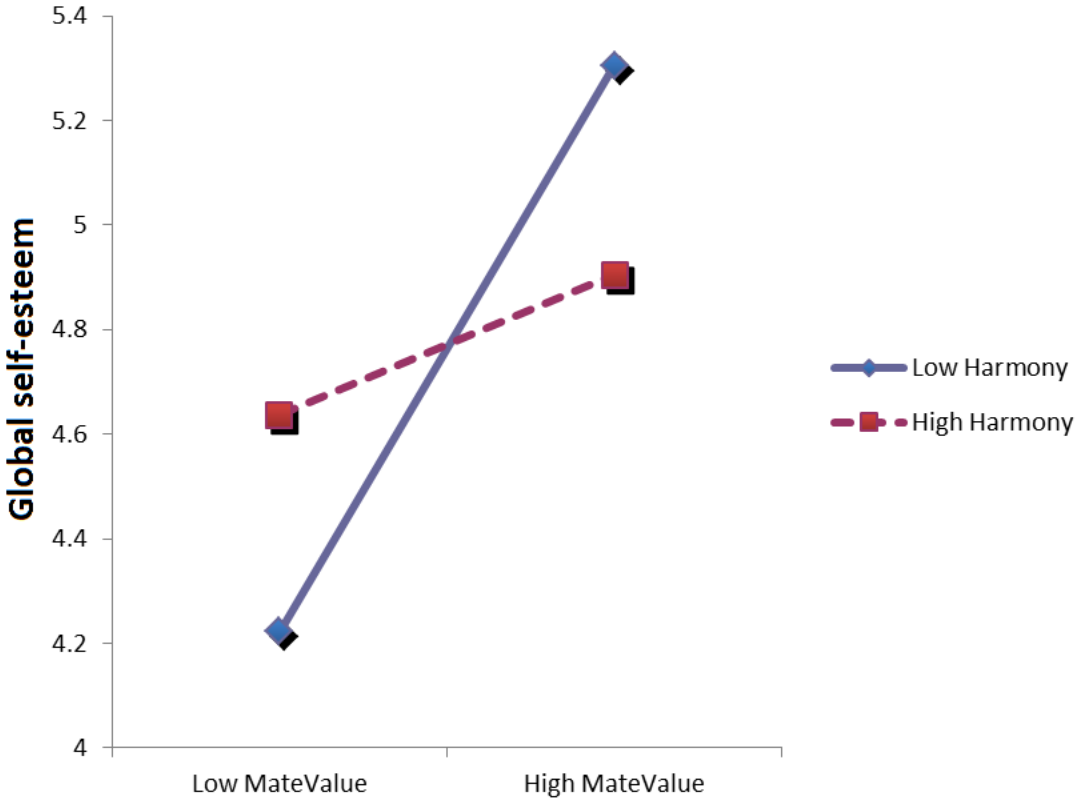

Figure 7: Two-way interaction between childhood family harmony and mate value on global self-esteem (only solid lines are significant).

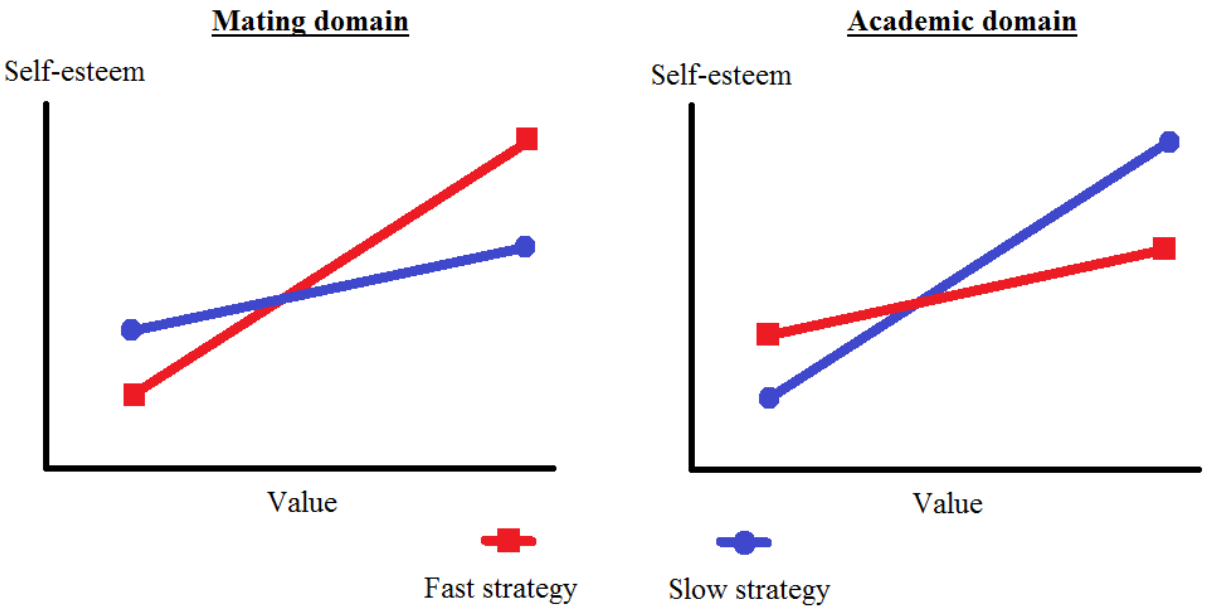

Figure 8: Predicted pattern of results for the three-way interaction effect of life history strategy and domain-specific value on self-esteem.

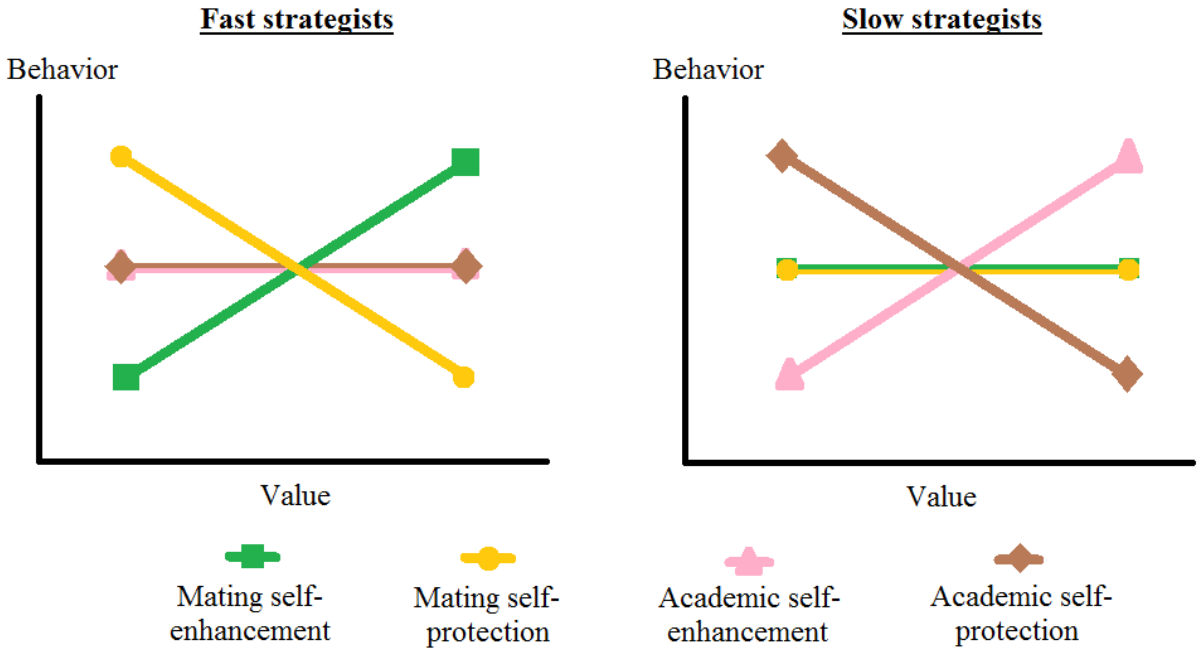

Figure 9: Predicted pattern of results for the three-way interaction effect of life history strategy and domain-specific value on domain-specific self-biased behaviors.

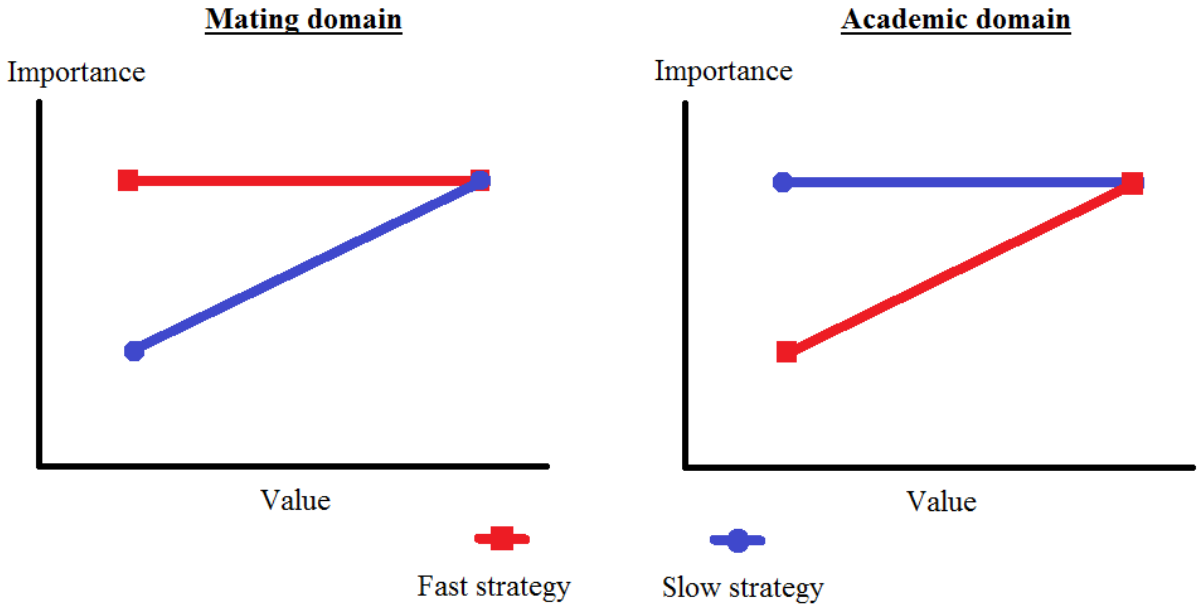

Figure 10: Predicted pattern of results for the three-way interaction effect of life history strategy and domain-specific value on the importance placed on domains.

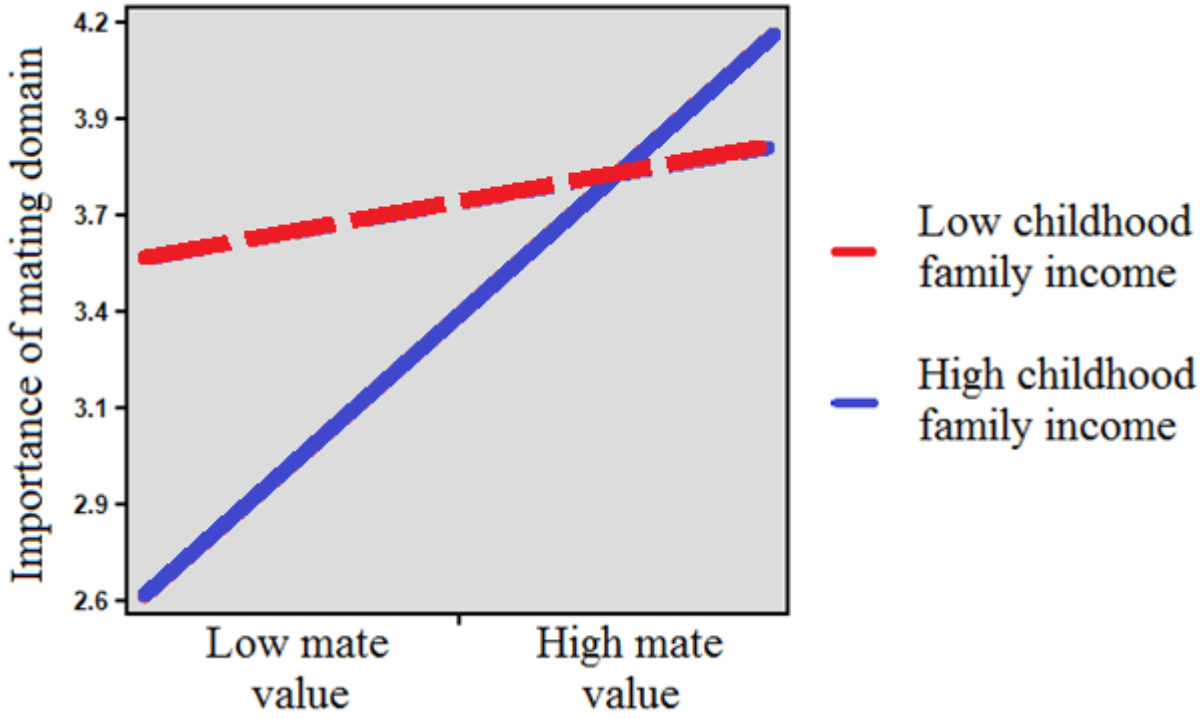

Figure 11: Two-way interaction between childhood family income and mate value on importance of the mating domain (only solid lines are significant).

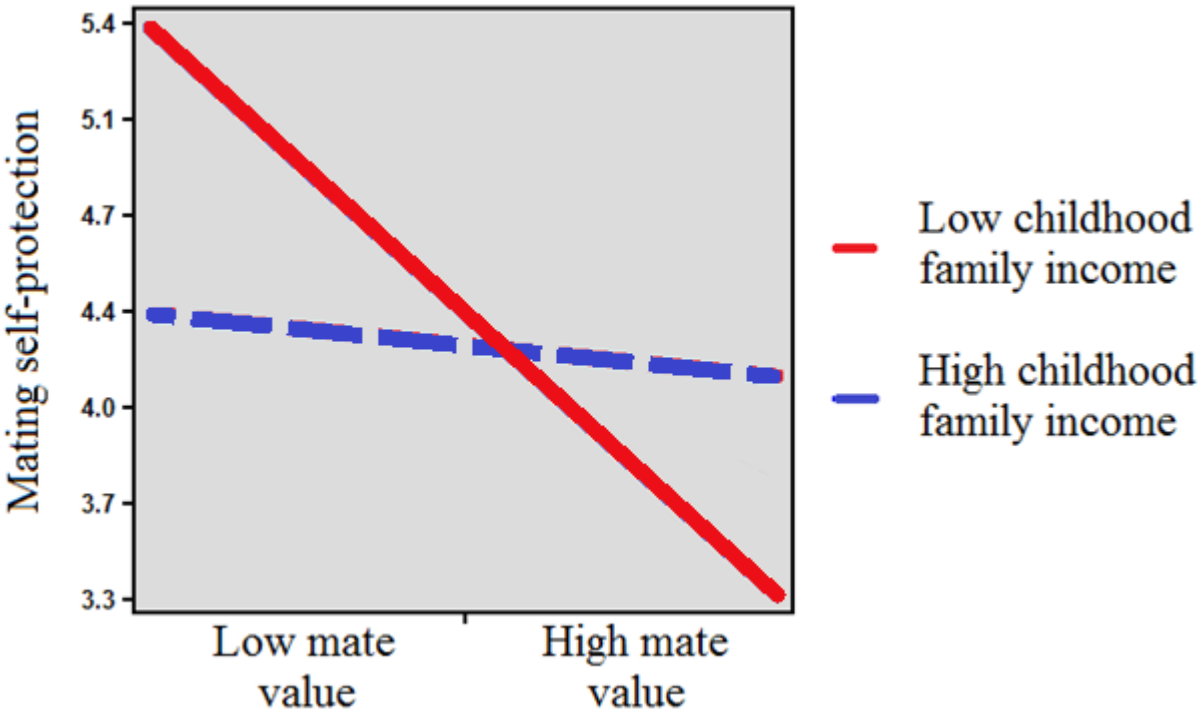

Figure 12: Two-way interaction between childhood family income and mate value on mating self-protection (only solid lines are significant).

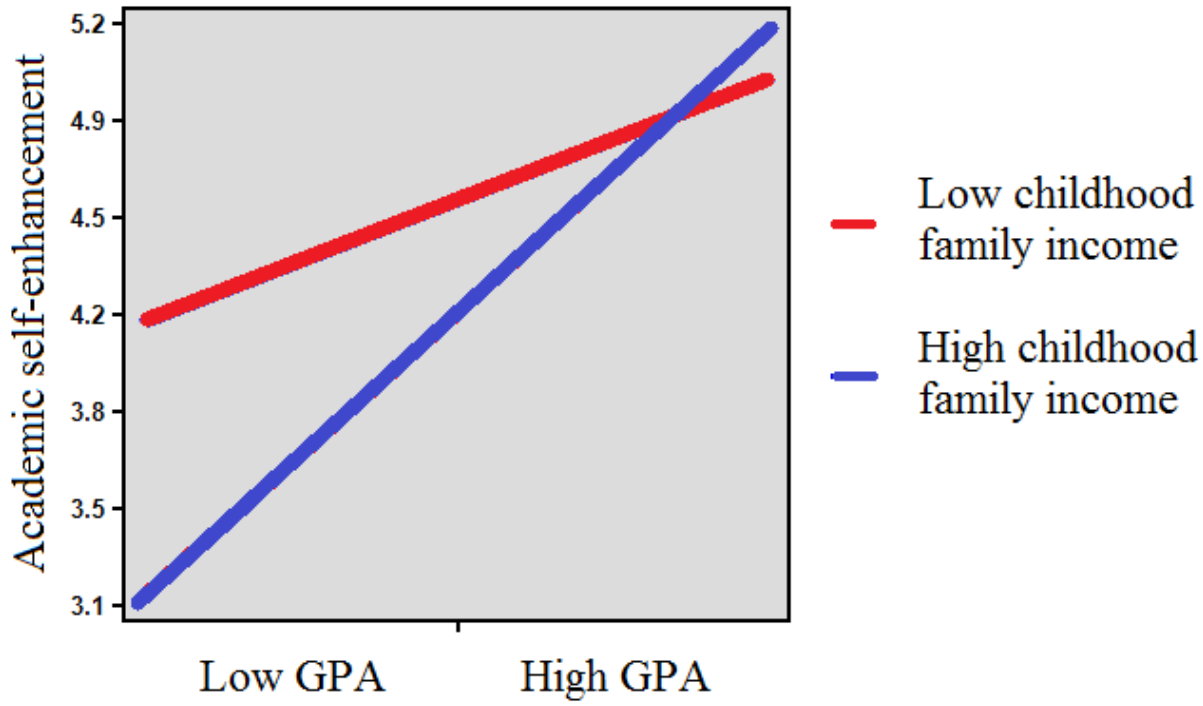

Figure 13: Two-way interaction between childhood family income and GPA on academic self-enhancement (only solid lines are significant).

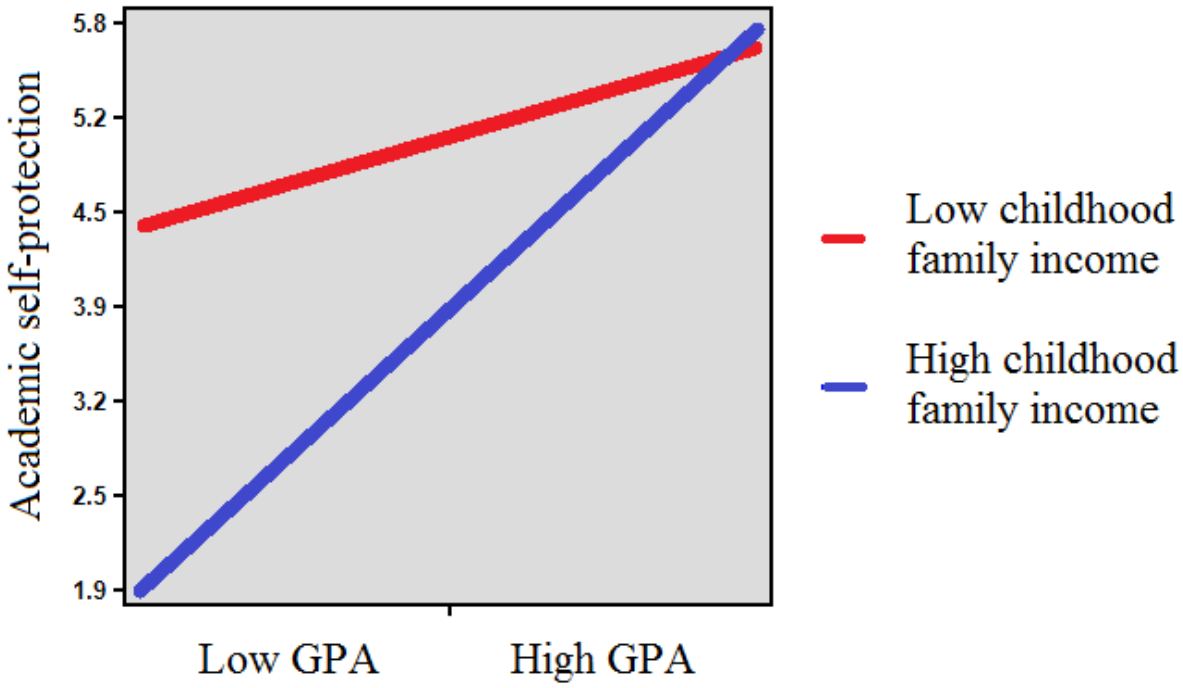

Figure 14: Two-way interaction between childhood family income and GPA on academic self-protection (only solid lines are significant).

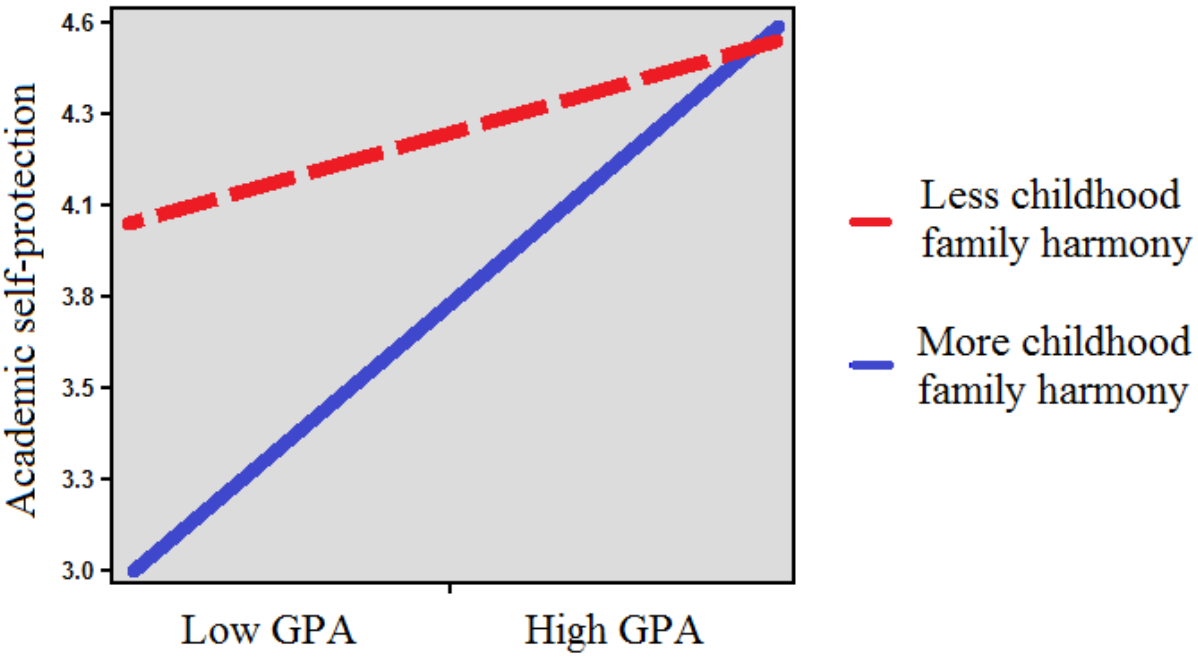

Figure 15: Two-way interaction between subjective childhood family harmony and GPA on academic self-protection (only solid lines are significant).

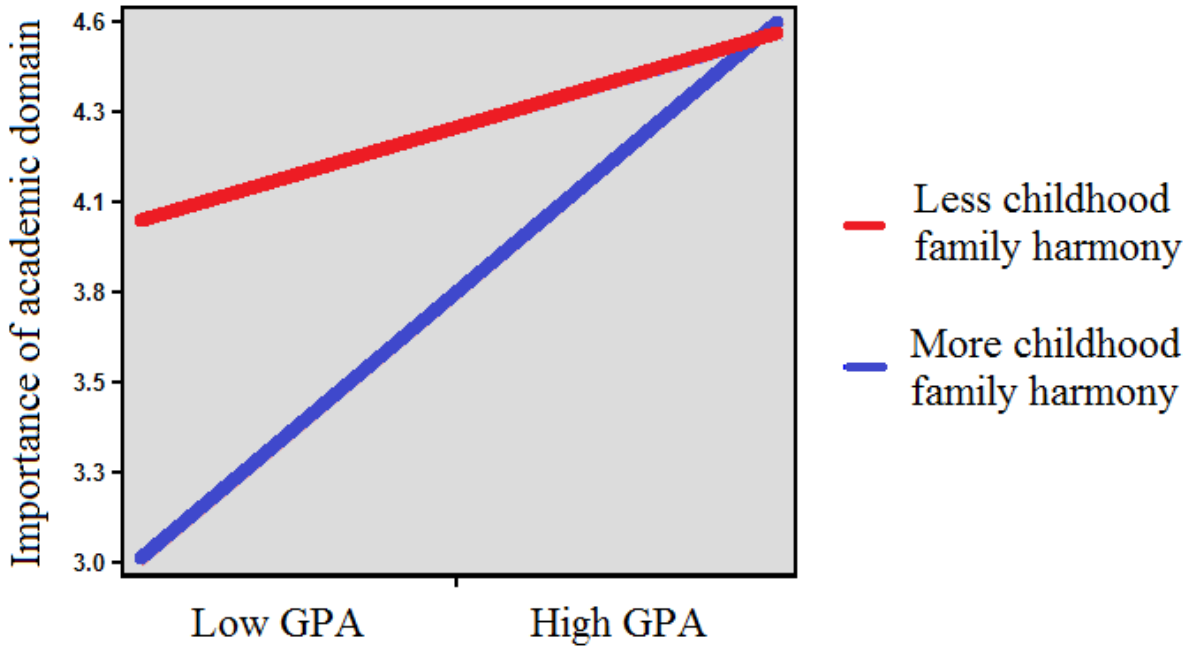

Figure 16: Two-way interaction between subjective childhood family harmony and GPA on importance of academic domain (only solid lines are significant).

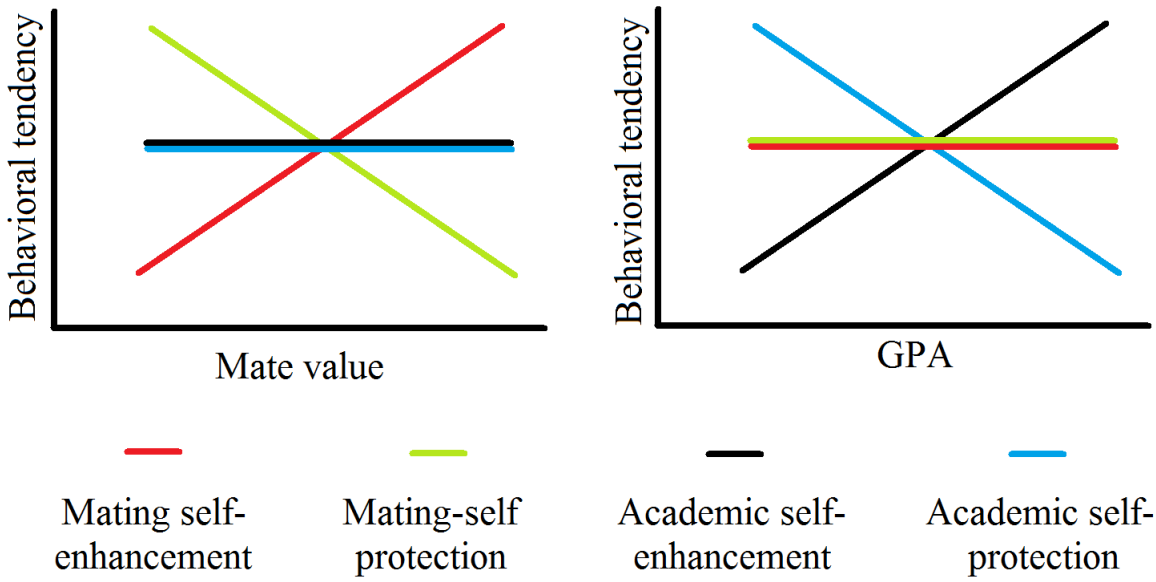

Figure 17: Predicted pattern of results for the interaction between domain-specific value and domain-specific self-biased behaviors.

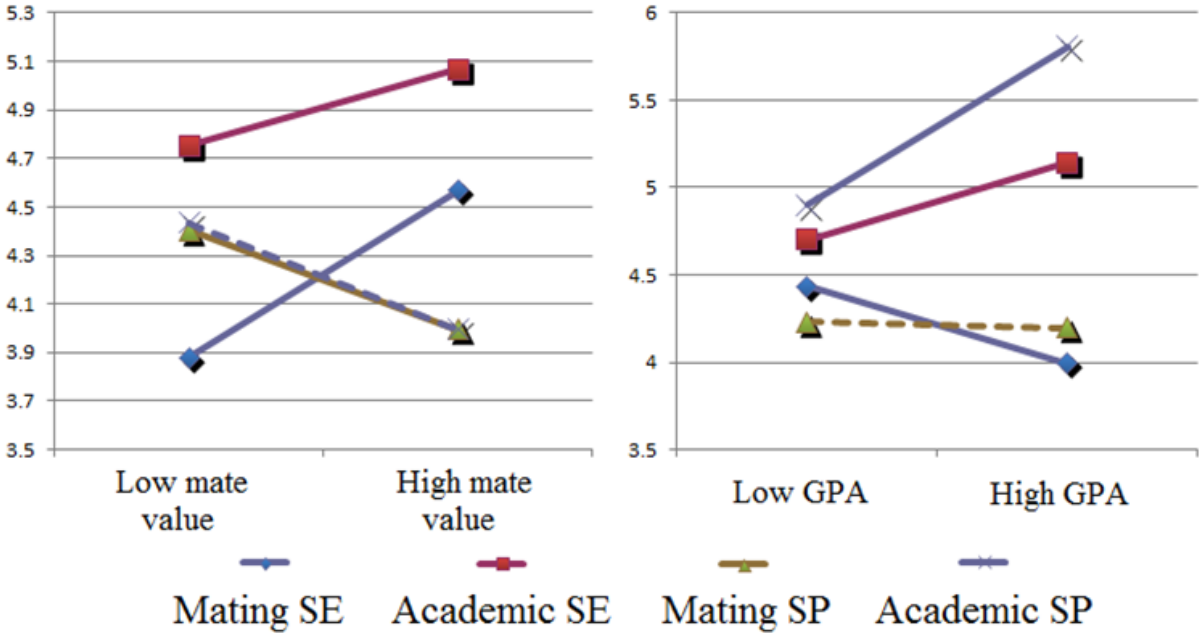

Figure 18: Pattern of results for the interaction between domain-specific value and domain-specific self-biased behaviors (only solid lines are significant).

12. Tables

Social domain and associated social goal	**Outcomes yielding relative utility**	**Outcomes yielding relative *dis*utility**	**Typical decision biases**
Affiliation Form and maintain cooperative alliances	Proximity to alliance partners Sharing resources equally among alliance partners	Social exclusion Reciprocity violations	Propensity to affiliate and conform when feeling fearful Sensitive cheating detection for reciprocity violations.
Status Gain and maintain social status	Dominating competitors (relatively more for men) Basking in reflective glory of group members' achievements	Deference to more powerful others Public losses of relative status	Risky status-yielding activities more attractive for young unmated men and less attractive for women.
Self-Protection Protect oneself and valued others from threats	Higher ratio of ingroup to outgroup members when threats salient. Barriers to outgroup members (e.g., walls, locks)	Being in a numerical minority when threat salient Presence of threatening outgroup members who are male and/or large.	Rapid detection of anger in male (versus female) faces Enhanced memory of angry outgroup male faces.
Mate Search Attract desirable mates	*For males judging females:* Cues to youth, health and fertility *For females judging males:* Cues to investment as long-term mates, social dominance and physical symmetry in short-term mates.	Poor health, aging cues, assymmetry. Conformity and deference to other males among potential male mates.	Males take more risks and resist conformity when mating opportunities are salient. Females are more publicly (but not privately) generous under mating motivation.
Mate Retention Retain and foster long-term mating	Communal sharing with relationship partner, rather than equality-based sharing Investment in partner's offspring	Cues to emotional infidelity *(relatively more salient to females judging males)* Cues to sexual infidelity *(relatively*	Attention by women to other physically attractive women. Attention by men to other socially dominant men

Social domain and associated social goal	**Outcomes yielding relative utility**	**Outcomes yielding relative *dis*utility**	**Typical decision biases**
bonds		*more salient to males judging females*	
Kin Care Invest in offspring and genetic relatives	Benefits to offspring, and to other relatives (discounted by degree of relatedness)	Threats to kin versus non-genetically related alliance partners Perceived favoritism of one's parent towards one's siblings	Grandparental investment highest by grandmother in daughter's offspring (tracking paternity certainty).

Table 1: Examples of behaviors and decisions associated with more or less utility in six broad social domains, and some decision biases associated with each domain (Kenrick et al., 2002).

Construct	Measure	*M*	*SD*
Childhood developmental circumstances	Subjective childhood family harmony	3.65	1.17
	Childhood family income	8583.79	5061.55
	Relationship quality with biological mother	5.25	1.65
	Relationship quality with biological father	4.77	1.77
Importance of domain	Mating importance	4.43	0.94
Domain value	Mate value	4.19	1.00
Global self-esteem	Global self-esteem	4.79	0.96

Table 2: Descriptives of measures for Study 1.

Variables	1	2	3	4	5	6	7	8
1 Sex	-							
2 Childhood family harmony	.10	-						
3 Childhood family income	-.11	-.13	-					
4 Relationship quality with biological mother	.14	.68**	-.09	-				
5 Relationship quality with biological father	.14	.62**	-.10	.67**	-			
6 Mating importance	-.07	-.59**	.02	-.37**	-.31**	-		
7 Mate value	-.09	-.13	.19*	-.03	-.06	.19*	-	
8 Global self-esteem	-.26**	-.02	.11	.10	.14	-.07	.30**	-

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

Table 3: Correlations (*n*=120) for Study 1.

Construct	Measure	*M*	*SD*
Childhood developmental circumstances	Subjective childhood socioeconomic status	4.03	1.53
	Subjective childhood family harmony	4.62	1.62
	Childhood family income	4.24	1.95
Valuation of domains	Importance of mating domain	3.64	1.00
	Importance of academic domain	5.50	1.35
Domain-specific value	Mate value	4.69	1.15
	GPA	3.41	.50
Self-esteem	Global self-esteem	4.92	1.27
	Life satisfaction	4.53	.93
Domain-specific self-biased behaviors	Mating self-enhancement	4.24	1.09
	Academic self-enhancement	4.91	.89
	Mating self-protection	4.20	1.07
	Academic self-protection	4.58	.67

(approximately US$35,001–$50,000 per year)

Table 4: Descriptives of measures for Study 2.

Variables		1	2	3	4	5	6	7	8	9	10	11	12	13	14
1	Sex	-													
2	Subjective childhood socioeconomic status	-.03	-												
3	Subjective childhood family harmony	-.14*	.41**	-											
4	Childhood family income	.09	.46**	0.69	-										
5	Importance of mating domain	.04	-.03	-.02	-.07	-									
6	Importance of academic domain	.21**	-.03	.03	.09	-.30**	-								
7	Mate value (*z*-scored)	-.02	.16*	.20**	.07	.17*	.12	-							
8	GPA (*z*-scored)	.29**	.01	-.08	.13	-.17*	.48**	.04	-						
9	Global self-esteem	-.22**	.06	.35**	.01	.01	.16*	.42**	.14*	-					
10	Life satisfaction	-.03	.17*	.43**	.02	.18**	.18**	.34**	.13	.63**	-				
11	Mating self-enhancement	-.19**	.13	.21**	-.05	.42**	.03	.39**	-.21**	.29**	.30**	-			
12	Academic self-enhancement	.06	.05	.15*	.04	-.20**	.61**	.18**	.25**	.27**	.23**	.20**	-		
13	Mating self-protection	.17*	.04	.07	-.06	.18*	.04	-.19**	-.02	-.20**	-.12	.22**	.11	-	
14	Academic self-protection	.23**	-.05	.01	-.07	-.21**	.45**	.09	.32**	.11	.25**	.66**	.76**	.56**	-

** Correlation is significant at the 0.01 level (2-tailed).

* Correlation is significant at the 0.05 level (2-tailed).

Table 5: Correlations (*n*=218) for Study 2.

Interaction variables	**Dependent variables**	***b***	***t*(213)**	***p***
Subjective childhood socioeconomic status × Domain × Value	Global self-esteem	.05	.06	.41
Subjective childhood family harmony × Domain × Value		.00	.10	.91
Childhood family income × Domain × Value		-.01	-.05	.71
Subjective childhood socioeconomic status × Domain × Value	Life satisfaction	.03	1.02	.34
Subjective childhood family harmony × Domain × Value		-.02	-.31	.74
Childhood family income × Domain × Value		.02	.05	.42
Subjective childhood socioeconomic status × Domain × Value	Valuation of domains	.01	.12	.86
Subjective childhood family harmony × Domain × Value		.05	.83	.47
Childhood family income × Domain × Value		-.04	.08	.47
Subjective childhood socioeconomic status × Domain × Value	Domain-specific self-enhancement	-.02	-.32	.75
Subjective childhood family harmony × Domain × Value		-.05	.09	.58
Childhood family income × Domain × Value		.03	.26	.83
Subjective childhood socioeconomic status × Domain × Value	Domain-specific self-protection	.05	1.09	.26
Subjective childhood family harmony × Domain × Value		-.01	-.22	.86
Childhood family income × Domain × Value		.03	1.01	.36

Table 6: Results of main tests of interaction effects for Study 2.

Interaction variables	**Dependent variables**	***b***	***t*(213)**	***p***
Subjective childhood socioeconomic status × Mate value	Global self-esteem	.01	.14	.89
Subjective childhood family harmony × Mate value		.03	.93	.35
Childhood family income × Mate value		.00	.11	.91
Subjective childhood socioeconomic status × Mate value	Life satisfaction	-.01	-.2	.84
Subjective childhood family harmony × Mate value		.00	.02	.99
Childhood family income × Mate value		-.02	-.34	.73
Subjective childhood socioeconomic status × Mate value	Mating self-enhancement	.00	.09	.92
Subjective childhood family harmony × Mate value		.01	.26	.79
Childhood family income × Mate value		.03	1.04	.30
Subjective childhood socioeconomic status × Mate value	Mating self-protection	.05	1.11	.27
Subjective childhood family harmony × Mate value		-.01	-.04	.71
Childhood family income × Mate value		**.08**	**2.12**	**.04**
Subjective childhood socioeconomic status × Mate value	Importance of mating domain	-.01	-.20	.84
Subjective childhood family harmony × Mate value		.02	.03	.47
Childhood family income × Mate value		**.06**	**1.82**	**.08**

Table 7: Results of supplementary tests of interaction effects in the mating domain for Study 2.

Interaction variables	**Dependent variables**	***b***	***t*(213)**	***p***
Subjective childhood socioeconomic status × GPA	Global self-esteem	.13	1.30	.20
Subjective childhood family harmony × GPA		.10	1.25	.21
Childhood family income × GPA		.06	1.00	.32
Subjective childhood socioeconomic status × GPA	Life satisfaction	.03	.24	.81
Subjective childhood family harmony × GPA		.10	1.12	.26
Childhood family income × GPA		.06	.80	.43
Subjective childhood socioeconomic status × GPA	Academic self-enhancement	-.02	-.34	.74
Subjective childhood family harmony × GPA		.05	.81	.41
Childhood family income × GPA		**.08**	**1.75**	**.08**
Subjective childhood socioeconomic status × GPA	Academic self-protection	-.06	-1.03	.30
Subjective childhood family harmony × GPA		**.22**	**3.11**	**.00**
Childhood family income × GPA		**.17**	**3.29**	**.00**
Subjective childhood socioeconomic status × GPA	Importance of academic domain	-.04	.09	.69
Subjective childhood family harmony × GPA		**.20**	**2.34**	**.02**
Childhood family income × GPA		.05	.06	.41

Table 7: Results of supplementary tests of interaction effects in the academic domain for Study 2.

Appendix 1

Mating Importance Scale (adapted from Ferris et al., 2010)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. Being attached is better than being single.
2. I like being in a relationship.
3. I feel better about myself when I know I can attract the attention of the opposite sex.
4. Being admired by the opposite sex gives me a sense of self-respect.
5. My opinion about myself isn't tied to how the opposite sex thinks about me. (R)
6. Without a boyfriend/girlfriend, I feel incomplete.

Appendix 2

Mate Value Scale (Kirkpatrick et al., 2002)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. Members of the opposite sex seem to like me.
2. I receive many compliments from members of the opposite sex.
3. Members of the opposite sex that I like tend to like me back.
4. Members of the opposite sex notice me.
5. I receive sexual invitations from members of the opposite sex.
6. After I date someone, they often want to date me again.
7. I can have as many sexual partners as I choose.
8. In a social situation, I often find that persons of the opposite sex seem to act as if I'm not even there. (R)
9. Members of the opposite sex find me uninteresting. (R)

Appendix 3

Global Self-esteem Scale (Rosenberg, 1965)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. I am able to do things as well as most other people.
2. On the whole, I am satisfied with myself.
3. I feel that I have a number of good qualities.
4. I feel that I'm a person of worth, at least on an equal plane with others.
5. I take a positive attitude toward myself.

6. All in all, I am inclined to feel that I am a failure. (R)
7. I feel I do not have much to be proud of. (R)
8. I certainly feel useless at times. (R)
9. I wish I could have more respect for myself. (R)
10. At times I think I am no good at all. (R)

Appendix 4

Childhood Socioeconomic Status (Griskevicius et al., 2011a; 2011b)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. My family usually had enough money for things when I was growing up.
2. I grew up in a relatively wealthy neighborhood.
3. I felt relatively wealthy compared to the other kids in my school.

Appendix 5

Childhood Family Harmony

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. My family was harmonious when I was growing up (from birth to 8 years of age).
2. While growing up, I had a close and warm relationship with my biological mother.
3. While growing up, I had a close and warm relationship with my biological father.

Appendix 6

Childhood Family Income (Griskevicius et al., 2011a; 2011b)

What was your household income when you were growing up (from birth to 8 years of age)?

(1) $15,000 or less
(2) $15,001–$25,000
(3) $25,001–$35,000
(4) $35,001–$50,000
(5) $50,001–$75,000
(6) $75,001–$100,000
(7) $100,001–$150,000
(8) $150,000 or more

Appendix 7

Domain-specific valuation (adapted from Schmader et al., 2001)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

Importance of mating

1. Being in a relationship is a significant part of who I am.
2. Being attached is very important to me.
3. Success at dating is not very important to me. (R)
4. How I feel about myself isn't tied to how the opposite sex thinks of me. (R)

Importance of academic achievement

1. Being good at academics is an important part of who I am.
2. Doing well on intellectual tasks is very important to me.
3. Academic success is not very valuable to me. (R)
4. It usually doesn't matter to me one way or the other how I do in school. (R)

Appendix 8

Satisfaction with Life Scale (Diener et al., 1985)

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

1. In most ways, my life is close to my ideal.
2. The conditions of my life are excellent.
3. I am satisfied with my life.
4. So far I have gotten the important things I want in life.
5. If I could live my life over, I would change almost nothing.

Appendix 9

Domain-specific Self-biased Behaviors Measure

1 (Disagree strongly), 2 (Disagree moderately), 3 (Disagree a little), 4 (Neither agree nor disagree), 5 (Agree a little), 6 (Agree moderately), 7 (Agree strongly)

Mating self-enhancement

Component	Items

Narcissism	1.	I would make a very good mate.	
	2.	I enjoy flirting if given the opportunity.	✓
	3.	I always know how to attract or interest the opposite sex.	
	4.	I am more attractive than other people.	
Approach	5.	An important goal in my life is to have a highly desirable mate(s) that others will envy.	✓
	6.	I am motivated by the thought of "scoring" a very attractive mate some day.	✓
	7.	I will be proud to show off an attractive partner.	
	8.	Having a romantic partner will greatly value add to my life.	✓
Promotion	9.	I like to meet new people of the opposite sex.	
	10.	I relish the opportunity to find unique ways to impress people of the opposite sex that I meet, sometimes surprising myself with what they find interesting about me.	✓
	11.	Regardless of the outcome, I typically enjoy my dates.	
	12.	I'm not bothered about being overly careful with how my dates see me.	

Academic self-enhancement

Component		Items	
Narcissism	1.	I am smarter than other people.	
	2.	I do not mind showing off my academic ability if I get a good chance to do so.	✓
	3.	I always know how to excel at my classes.	
	4.	Everybody admires my intellect.	
Approach	5.	An important goal in my life is to achieve higher grades and performance than my peers.	✓
	6.	I am driven by the thought of demonstrating my intellect and competence to others.	
	7.	I am motivated and encouraged when others compliment my academic ability.	✓
	8.	I desire to fully master the craft or work that my academic discipline entails.	
Promotion	9.	I work better when the school assignment guidelines are not so rigid and allow room for creativity and experimentation.	
	10.	I'm not too worried about reviewing or checking my school work very closely.	✓

	11.	Regardless of the outcome, I typically enjoy going for classes.	✓
	12.	I like being challenged academically, and have had my fair share of excelling.	✓

Mating self-protection

Component		Items	
Self-handicapping	1.	I am sometimes unlucky when it comes to meeting the right person for a romantic relationship.	✓
	2.	I think I have qualities that people would want in a mate, but I'm just shy.	
	3.	My standards for a date are perhaps too high.	
	4.	I don't dress up well enough when I go out.	
Avoidance	5.	I often ask myself, what if no one wants to date me?	
	6.	I worry about the possibility that people will look down on my partner if he/she is unimpressive.	
	7.	I want to avoid remaining single.	
	8.	Seeing others in happy relationships when I'm not makes me feel terrible.	
Prevention	9.	I tend to be very careful with how I approach or talk to the opposite sex so they don't see me in a negative way.	✓
	10.	I try my best to conceal or make up for my flaws either with cosmetics or dressing well.	✓
	11.	If there's something I do that tends to impress the opposite sex, I will usually rely on that to try and create a positive impression.	
	12.	I often think about whether the opposite sex is critical of me or finds me undesirable.	✓

Academic self-protection

Component		Items
Self-handicapping	1.	I am sometimes unlucky when it comes to school and grades, such as being grouped with incompetent classmates or being tested on the topics I didn't study for.
	2.	I think my academic ability is good, but I'm just bad at examinations.
	3.	I have too many other things going on that get in the way of my school work.

	4.	I sometimes cave in to the temptation to go out at night before a major examination.	
Avoidance	5.	I often ask myself, what if I do badly in my course?	
	6.	I worry about the possibility that people will look down on me if my academic performance is mediocre.	
	7.	I want to avoid doing poorly in school.	✓
	8.	Seeing others do better than me in school makes me feel terrible.	
Prevention	9.	I am conscientious and careful with my work so that I can do the best that's expected of me.	✓
	10.	Specific course outlines and instructors' expectations are necessary for me to get my assignments done well.	✓
	11.	I always try to make my work as accurate and error-free as possible.	✓
	12.	I often think about whether others view my academic achievements as impressive.	