Self-Esteem Vulnerabilities Are Associated With Cued Attentional Biases Toward Rejection

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Abstract

Feelings of insecurity, including those related to low self-esteem, have been linked to broad attentional biases toward social rejection. However, people's insecurities are often not broad and all-encompassing but rather are linked to specific self-worth contingency domains. We hypothesized that a person should exhibit a rejection bias primarily when reminded of a self-perceived flaw in an important domain. We adapted the dot probe measure of attentional bias by beginning each trial with a cue word. First, we re-examined a cognitive avoidance pattern documented in previous research and found that socially anxious people exhibited a rejection bias when cued with social competence flaws such as *foolish* (Study 1). Next, we found that low self-esteem was associated with a rejection bias when cued with *failure* (Study 2). Finally, people with specific self-worth contingencies relating to academics (Study 3) and thinness (Study 4) exhibited a rejection bias when cued with *stupid* and *obese*, respectively. Our findings show that attentional biases are particularly likely when a person feels most vulnerable.

Keywords: attentional bias; rejection; self-esteem; self-worth contingency; social anxiety

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1. Introduction

Many people feel insecure about one thing or another. One person might worry about gaining weight; another might feel threatened by the potential for academic underperformance; while another might feel a drop in self-esteem after any small mistake or failure. Crocker and her colleagues have conceptualized these specific types of insecurities as *self-worth contingencies*: domains in which the outcome affects one's self-esteem (Crocker, Luhtanen, Cooper, & Bouvrette, 2003; Crocker & Wolfe, 2001). In Crocker and colleagues' early research they identified seven key sources of self-esteem: approval from others, academic competence, competition, appearance, family support, virtue, and God's love (Crocker et al., 2003). Research has documented that self-worth contingencies can engender a psychological vulnerability due to the fluctuations in self-esteem resulting from failures and successes in specific domains (Crocker, 2002).

Much research on the topic of self-esteem vulnerability in general documents that it is strongly influenced by the expectation of interpersonal rejection (e.g., Leary & Downs, 1995) and the social information processing biases associated with that expectation. Of note, external contingencies (i.e., approval, academics, competition, appearance) are especially rooted in others' evaluations of the self and, as such, self-esteem in these domains tends to be highly dependent on interpersonal acceptance (Crocker et al., 2003; Crocker & Wolfe, 2001; Ryan & Brown, 2006) – consequently, these external sources of contingent self-esteem have been linked to heightened psychological vulnerability (Bos, Huijding, Muris, Vogel, & Biesheuvel, 2010). For example, in one study senior undergraduate students with strong academic contingencies were particularly likely to show decreases in self-esteem on days that they received negative

news about their graduate school applications (Crocker, Sommers, & Luhtanen, 2002). Moreover, the extent to which students base their self-worth on academic competence has been associated with psychological stress responses to school stressors (Ishizu, 2017) and can predict academic performance (Lawrence & Crocker, 2009). In addition, there has been a great deal of research showing that basing self-worth on appearance bestows a vulnerability to many negative outcomes, including eating disorders and body image anxiety (Bardone-Cone, Lin, & Butler, 2017; Clabaugh, Karpinski, & Griffin, 2008; Rieger, Dolan, Thomas, & Bell, 2017; Rieger, Van Buren, Bishop, Tanofsky-Kraff, Welch, & Wilfley, 2010).

Given that insecurities of this sort can be mildly or even highly distressing, it is perhaps surprising that not more is known about the social cognitive processes involved, especially since these biased processes can exacerbate a person's feelings of insecurity. For example, cognitive models of anxiety have long recognized the key role of biased information processing patterns in perpetuating anxiety (e.g., Beck, Emery, & Greenberg, 1985). In particular, selective attention is a key process to understand as it represents the first window of social information processing: As a person navigates their social environment, their attention will be selectively biased toward certain types of social cues. Importantly, some people may have a negative attentional bias, whereby their attention is automatically directed toward any negative social cues instead of being directed to more positive social cues. A robust literature implicates negative attentional biases as playing a significant role in maintaining a range of broad psychological vulnerabilities (Mathews & MacLeod, 2005), as such biases filter the information available for further processing and emphasize any unsupportive and rejecting aspects of one's social experience. Individuals with a relatively high level of general insecurity, for example in the form of social anxiety or chronic low self-esteem, tend to show selective attentional patterns broadly biased toward social threats including rejection (Bantin, Stevens, Gerlach, & Hermann, 2016; Dandeneau, Baldwin, Baccus,

Sakellaropoulo, & Pruessner, 2007). Thus, as a person with low self-esteem walks around in their daily lives, their attention is directed to and captured by any sort of rejecting social cues, in turn reinforcing their baseline negative expectation and making them feel even more insecure.

We sought to refine the analysis of attentional biases. Current measures of attentional bias – although useful in picking up general patterns of attention that contribute to broad psychological vulnerabilities – are not nuanced or tailored enough to capture the variation between different types of insecurities an individual might experience. Rather, the implicit assumption seems to be that an insecure person will *always* have their attention biased toward rejecting social cues. In other words, the attentional bias literature to date has failed to acknowledge that individuals surely differ in the specific self-perceived flaws – whether regarding their weight, or social skills, or competence in some important domain – about which they feel insecure (Crocker et al., 2003; Moscovitch, 2009; Schlenker & Leary, 1982). Indeed, questionnaire research has shown that when people fail in a specific self-worth contingency domain, they feel less accepted by their significant others (Horberg & Chen, 2010; see also Leary, Tambor, Terdal, & Downs, 1995). Consistent with this idea, previous social cognitive research has shown that even individuals with chronic low self-esteem do not necessarily always expect to be rejected – rather, low self-esteem individuals are particularly fast to recognize rejection-related words after they have been reminded of *failure* (Baldwin, Baccus, & Fitzsimons, 2004; Baldwin & Sinclair, 1996), presumably due to a specific expectation associating failure with rejection (e.g., "If I fail, then I will be rejected").

An examination of this type of individual variability is largely missing in the attentional bias literature, in which an individual's attentional orientation is essentially treated as constant and stable. However, research in this area needs to better incorporate the principle that attention is dynamic – meaning that attentional priorities change based on a variety of influences,

including expectancies, goals, cues, and contexts (Ristic & Enns, 2015). As such, it seems likely that the specific context in which a person expects and attends to rejection may differ based on a person's self-esteem concerns. As opposed to assuming that an insecure person will always show a negative bias, it is possible therefore that this bias will arise specifically in contexts where a person's self-esteem can be threatened. Importantly, if attentional biases are evident primarily when a person feels vulnerable, treating a bias as purely a chronic orientation would overlook this important aspect of insecurity. For instance, a person with body weight/shape contingencies of self-worth might show no attentional bias whatsoever throughout the day until suddenly they are trying on bathing suits and are confronted with cues suggesting their body is flawed, leaving them feeling vulnerable to rejection – in contrast, this very same person may not be feeling vulnerable as they sit in class and receive a failing exam grade.

We hypothesized that people should show an attentional bias toward social rejection primarily when reminded of a self-perceived flaw in a self-relevant domain. Specifically, we expected individuals with particular self-worth contingencies to orient toward rejection when cued with failure in that domain. To address this hypothesis we adapted the dot probe task (MacLeod, Mathews, & Tata, 1986), which is the most common, widely-used measure of attentional biases. The standard task involves the presentation of a pair of faces – one emotional (e.g., rejecting) and one neutral – followed by the presentation of a probe. Participants' reaction times to indicate the position of the probe are then recorded. The rationale behind the task is that reaction times will be faster when the probe appears in the location of the face that the person was already attending to (MacLeod et al., 1986). A typical finding with this task is that insecure (e.g., anxious or low self-esteem) individuals tend to show relatively faster reaction times to probes replacing a threatening or rejecting face, indicating a hypervigilance toward social rejection (i.e., a rejection bias). Our modified approach involved presenting a cue word at the

beginning of every dot probe trial (see Fig. 1). This cue word was chosen to either reflect or not reflect an individual's self-perceived flaw, with the prediction that rejection biases would be evident primarily on flaw-cued trials.

In Study 1, we addressed an earlier study by Helfinstein, White, Bar-Haim, and Fox (2008), which used an approach similar to ours but found results opposite to our predictions: Their study found that people with higher social anxiety actually showed a greater attentional *avoidance* of rejection – that is, attention *away from* rejection – when dot probe trials were cued with social threat words. We reanalyzed their data by isolating those trials with cue words relating to self-perceived flaws and analyzing them separately from trials with cue words relating to other components of social anxiety. In Study 2, we aimed to test our hypothesis using our own adapted dot probe task by assessing whether people with low self-esteem would show an attentional bias toward social rejection when reminded of failure (i.e., when cued on dot probe trials with the word *failure*). Next, we examined more specific insecurities by examining people's contingencies of self-worth: In Study 3, we examined the domain of academic competence, and in Study 4 we examined the domain of thinness.

2. Study 1

In our first study, we sought to address earlier research by Helfinstein et al. (2008) which involved a cueing methodology but found results opposite to our hypothesis: Socially anxious individuals in that study showed less, rather than more, rejection bias when cued with words related to social anxiety. We drew on subsequent work by Moscovitch (2009), who argued that when investigating cognitive processes in social anxiety it is critically important to consider distinct components of the experience, including feared contexts, feared stimulus characteristics (or flaws in the self), and feared consequences. Helfinstein et al. (2008) did not make these distinctions among their social anxiety cue words. For example, they included words such as

foolish, *clumsy*, *stupid*, and *incompetent* – which would be considered self-perceived flaws in the self and are similar to the types of insecurities we wish to examine – but also included feared consequence words such as *rejected*, *humiliated*, *criticized*, and *judged*, and contextual words such as *date, party,* and *dance*.

We contacted lead author Sarah Helfinstein who graciously provided us with their original data to reanalyze. Guided by psychometric work by Moscovitch and Huyder (2011) on social anxiety components, we identified cue words mapping onto specific flaws that socially anxious people often perceive themselves to have (e.g., "socially awkward", "lacking social skills", "humorless"). We predicted that highly socially anxious individuals (compared to low anxious individuals) would exhibit a rejection bias particularly on trials cued with words reflecting these self-perceived flaws.

2.1. Methods.

A detailed description of Helfinstein et al.'s (2008) procedure can be found in the original article. We present pertinent information below.

2.1.1. Participants.

Helfinstein et al., (2008) recruited 24 female undergraduate students (M_{age}=20.26 years, range = 19 to 27 years) based on extreme (high and low) scores on standard measures of social anxiety. Primary analyses involved comparing two groups: 12 highly socially anxious (HSA), and 12 low socially anxious (LSA).

2.1.2. Procedure.

Participants completed a dot probe task consisting of 256 experimental trials. Each trial began with a fixation cross presented for 500 ms, followed by a cue word in white text against a black background for 200 ms, a blank screen for 300 ms, and finally a pair of faces presented for 500 ms. Each cue word (from a list of 64 neutral words and 64 social threat words) was

presented twice randomly throughout the task. The probe, a small white arrow, replaced one of the faces. See Helfinstein et al. (2008) for further details.

2.1.3. Reanalysis.

To identify self-flaw cue words, we referred to Moscovitch and Huyder's (2011) social competence subscale of the Negative Self-Portrayal Scale (NSPS), which identifies 11 self-attributes reflecting social competence flaws as often perceived by socially anxious individuals. We identified one cue word from Helfinstein et al.'s (2008) list that appeared the best fit to each of the 11 social competence flaws articulated by Moscovitch and Huyder (2011). For example, we matched the cue word *inept* to the self-flaw of "lacking social skills" and the cue word *foolish* to the self-flaw of "speaking incoherently." For a full list of the matched cue words and self-flaws, see Table 1. For exploratory purposes we also identified a subset of words from Helfinstein et al. (2008) that we judged to be reflective of contextual social threat cues (e.g., *date, party*) and rejection consequence cues (e.g., *criticized, humiliated*). See Table 2 for a list of the contextual and rejection consequence cue words.

To assess our selection of the 11 social threat cues, we recruited a convenience sample of undergraduate psychology students (n = 5). Participants were given the full list of 64 threat cue words in Helfinstein et al.'s (2008) original study, as well as the 11 social competence flaws outlined by Moscovitch and Huyder (2011), and were instructed to select one cue word (without using the same word twice) to match each of the 11 flaws. Findings from this sample supported our selections: Overall, at least 3 out of the 5 participants selected each of the cue words in our total list, except the word *uninvolved* which was selected just by 2 participants. Moreover, no other prime word from the list of 64, except *hostile* (chosen by 2 participants), was selected more than once. Analyzing the data with the inclusion of the *hostility* trials did not meaningfully change the results (see Supplemental Material).

2.2. Results.

2.2.1. Data preparation.

Helfinstein et al. (2008) excluded trials with errors and reaction times (RT) less than 200 ms. To keep our dot probe bias analyses consistent with Helfinstein et al. (2008), no other exclusionary criteria were applied. Consistent with the literature, each rejection bias score was calculated by subtracting the participant's mean RT on valid rejection trials (where the probe replaced the frown) from their mean RT on invalid rejection trials (where the probe replaced the neutral face). Higher scores indicated a higher rejection bias (MacLeod et al., 1986). We calculated separate bias scores for each of the cue word categories outlined above, to yield three rejection biases: (1) a *flaw-cued rejection bias,* (2) a *context-cued rejection bias,* and (3) a *consequence-cued rejection bias.*

2.2.2. Flaw-cued biases.

Consistent with our prediction, our reanalysis of only trials cued with social competence flaw words (e.g., *foolish*) showed that the HSA group (M = .01, SD = .05) had a greater attentional bias toward rejection when compared to the LSA group (M = -.04, SD = .07); $t(22)$ = 2.11, p = .046. In other words, self-perceived social competence flaw cues did not produce an attentional avoidance pattern as suggested by the original Helfinstein et al (2008) paper. Rather, being reminded of a social competence flaw was associated with a greater rejection bias for those higher in social anxiety compared to those lower in social anxiety.

2.2.3. Exploratory analyses.

Additional analyses showed no significant association between social anxiety and the *consequence-cued rejection bias* (e.g., trials cued with *humiliated*). However, and consistent with the findings originally reported by Helfinstein et al. (2008), analysis of the *context-cued rejection bias* (e.g., trials cued with *party*) showed that the HSA group (M = -.01, SD = .05) had a lower

attentional bias than the LSA group (M = .05, SD = .06); $t(22) = -2.93$, p = .008. This finding, which we return to in the General Discussion, implies that the attentional avoidance pattern found by Helfinstein et al. (2008) for HSA participants was primarily driven by the rejection bias on trials cued with contextual prime words. In contrast, and consistent with our hypothesis, when self-perceived flaws were primed relatively socially anxious individuals showed a greater attentional bias than did low-anxious individuals.

3. Study 2

The previous study provided initial evidence for our hypothesis by showing that social anxiety was related to an attentional bias toward rejection when reminded of social competence flaws. In Study 2, we employed our adapted dot probe task to assess the cued attentional bias patterns of individuals with low self-esteem. As discussed previously, prior work has shown that for people with low self-esteem thoughts of rejection are activated after reminders of failure (Baldwin & Sinclair, 1996). The goal of Study 2 was to assess whether this same pattern (i.e., *If failure, then rejection*) would be evident at the level of attentional bias – that is, we investigated whether low self-esteem would be associated with an attentional bias toward rejection particularly on dot probe trials cued with failure. We also created a *failure self-worth contingency* self-report measure, by adapting the assessment approach used by Crocker and colleagues (2003). We hypothesized that this measure would correlate with the *failure-cued rejection bias* and with low self-esteem.

3.1. Method.

3.1.1. Participants.

We set out to recruit 200 North American participants online via the crowdsourcing site CrowdFlower. Of these 200 participants, we discarded data from 20 participants who did not complete the study, due to various technical issues (e.g., failure to redirect participants between

different elements of the study or failure to use the same identification code across the parts of the study, which made it impossible to match up their responses). As well, participants with more than a 10% error rate on the dot probe, whose mean reaction time on *failure-cued* and *success-cued* valid and invalid rejection trials was greater than 1000 ms[1], or who failed an attention check question, were excluded from data analyses (21.67% of the sample). This resulted in a final sample of 141 participants (M_{age}=37.35, *SD*=12.70; 56.0% female, 43.3% male, 0.7% declined to answer). The majority of the participants were employed (56.03%; e.g., teacher, consultant, engineer); the remainder were homemakers (14.18%), students (10.64%), unemployed (9.93%), retired (5.67%), or self-employed (3.55%).

3.1.2. Measures.

3.1.2.1. Self-esteem.

Participants completed the widely-used Rosenberg Self-Esteem Scale (RSES; Rosenberg, 1965), a 10-item measure that assesses both positive and negative feelings and judgments about the self (e.g., *"*On the whole, I am satisfied with myself*"*).

3.1.2.2. Self-worth contingencies.

Participants completed the Contingencies of Self-Worth Scale (CSWS; Crocker et al., 2003), including 4 novel items we generated to reflect the general contingency domain of success and failure (e.g., "When I think I have failed, I feel bad about myself").

3.1.2.3. Trait anxiety.

Participants completed the 20-item trait anxiety subscale from the State-Trait Anxiety Inventory Y-2 Form (STAI; Spielberger, Gorsuch, Lushene, Vagg, & Jacobs, 1983). As much

[1] Only two participants were excluded from our analyses for having reaction times on cued valid and invalid trials longer than 1000 ms. Importantly, even if we include these two participants, our primary finding showing a significant correlation between self-esteem and the *failure-cued rejection bias* (see 3.2.2. below) was unaltered, $r(141)=-.19$, $p=.026$.

previous research using the dot probe has focused on trait anxiety (e.g., Bar-Haim, Lamy, Pergamin, Bakermans-Kranenburg, & van IJzendoor, 2007), we included this as a control measure to ensure that our findings were not simply a function of high levels of trait anxiety.

3.1.2.4. Attentional check item.

An item to assess if participants were completing the study conscientiously ("Leave this question unmarked to indicate that you have read the question") was administered. Participants who failed to leave the question blank were excluded from further data analyses.

3.1.3. Procedure.

Participants completed the questionnaires in the above-mentioned order, followed by a 160-trial dot probe task programmed in Javascript and executed in the participant's browser. They were asked to sit approximately 60 cm away from their computer screen and were told their task was simply to indicate the up or down orientation of the arrows. Each trial began with a cue word (*fail* or *failure* on half the trials*; succeed* or *success* on the remaining trials) presented in the middle of the screen for 500 ms. One of the following face pairs was presented at random: frown-neutral, smile-neutral, or neutral-neutral. The face stimuli were 4.5 cm in width and 4.5 cm in height, and were 11.4 cm apart measured from their centers. Following the offset of the paired face stimuli, a black arrow pointing either up or down appeared in the location of one of the faces (see Fig. 1). Participants were asked to indicate the up or down direction of the arrow (using arrow keys) as quickly as possible and reaction times were recorded. Trial parameters, including word primes and face presentation parameters (e.g., female/male, accepting/rejecting, left vs right position of the neutral face), were randomly selected without replacement from a list.

3.2. Results.

3.2.1. Data preparation.

Dot probe trials with errors were discarded (5.22% of the data), as were trials with reaction times (RTs) faster than 200 ms (0.42%) or more than two standard deviations above each participant's personal overall mean RT (2.90%) (consistent with previous research; see, e.g., Dandeneau et al., 2007, Heeren, Philippot, & Koster, 2015 and Sluis & Bochen, 2014). Cued rejection bias scores were calculated separately from the trials cued by *fail/failure* and *succeed/success*.[2]

3.2.2. Self-esteem.

Supporting our main prediction that lower self-esteem would be associated with a heightened cued attentional bias, we found that self-esteem was significantly and negatively correlated with the *failure-cued rejection bias*, $r(139) = -.18$, $p = .037$. Our critical findings for the *failure-cued rejection bias* were not altered when gender and trait anxiety were controlled for in a regression, $\beta = -.10$, $t(137) = -2.42$, $p = .017$, $r_{partial} = -.20$. Importantly, the attentional bias was not evident in the context of success: self-esteem was unrelated to the *success-cued rejection bias*, $r(139) = -.02$, $p = .852$. These findings demonstrate that people with lower self-esteem have attentional biases toward rejection primarily when cued with thoughts related to *failure*, but not in the context of *success*.

3.2.3. Failure contingency.

Our novel failure self-worth contingency measure was negatively correlated with self-esteem, $r(139) = -.42$, $p < .001$, supporting the notion that the lower one's self-esteem, the more self-esteem is reactive to failures and successes. However, contrary to our predictions, the failure

[2] Acceptance bias scores were also calculated based on smile-neutral trials. As is commonplace in the literature, analyses of acceptance bias scores were generally uninformative in all studies and they will not be discussed further.

contingency did not significantly correlate with the *failure-cued rejection bias*, $r(139) = -.05$, $p = .583$.

4. Study 3

The results of Study 2 were consistent with our primary hypothesis that low self-esteem would be related to a rejection bias on trials cued with thoughts of failure, a finding that extended the previous work of Baldwin and Sinclair (1996) to the process of attentional bias. Contrary to predictions, although our novel measure of failure self-worth contingency was associated with low self-esteem, it was not correlated with the cued rejection bias. This may be due in part to the still relatively generic idea of *failure*: Individuals with particular insecurities surely differ in terms of the specific types of failures that imply rejection from others (Crocker & Wolfe, 2001) so clearer findings might emerge with more precise measurement. For Study 3, we elected to examine a more specific self-worth contingency, relating to the domain of academic competence. As outlined in the Introduction, students with greater academic contingencies are especially vulnerable to failures in this domain (e.g., Crocker et al., 2002). Extending this reasoning to attentional biases, we predicted that students with strong academic contingencies would show a rejection bias particularly on trials cued with the word *stupid*. In this study, we also included a second set of positive and negative cues unrelated to academic competence, to address the possibility that any negatively valenced word –not just a word related to one's insecurity - might have a similar impact on attention.

4.1. Method.

4.1.1. Participants.

A total of 57 undergraduate participants, recruited through the McGill Psychology Human Participant Pool, completed the study; data collection was terminated due to a deadline for the undergraduate project based on this study. Of these participants, 12 only partially

completed the study for the same reasons as in Study 2. Following the same approach as in Study 2, we discarded data from 5 participants with a greater than 10% error rate on the dot probe task. No participants had mean valid and invalid cued rejection trial reaction times longer than 1000 ms. These procedures resulted in a final sample size of 52 participants (M_{age}=20.44, *SD*=1.35; 92.3% female, 7.7% male).

4.1.2. Measures.

4.1.2.1. Questionnaires.

Participants completed the same questionnaires as in Study 2: RSES (Rosenberg, 1965), CSWS (Crocker et al., 2003), and the trait anxiety subscale of the STAI (Spielberger et al., 1983). From the standard CSWS, we drew the academic competence contingency subscale (e.g., "I feel bad about myself whenever my academic performance is lacking.") as our indicator of specific insecurity.

4.1.3. Procedure.

The procedure was the same as in Study 2 with two exceptions. First, the prime words used were the following: *smart, stupid, moral*, and *immoral (*with the latter two primes designed to reflect valenced but not insecurity-relevant cues*).* Second, to try to avoid fatigue and thereby reduce the somewhat high dot probe error rates observed in Study 2, the dot probe trials were split into 2 blocks: one block completed before the survey and one block after the survey. In order to avoid increasing the number of trials with the inclusion of a second set of cues, trial configurations were partially counterbalanced to ensure an equal number of trials in each block with each cue, face position, face gender, probe position, and probe orientation.

4.2. Results.

4.2.1. Data preparation.

As in Study 2, we calculated rejection bias scores after discarding dot probe trials with errors (2.53% of the data), RTs less than 200 ms (0%) or longer than two standard deviations above a participant's personal mean (3.10%).

4.2.2. Academic contingency.

Supporting our primary prediction, we found the academic competence self-worth contingency to be significantly correlated with the *stupid-cued rejection bias,* $r(50) = .30$, $p = .032$. A regression controlling for gender, trait anxiety, and self-esteem revealed that the *stupid-cued rejection bias* remained a significant predictor of the academic contingency, $\beta = .32$, $t(47) = 2.41$, $p = .020$, $r_{partial} = .33$. In comparison, the academic contingency was not associated with the *smart-cued rejection bias,* $r(50) = -.04$, $p = .775$. For people high in academic competence self-worth contingencies, then, being cued with the word *stupid* – but not with *smart* – led to a heightened attentional bias toward rejection.

4.2.3. Domain specificity.

Next, we wanted to ensure that our key findings were not simply a matter of any negative cue eliciting a greater attention bias. Simple correlations revealed that the academic contingency was not significantly associated with the *immoral-cued rejection bias,* $r(50) = .01$, $p = .963$, although was marginally negatively correlated with the *moral-cued rejection bias*, $r(50) = -.27$, $p = .056$. Including these two additional cued biases, as well as the *smart-cued rejection bias*, in a regression (with gender, self-esteem, and trait anxiety as controls) did not alter our primary finding: The *stupid-cued rejection bias* remained the only significant predictor of the academic contingency, $\beta = .41$, $t(44) = 2.52$, $p = .015$, $r_{partial} = .36$, whereas none of the other three cued biases was significant, all p's $> .100$[3]. (See Supplemental Materials). These findings demonstrate

[3] The *stupid-cued rejection bias* remained a significant predictor of the academic contingency when self-esteem was removed from the model, $\beta = .41$, $t(45) = 2.58$, $p = .013$,

that being reminded of a failure in a non-relevant domain (e.g., *immoral*) does not activate a highly academic contingent person's bias toward rejection. Rather, it is only when reminded of a failure or threat in a self-relevant domain (e.g., *stupid*) that the highly academic competence contingent person attends selectively to rejection.

5. Study 4

In Study 4, we examined contingencies relating to body image, particularly the tendency to base feelings of self-worth on the ability to control and maintain an ideal shape and weight (Clabaugh et al., 2008). For this purpose, we generated a brief measure of *thinness self-worth contingencies*, and presented critical dot probe trials cued with the words *obese* and *thin*.

5.1. Method.

5.1.1. Participants.

A total of 74 undergraduate participants completed the study through the McGill Psychology Human Participant Pool; data collection was terminated once the end of the academic term was reached. As in the previous studies, 10 participants were discarded for having more than a 10% error rate. No participants had mean valid or invalid cued rejection trial reaction times above 1000 ms. This resulted in a final sample of 64 participants (M_{age}=20.98, *SD*=1.63; 68.8% female, 31.3% male).

5.1.2. Measures.

5.1.2.1. Questionnaires.

The same questionnaires used in Study 2 and 3 were also used in the present study. In addition, we designed specific thinness contingency items (e.g., "I can't respect myself if I am not thin").

$r_{partial}$ = .36, as well as when trait anxiety was removed from the model β = .45, $t(46) = 3.08$, p = .003, $r_{partial}$ = .41.

5.1.3. Procedure.

The same procedure used in Study 3 was followed, except that the cue words were *obese*, *thin*, *lazy*, and *hardworking (*with the latter two primes designed to reflect valenced but not insecurity-relevant cues*)*.

5.2. Results.

5.2.1. Data preparation.

As in the previous studies, rejection biases were calculated after discarding trials with errors (3.18% of the data), RTs less than 200 ms (0.03%), or RTs longer than two standard deviations above a participant's personal mean (3.19%).

5.2.2. Thinness contingency.

Supporting our main hypothesis, we found a significant correlation between the thinness contingency and the *obese-cued rejection bias*, $r(62) = .32$, $p = .011$[4]. A regression controlling for gender, trait anxiety, and self-esteem revealed that the *obese-cued rejection bias* remained a significant predictor of the thinness contingency, $\beta = .26$, $t(59) = 2.13$, $p = .037$, $r_{partial} = .37$. Importantly, the thinness contingency was uncorrelated with the *thin-cued rejection bias*, $r(62) = -.06$, $p = .663$. In other words, people with higher thinness contingencies of self-worth demonstrated a heightened attentional bias toward rejection when cued with the word *obese*, but not when cued with *thin*.

5.2.3. Domain specificity.

[4] Although our sample sizes for men and women were smaller and uneven, we tested whether there were any gender differences. In our regression model, we entered (1) gender (coded 0=male, 1=female), (2) the thinness contingency (centered), and (3) the 2-way Gender X Thinness Contingency interaction, predicting the *obese-cued rejection bias*. We found that the 2-way Gender X Thinness Contingency interaction was not significant, $\beta = -.12$, $t(60) = -.56$, $p = .577$. Additionally, there was a positive correlation between the thinness contingency and the *obese-cued rejection bias* among both male ($r(18)=.37$) and female participants ($r(42)=.25$).

Similar to the previous study, we aimed to ensure that our findings were not simply due to a general negativity effect. Simple correlations first revealed that the thinness contingency was not associated with the *lazy-cued rejection bias*, $r(62) = .07$, $p = .593$, nor with the *hardworking-cued rejection bias*, $r(62) = -.15$, $p = .238$. A regression with all four cued biases (controlling for gender, trait anxiety, and self-esteem) revealed that only the *obese-cued rejection bias*, $\beta = .30$, $t(56) = 2.06$, $p = .045$, $r_{partial} = .27$, was a significant predictor of the thinness contingency, whereas none of the *thin-*, *hardworking-*, or *lazy-cued rejection biases* was significant; all p's > .100.[5] (See Supplemental Materials). These findings suggest that people with greater thinness contingencies only show a rejection bias when cued with relevant threats (e.g., *obese*), as opposed to any negative threat word (e.g., *lazy*).

As an additional test of specificity we drew on the fact that the standard CSWS, administered in this study, included the subscale for academic contingency. Although this contingency was associated with the *stupid-cued rejection bias* in the previous study, it should not be associated with the *obese-cued rejection bias* in this study. Indeed, simple correlations revealed that the *obese-cued rejection bias* was not associated with the academic contingency, $r(62) = -.03$, $p = .787$. We also ran a regression predicting the *obese-cued rejection bias* from both the academic and thinness contingency. In this analysis the thinness contingency was a significant predictor, $\beta = .34$, $t(61) = 2.76$, $p = .008$, $r_{partial} = .33$, but the academic contingency was not, $\beta = -.11$, $t(61) = -.90$, $p = .374$, $r_{partial} = -.11$. These findings were unaltered when adding gender, trait anxiety, and self-esteem as controls. Had our cued attentional bias findings been due to simply having a general insecurity, we might have expected those with any insecurity to show

[5] The *obese-cued rejection bias* remained a significant predictor of the thinness contingency when self-esteem was removed from the model, $\beta = .31$, $t(57) = 2.14$, $p = .037$, $r_{partial} = .27$, as well as when trait anxiety was removed from the model $\beta = .32$, $t(58) = 2.20$, $p = .032$, $r_{partial} = .28$.

a greater *obese-cued rejection bias*. In contrast, our findings support our specificity hypothesis, such that only individuals insecure about thinness, but not academics, showed an enhanced rejection bias when cued with a relevant threat (e.g., *obese*).

6. General Discussion

Due to the abundance of information in our social environment we require a system of selective attention that functions to identify information that is important and should receive additional processing, and other information that is irrelevant and can be disregarded (Duncan, 2004). It is known that broad insecurities can engender an attentional bias toward rejection, reinforcing the socially insecure person's negative expectations (Alden & Taylor, 2004; Clark & Wells, 1995; Leary & Downs, 1995). Our findings demonstrate that specific insecurities involve a specific form of attentional bias: a cued attentional bias that occurs in response to reminders of a self-perceived flaw.

Across four studies we found support for our primary hypothesis that attentional biases toward social rejection would be more evident when a person is reminded of his or her specific insecurity. In Study 1, we found support for our hypothesis in the domain of social anxiety by re-examining Helfinstein et al.'s (2008) original findings of an attentional avoidance among highly socially anxious individuals. We found that highly socially anxious individuals showed an attentional vigilance toward rejection when cued with social competence flaws. In Study 2, we found that individuals with low self-esteem – compared to those of higher self-esteem – were likely to orient toward rejection particularly when failure was brought to mind. However, contrary to our predictions, the failure contingency was not found to be associated with the *failure-cued rejection bias*. One explanation for this finding is that the idea of failure was simply too generic. Indeed, our central thesis is based on the assumption that individuals will differ in regards to the specific domains in which their self-esteem is threatened by failure (Crocker et al.,

2003). As such, we suspected that a more narrow, specific conceptualization of failure may be necessary to produce a cued attentional bias. Therefore, in Studies 3 and 4, we assessed more precise self-worth contingency domains, namely academic competence and thinness, which revealed a rejection bias only when cued with a self-relevant threat (e.g. *stupid* and *obese*, respectively). Moreover, Studies 3 and 4 taken together provided support for the specificity of these cued attentional biases by showing that only self-relevant cues result in an enhanced bias – thus ruling out the possibility of our findings simply being due to a general insecurity. In addition, by controlling for general levels of self-esteem, we further demonstrated the specificity of our self-worth contingency findings.

Our exploratory data analysis in Study 1 yielded an interesting finding in regards to Helfinstein et al.'s (2008) original finding of attentional avoidance. Here we found that highly socially anxious people engaged in an attentional avoidance of rejection particularly when reminded of social situations and contextual triggers (e.g. *conversation, date*). This finding is in line with behavioral research showing that socially anxious individuals deal with their distress by engaging in avoidance behaviors such as refusing to attend threatening social events (Clark & Wells, 1995; Leary & Kowalski, 1995). Attentional avoidance under certain circumstances has previously been observed in social anxiety (Cisler & Koster, 2010): Our findings suggest that people higher in social anxiety may show a stronger avoidance of rejection particularly when reminded of feared contexts – likely because they have learned to control their anxiety by cognitively avoiding these situations. Importantly for our purposes, these results mark a boundary condition to our pattern of findings in that a cued rejection bias will be present only in response to a self-perceived flaw, as opposed to being cued with any threatening word.

We acknowledge that there are limitations to our present research. First, our findings do not yet warrant generalization to other self-worth contingency domains. Although we have

considered two important areas – namely, thinness and academic contingencies – we cannot conclude that the same pattern of findings would emerge for Crocker's other contingency domains. On a related note, the domains we chose to assess were those that have previously been found to be particularly relevant to college students (Crocker et al., 2003). Thus, beyond a necessity to assess other domains, it will be crucial to consider different populations other than university undergraduate students. Second, we have used only one type of methodology to assess the precise circumstances under which a person orients their attention toward rejection. In addition to our novel cued dot probe approach, one might also consider the benefits of using other methods. For instance, a different approach may involve having participants imagine themselves undergoing different socially threatening experiences (e.g., think about failing an exam at school) before completing the dot probe task, as opposed to including a threatening cue word on select dot probe trials.[6] However, caution is warranted in applying this type of approach given our findings in Study 1 that suggests socially anxious people may show an avoidance pattern when confronted with socially threatening situations.

In our future research, we aim to extend this cued dot probe approach to the literature on attention bias modification (ABM). With the extensive body of work implicating negative attentional biases in the maintenance of insecurities (e.g., Bantin et al., 2016), efforts to target and reduce these biases have now become widespread. ABM is an intervention technique designed to train attention away from negative stimuli and toward positive stimuli. One form of ABM involves a modification to the standard dot probe task, whereby the probe is systematically paired in the location of the smiling face across all trials (MacLeod, Rutherford, Campbell, Ebsworthy, & Holker, 2002). As a result, a person implicitly learns over repeated dot probe trials that their attention should be drawn towards social acceptance rather than rejection. This type of

[6] We thank an anonymous reviewer for this suggestion.

ABM has been shown to be effective in reducing attention towards threat, as well as reducing emotional vulnerability among anxious people (MacLeod et al., 2002). Additionally, ABM has proven successful among individuals with low self-esteem (Dandeneau et al., 2007), as well as those with social anxiety (Amir et al., 2009; Heeren, Mogoase, Philippot, & McNally, 2015). Despite these advances, ABM targets a general attentional bias toward rejection – in other words, a person learns to orient toward social acceptance generally and consistently rather than under precise circumstances. As such, our goal is to modify ABM approaches by training an attentional bias toward social acceptance specifically when reminded of one's self-perceived flaw. Thus, only on dot probe trials cued with a relevant flaw will the dot probe appear behind the smiling face. Importantly, it is possible that it is this precise instance of attentional bias that is the driving force behind the vicious cycle of insecurity and thus efforts to intervene at this dynamic level may be a necessary therapeutic advance.

Our work also raises important clinical implications. In particular, our findings support clinical therapy models that highlight the need for considering a patient's contingent responses to specific events, rather than simply addressing more generic schemas[7]. For instance, metacognitive interpersonal therapy (MIT) for personality disorders represents one clear example of this type of approach (Dimaggio, Salvatore, MacBeth, Ottavi, Buonocore, & Popolo, 2017). MIT acknowledges that there is a great deal of variation in terms of the underlying maladaptive schemas between the different types of personality disorders. As such, an approach to treat one type of personality disorder cannot be generalized to treat other types. Thus, MIT focuses on understanding a specific patient's wishes (e.g., to be academically competent), responses of others' (e.g., rejecting, critical feedback), and the responses of the self to others (e.g., insecure, anxious). This type of therapy model is consistent with our dynamic *if-then* approach to

[7] We thank an anonymous reviewer for raising this issue.

attentional biases in that it focuses on more nuanced responses to specific contexts rather than on generic orientations.

It is important to note that we do not argue against the value of studying broad forms of insecurity. Of course, simply having contingent self-esteem in general can be a source of vulnerability (Baldwin & Sinclair, 1996; Bos et al., 2010; Ryan & Brown, 2006), as attempts to pursue self-esteem can have negative consequences for both a person's mental and physical health (Crocker & Park, 2004). Such broad self-esteem contingencies can arguably be captured by the terms *failure* and *success* (cf. Baldwin & Sinclair, 1996); we found this to be the case in Study 2 whereby self-esteem was associated with a rejection bias when cued with thoughts of failure but not success. However, as we explored in Studies 3 and 4, these generic terms refer to different things for different people depending on what they believe their shortcomings to be. As William James (1890) famously noted a century ago, whereas he wouldn't feel bad about his incompetence at Greek, he would be mortified by thoughts of being a failure in psychology. Thus, we emphasize that a focus on these specific vulnerabilities is also necessary, particularly if we aim to pin down the precise social cognitive mechanisms that underlie these vulnerabilities.

Overall, our findings highlight the importance of considering the precise instances under which a socially insecure person engages a heightened attentional bias toward stimuli representing social rejection. Beyond considering general attentional biases, therefore, it is important to acknowledge the patterns of selective attention that arise when a person is reminded of their perceived shortcoming. It is precisely in this instance when a person feels the most vulnerable to being rejected for their self-perceived flaws that they engage in biased information processing, which can lead them to view their social world in a way that confirms their worst expectations.

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Tables

Table 1

Self-perceived social competence flaws from Moscovitch and Huyder's (2011) NSPS Social Competence Subscale matched to a Helfinstein et al.'s (2008) social threat cue word.

Self-Flaw	Cue Word
Socially awkward	Clumsy
Lacking social skills	Inept
Lacking personality	Inadequate
Interpersonally ineffective	Incompetent
Unable to express oneself	Shy
Reserved	Inhibited
Humorless	Dull
Speaking incoherently	Foolish
Stupid	Stupid
Aloof	Uninvolved
Boring	Boring

Table 2

Cue words from Helfinstein et al. (2008) used in Study 4 to calculate the *context-cued rejection bias* and the *consequence-cued rejection bias*.

Cue Words	
Context	Consequence
Class	Criticized
Conversation	Despised
Dance	Disgraced
Date	Embarrassed
Festivity	Hated
Game	Hostile
Handshake	Humiliated
Invitation	Judged
Joke	Loathed
Party	Lonely
Presentation	Neglected
Speech	Rejected
Stranger	Ridicule
	Scorned
	Scrutiny
	Snub
	Unwelcome

Figures

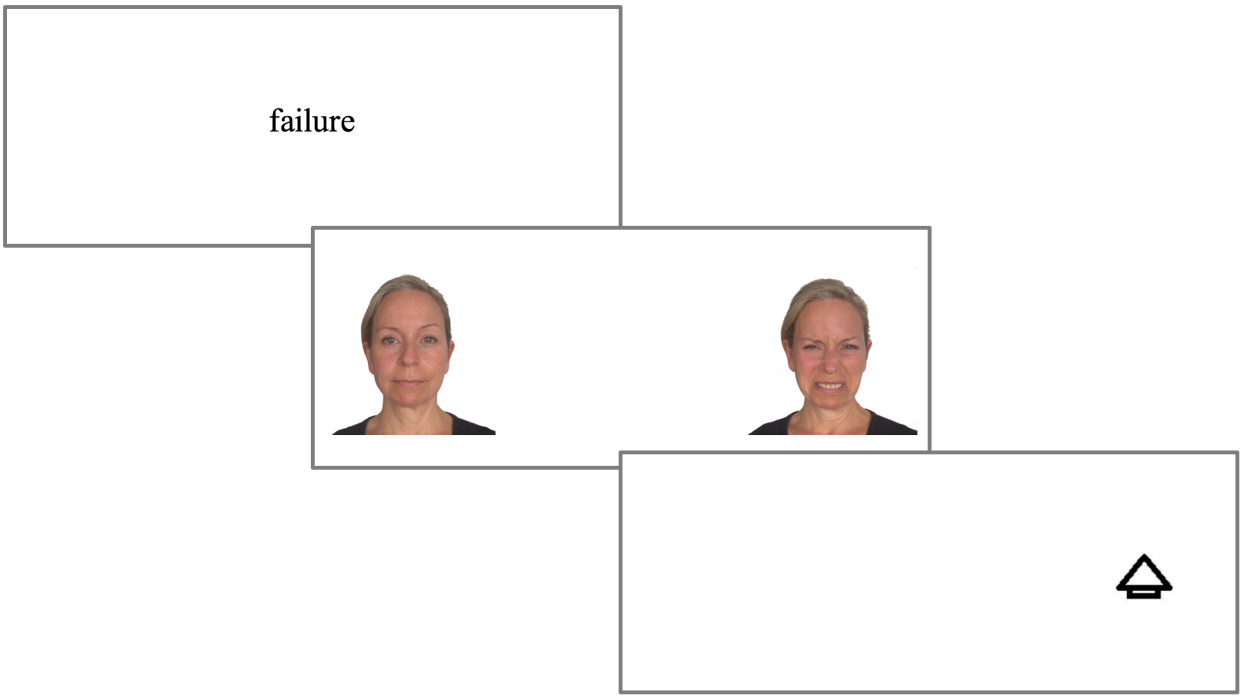

Fig. 1. Example of the cued dot probe task used in Study 2. A faster reaction time on this type of trial where the probe replaces the frown would indicate a stronger *failure-cued rejection bias* (i.e. a stronger attentional bias toward rejection when cued with the word *failure*).