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Abstract

Much research has identified how people react to receiving threatening information about the self. The purpose of this article is to discuss such experiences in the context of a model of state self-esteem regulation. The authors propose that people engage in one of three regulatory responses to threat: compensation, resistance, and breaking. They conduct a meta-analysis aimed to examine when people engage in each of these three responses to threat and how trait self-esteem affects the selection and success of selecting each regulatory response. Furthermore, the authors test six theoretical models that might explain why responses to ego threat vary across level of trait self-esteem. The models for differences between people with low and high trait self-esteem that fit the data best suggest that (a) self-esteem serves as a resource and (b) there is a self-verification motivation.

Keywords

self-esteem, self-regulation, self-identity

In their daily lives, people prefer to seek out experiences that confirm their winning talents and charm (S. C. Jones, 1973). Even people with low self-esteem prefer to receive information about their perceived positive traits rather than information about their other traits (Pelham, 1993). Despite people's best efforts to experience situations that confirm positive self-views, social life is uncertain. As a result, people may all too frequently come across unexpected behaviors from friends, mentors, strangers, and even themselves. These unanticipated situations may further confirm people's positive characteristics, or they may call into question their perceived abilities or social standing.

Most people have relatively positive views of both their specific and their global traits (Twenge & Campbell, 2008; vanDellen, Bradfield, & Hoyle, 2010). When people come across unexpected positive information about the self, this information is easy to process because it generally confirms what people already know and feel. Even people who have relatively low self-esteem prefer feedback about themselves that is positive, so long as it is also perceived as true (Swann, Pelham, & Krull, 1989). Negative information about the self, however, is harder to manage. This feedback is at odds with expectations and—compared to positive information—is associated with larger changes in self-esteem for both people with high and low self-esteem (Leary, Haupt, Strausser, & Chokel, 1998). Furthermore, negative self-related information is more influential than positive feedback for

self-evaluation and the regulation of depression and anxiety across level of self-esteem (Woolfolk, Novalany, Gara, Allen, & Polino, 1995).

Our focus in this article is on reactions to negative information about the self. We first discuss such reactions in a self-regulatory framework and introduce three general outcomes that might occur as a result of people regulating state self-esteem. Next, we highlight six models of self-esteem that might account for why people with high and low trait self-esteem differ in the regulation of state self-esteem. Finally, we present the results of a meta-analysis testing how well these models predict responses to threats to self-worth.

Self-Regulation of State Self-Esteem

Following a cybernetic self-regulatory perspective, we expect that negative information about the self evokes a discrepancy between people's *desired* self-feelings and their *current* self-feelings (vanDellen et al., 2010). Theories of general self-regulation posit that when people experience

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discrepancies between desires or expectations and reality, they attempt to reduce resultant negative affect by changing their expectations, reconstruing reality, or exiting the situation (Carver & Scheier, 1981; Higgins, 1987; Rothbaum, Weisz, & Snyder, 1982). Self-regulation is successful when the discrepancy is eliminated or reduced (Carver & Scheier, 1990). In this article, we are interested in the regulation of state self-esteem. We assume that, with rare exceptions, people possess a standard for having high—or higher—self-esteem. Although not all people may express behavior toward this standard in similar ways (e.g., people with low self-esteem may express this desire indirectly, whereas those with high self-esteem may express it directly; Gibbons & McCoy, 1991), consensus across a variety of theoretical perspectives is that most people (i.e., those without pathologically negative self-views) desire to have more positive self-views (Baumeister & Tice, 1985; Pyszczynski, Greenberg, Arndt, & Schimel, 2004; Sedikides & Strube, 1997). When instead people encounter negative information about the self, they experience an undesired discrepancy between the standards they have for their self-feelings and the way the situation suggests they should feel about themselves. As a result, people engage in strategies aimed to minimize this discrepancy. As in the case of general self-regulation, efforts to regulate state self-esteem may be conscious or effortful or may be automatic and unintentional.

What Is Threat?

In the context of a self-regulatory model of self-esteem, negative information about the self plays an important role by threatening the validity of people's desired self-views. We define threat as an event that calls into question one's positive self-regard. Importantly, this positive self-regard may be either current (as in the case of people with high trait self-esteem) or desired (as in the case of people with both low and high self-esteem). As a result, threats evoke self-regulation of state self-esteem. A potential source of threat is feedback about one's intelligence or academic competence (e.g., Aspinwall & Taylor, 1993; Baumeister & Tice, 1985) or one's personality or social competence (e.g., Baumgardner, Kaufman, & Levy, 1993; Brown, Collins, & Schmidt, 1988). Another source of threat involves the experience of relational devaluation (e.g., Leary et al., 1998; Leary, Terdal, Tambor, & Downs, 1995). Threat may also occur when people find that they have acted inconsistently with their beliefs (e.g., Festinger & Carlsmith, 1959) or when they are faced with the notion that they are creaturely or that their lives will end and might therefore have questionable value (e.g., Greenberg et al., 1992). Such notions lead to increased negative affect, presumably because self-standards have been violated (Harmon-Jones, 2000).

Although threat to self-worth may come in a variety of forms, social psychologists have largely used negative

feedback about academic competence, social skills, or interpersonal relationships to threaten self-esteem. A recent review by Leary and colleagues points out that these threats vary greatly (Leary, Terry, Allen, & Tate, 2009). Keeping this argument in mind, we have included only threats that at least in some way invoke a discrepancy between desired and current self-worth. We have examined variation across type of threat so that, if there are substantive differences across threatening situations, we will be able to uncover those.

The result is that we are examining a range of situations (a) that invoke a discrepancy between actual and desired self-worth and (b) where the context is used as a separate variable allowing us to examine the consistency across these situations (i.e., threat) as well as possible differences. Clearly, additional psychological processes may also be at play (e.g., responding to a lack of personal control, responding to a personal affront) in any of these situations. However, the meta-analytic approach we employ allows us to examine the commonality across these situations. For instance, people who are exposed to thoughts about their own death may feel as though their self-worth is called into question because their value is temporary (Greenberg et al., 1992; for a review, see Burke, Martens, & Faucher, 2010). Similarly, people who realize they are acting inconsistently with their explicit attitudes may feel that they are not worth positive self-views if they do not act as they think they should (Steele, Spencer, & Lynch, 1993).

In the current article, we are interested in reactions to threat rather than preparations for threat. Because of this interest, we include only studies that treated threat as an event that has occurred, not as one that could occur. Stereotype threat, for instance, is an event that may call into question one's value. However, the threat exists because it reminds people that in the future some evaluation of them may be based on their race, sex, or stigmatized status. The threat is not one that has occurred but indicates that one might occur in the future. Because the threat has not yet occurred, different regulatory strategies may be at play in an attempt to thwart the event or to prepare the self to respond to the threat. For instance, when people know they will be evaluated on a very difficult task, they may self-handicap by cutting short their practice time or seeking other excuses for potential failure (e.g., E. E. Jones & Berglas, 1978; Tice & Baumeister, 1991). If people then receive negative feedback, they have an easy excuse to explain their poor performance because they short-changed the perceived effort they put into the task. Another example of expected threat would include situations in which people expect to be embarrassed by a behavior. For instance, in some studies, experimenters have informed participants that they will soon be giving a speech or singing the national anthem (e.g., Farag, Bardwell, Nelesen, Dimsdale, & Mills, 2003). Such manipulations are aimed more at increasing stress or embarrassment rather than presenting a threat to self-worth. Because they do not necessarily invoke a discrepancy

between current self-feelings and desired self-feelings, we do not consider these manipulations as threats to self-worth in this article. In contrast, we focus on threat as information that has been received or experiences that have been encountered. Because we are interested in reactionary rather than preparatory strategies, we examine only situations in which threat has already occurred.

How Do People React to Threat?

Many studies have investigated how people respond to negative information about the self (e.g., Brown & Dutton, 1995; Leary et al., 1995; for a review, see Leary et al., 2009). Common responses to threats include making external attributions for failure (e.g., Millimet & Gardner, 1972; Shrauger & Lund, 1975), shifting attention to perceived positive characteristics (e.g., Aronson, Blanton, & Cooper, 1995; Dodgson & Wood, 1998), and engaging in risky behaviors (e.g., Baumeister, Heatherton, & Tice, 1993; Twenge, Baumeister, DeWall, Ciarocco, & Bartels, 2007). Importantly, each of these strategies provides people with a chance to rapidly realign their situational self-feelings with their desired self-feelings. In the long run, however, these strategies are not guaranteed to produce positive feelings. For example, attributing failure to an external source rather than accepting responsibility may prevent people from practicing a skill and may eventually expose them to further negative feedback. Furthermore, engaging in risky behaviors might provide an immediate affective boost if the risk pays off but might leave people even further discouraged if the risks are unsuccessful. Despite these unwanted long-term outcomes, each of these behaviors could provide an immediate resolution to the discrepancy evoked by the threatening self-related information.

Not all people respond to threatening information about the self in the same way. Although some people may challenge the threat behaviorally or cognitively, others may instead lower their expectations to reduce discrepancy. For example, some people may acknowledge the negative information as valid (Fitch, 1970; Swann, Griffen, Predmore, & Gaines, 1987). This strategy might not immediately restore positive affect and state self-esteem but could still effectively reduce the experienced discrepancy. In the long run, such a strategy might provide the benefit of preventing a recurrence of a similar unpleasant event.

Our focus on threatening information about the self as an instigator of self-regulation hinges on the assumption that self-esteem serves important social and psychological functions (Baumeister & Leary, 1995; Greenberg et al., 1992). Situations involving threatening information about the self therefore invoke self-regulatory processes aimed at bolstering or restoring self-esteem. The aim of these strategies is not self-regulation in general but rather a subset of self-regulation involving the management of state self-esteem. In this article, we classify the multitude of reactions people

Table 1. Examples of Compensating, Breaking, and Resisting Responses

Compensating	Breaking	Resisting
External attributions for failure	Internal attributions for failure	Equal internal and external attributions for failure
Positive self-evaluations	Negative self-evaluations	Neutral self-evaluations
Downward social comparisons	Upward social comparisons	No preference for upward or downward social comparisons
Increased aggression	Decreased aggression	No change in aggression
Increased mood or state self-esteem	Decreased mood or state self-esteem	No change in mood
Increased motivation, persistence, or performance	Decreased motivation, persistence, or performance	No change in motivation, persistence, or performance
Negative evaluations of evaluators and relevant others	Positive evaluations of evaluators and relevant others	Neutral evaluations of evaluators and relevant others
Increased in-group bias	Decreased in-group bias	No change in in-group bias
Increased justification for behavior	Decreased justification for behavior	No change in justification for behavior
Attention to success	Attention to failure	No change in attention

might demonstrate after receiving negative information about the self into three categories: *breaking*, *compensating*, and *resisting* (see Table 1 for examples of each type of response).

Breaking responses are aimed at changing people's self-construals. Rather than denying that the negative information is valid, people might lower their self-expectations. For example, after receiving failure feedback on an academic competency task, people might report that the task is a good measure of academic competence or conclude that they must not be intelligent. Breaking strategies are often reflected in behaviors and cognitions that reflect an acceptance of the threat as valid. Other examples of breaking occur when people become less aggressive, evidence a decreased in-group bias, and report negative mood.

Compensating strategies are aimed at changing construals of the current situation. Such strategies might minimize the significance of negative self-related information or refocus attention to other information that could be used to evaluate the self. For example, compensating might occur when people who have been rejected by others derogate those who did the aggressing or inflate their views about their own

intelligence. Importantly, although people likely do not intend for them to do so, compensating responses go beyond merely making up for the negative information. For instance, rather than simply blaming others for failure enough to protect self-esteem, people might blame others for failure to such an extent that they actually experience an immediate *increase* in state self-esteem. People are unlikely to be aware of the extent to which their responses will overshoot the mark needed to restore self-esteem prior to engaging in them. We assume that compensatory responses involve as much energy and effort as people can put forth to reduce the discrepancy. The larger the discrepancy, the greater the people want to restore self-esteem by changing the situation. We discuss compensation that does not overreact to a discrepancy as an example of a resistance response.

Along with compensating or breaking, people may resist threatening information about the self. Resistance may involve any combination of active and passive strategies. We define resistance in much the same way that one might think about a body resisting a disease. A body can resist disease through active measures (e.g., white blood cells attack foreign materials) or through passive measures (e.g., skin prevents diseases from entering the body). In terms of resistance responses to threatening information about the self, people may engage in passive strategies such as failing to recognize the existence or personal relevance of threatening information. Active responses might occur if people respond to threatening information about the self in ways that restore self-esteem to its desired level. For example, people may shift attention to their other positive characteristics, but only as much as they need to do to restore self-feelings. Such attention shifts would not constitute compensation because they do not involve as much effort oriented at immediately restoring state self-esteem. Given our intention to review responses to threatening information in this article, we cannot distinguish between active and passive resistance responses. Although some studies may have included additional measures of whether threat has been noticed, such measures are not common.

Because these defensive strategies are aimed at regulating state self-esteem, we expect that trait self-esteem will affect which strategies people select and the degree to which their implementation is successful. Indeed, many studies have shown that people with high trait self-esteem differ from people with low self-esteem in the likelihood and degree to which they attempt to restore self-esteem after experiencing threat (Crocker, 1993; Dunning & Beauregard, 2000; S. C. Jones, Knurek, & Regan, 1973; Sommer & Baumeister, 2002; Stone & Cooper, 2003). In this article, we analyze not only overall reactions to threatening information about the self but also the extent to which trait self-esteem influences patterns of responding. Next, we review six models that provide potential explanations for why trait self-esteem affects reactions to self-esteem threat.

Models of Reactions to Threat

Despite recent debate over the importance of trait self-esteem in predicting behavior (Baumeister, Campbell, Krueger, & Vohs, 2003; Swann, Chang-Schneider, & McClarty, 2007), trait self-esteem appears to serve an important role as a moderator of behavior, affecting how people respond under specific circumstances. One advantage of this article is that our meta-analytic strategy allows us to examine how trait self-esteem moderates responses to threatening information about the self across a broad literature. Many theories have posited that people with low and high self-esteem should differ with respect to how they respond to threat. Some theories suggest that people with low self-esteem should respond more dramatically to threat (Brockner, 1983), whereas others suggest that people with high self-esteem should experience greater swings in affect, behavior, and cognition after they receive threatening information about the self (Kernis, Cornell, Sun, Berry, & Harlow, 1993). In essence, these theories differ in their predictions of whether compensating, resisting, and breaking reactions to threat will occur among people with high and low self-esteem. Some of these theories also clarify when people with high self-esteem and low self-esteem should differ. In our analysis, we examine two of these situational factors: *strong threat* (as compared to weak threat) and *response domain* (affect, behavior, or cognition).

Because our article reports the results of a meta-analysis, we can simultaneously test how well these six theories predict responses to threatening information about the self. In a single study—or even in a series of studies—comparing six competing hypotheses would be very difficult. Although a meta-analysis does not allow for a detailed test of the predictions made by each theory, it can provide a basis for understanding when specific theories might correctly prescribe behavior. In our analysis, we compare six theoretical explanations for why people with low and high self-esteem might differ in their reactions to threat. Tables 2 and 3 present a summary of predictions that would be consistent with each of the models we review. Next, we expand on the specific predictions consistent with each theoretical model.

Self-Verification Model. One view on self-esteem, the self-verification model, suggests that people tend to prefer information that confirms their self-views. In other words, people with high trait self-esteem should attempt to maintain high self-esteem and people with low trait self-esteem should attempt to maintain low self-esteem. Typically, research on self-verification has addressed what situations people prefer to experience (Swann, Wenzlaff, Krull, & Pelham, 1992; Swann, Wenzlaff, & Tafari, 1992). In this article, however, we are interested in whether self-verification motivations affect how people respond to negative information about the self. Receiving negative information about the self should strengthen the motivation to self-verify (e.g., Shrauger & Rosenberg, 1970; Taylor, Neter, & Wayment, 1995). For

Table 2. Predictions for Responses to Threat Across Level of Trait Self-Esteem and Level of Threat

Theory	Ego threat			
	High		Low	
	HSE	LSE	HSE	LSE
Self-verification	Compensation	Breaking	Compensation	Breaking
Self-enhancement	Compensation	Compensation	Compensation	Compensation
Threat-neglect model	Resistance	Breaking	Resistance	Breaking
Self-esteem as resource	Compensation	Breaking	Compensation	Resistance
Low self-esteem plasticity	Resistance	Breaking	Resistance	Breaking
Self-esteem as stake	Breaking	Resistance	Breaking	Resistance

Note: HSE = high self-esteem; LSE = low self-esteem.

example, in one study, participants who had received information evoking a discrepancy between their desired view and their current view were more likely to seek self-verifying information (Frey, 1981). Among people with high self-esteem, this should be demonstrated by attempts to highlight positive aspects of the self (i.e., compensating reactions). Among people with low self-esteem, however, discrepant information should lead to attempts to confirm negative aspects of the self (i.e., breaking reactions).

We have no reason to suspect that this pattern of responses, by which people with high self-esteem evidence compensating reactions and people with low self-esteem display breaking reactions, should differ across intensity of threat. However, a self-verification perspective might predict a different pattern of results across response domains (i.e., affect, behavior, cognition). Although people with high self-esteem find threat inconsistent with their self-views, people with low self-esteem might find that threat confirms their current self-views (Shrauger, 1975; Swann et al., 1987). Such differences are not as common in affective reactions because both people with high and low self-esteem want to have positive self-views. Following from this, we expect that after threat people should demonstrate breaking on affective measures regardless of their trait self-esteem. After threat, however, we expect that people should continue to self-verify with people with high self-esteem evidencing behavioral and cognitive strategies aimed at restoring self-esteem (either resistance or compensating) and people with low self-esteem demonstrating behavioral and cognitive breaking responses.

Self-Enhancement Model. Another possible explanation for differences between effect sizes among people with high and low self-esteem is that people with high and low self-esteem might have self-enhancement motivations that differ in strength (Baumeister, 1982; Crocker & Schwartz, 1985; Shrauger, 1975). Although some have argued that people with low self-esteem might have a stronger self-enhancement motivation (e.g., Shrauger, 1975), others have found that people with high self-esteem have a stronger self-enhancement motivation (e.g., Baumeister, 1982; Crocker & Schwartz, 1985).

Typically, we might expect that people with high self-esteem would have a weaker self-enhancement motivation because they might be satiated (at least more so than people with less self-esteem). However, we are studying a specific situation where satiation is not likely. That is, we are investigating the possibility that threat might increase the self-enhancement motivation. Given this specific situation, people with high self-esteem might have a stronger self-enhancement motivation after threat because their experience of the threat could evoke a larger discrepancy between their desired and current self-views than it would for people with lower levels of trait self-esteem.

We are interested in how self-enhancement motivations affect responses to threat. As a result, we suspect that people with high self-esteem likely have stronger self-enhancement motivations if negative information about the self evokes a larger self-regulatory discrepancy. In this perspective, all people would enhance after threat, but people with high self-esteem might be more likely to do so, or might do so to a greater degree. As Tables 2 and 3 show, all people should demonstrate compensating responses to threat—because all people should have a positivity striving after a negative experience. These responses should be consistent across levels of ego threat and response domain. Although all responses should demonstrate compensating, if we see any differences across level of self-esteem, we would expect larger compensation responses among people with high self-esteem than among those with low self-esteem.

Threat-Neglect Model. In this perspective, self-esteem serves as a buffer from experiencing threat, protecting people from realizing that threatening information is either negative or self-relevant and, therefore, minimizing the need to regulate state self-esteem. Some evidence for this theory comes from research showing that people with low self-esteem may be more attentive to social cues (Pickett, Gardner, & Knowles, 2004). As a result, they might also be more likely to notice interpersonal rejection. If self-esteem serves as a buffer from threat, we would expect to see little to no differences between control groups and threatened groups

Table 3. Predictions for Responses to Threat Across Level of Trait Self-Esteem and Response Domain

Theory	Response domain					
	Affect		Behavior		Cognition	
	HSE	LSE	HSE	LSE	HSE	LSE
Self-verification	Breaking	Breaking	Compensation	Breaking	Compensation	Breaking
Self-enhancement	Compensation	Compensation	Compensation	Compensation	Compensation	Compensation
Threat-neglect model	Resistance	Breaking	Resistance	Breaking	Resistance	Breaking
Self-esteem as resource	Resistance	Breaking	Compensation	Resistance	Compensation	Resistance
Low self-esteem plasticity	Resistance	Breaking	Resistance	Breaking	Resistance	Breaking
Self-esteem as stake	Breaking	Resistance	Breaking	Resistance	Breaking	Resistance

Note: HSE = high self-esteem; LSE = low self-esteem.

for people with high self-esteem but much larger differences between groups for people with low self-esteem. That is, people with high self-esteem should demonstrate resistance reactions to threat and people with low self-esteem should evidence breaking responses.

Self-Esteem as Resource Model. Another possibility is that self-esteem serves as a resource not at the point of detecting threat but rather at the point of responding to the threat. In this view, a positive self-view provides a resource for invalidating potentially incongruent information in much the same way that positive views of political figures increase the likelihood that people will view negative information about that political figure as invalid. We operate under the assumption that people with high self-esteem have a larger pool of positive experiences and thoughts about the self that they can draw on when threats occur (Spencer, Josephs, & Steele, 1993). People with high self-esteem also may be more aware of their strengths and have more complex self-perceptions than people with low self-esteem (J. D. Campbell & Lavelle, 1993). Thus, self-esteem itself is not the resource, but the positive experiences and cognitive tendencies that give rise to high self-esteem provide resources on which people draw when they are threatened. Importantly, although we refer to these experiences as resources, these are cognitive resources, not motivational resources such as those used in general self-regulation (e.g., Baumeister, Bratlavsky, Muraven, & Tice, 1998).

The theory that such experiences are resources during threat would be supported if people with high self-esteem demonstrated more compensating than did people with low self-esteem. People with low self-esteem may evidence resistance or breaking. Furthermore, we should expect to see that people with low self-esteem are particularly unable to immediately manage strong ego threats. We might also expect to see response domain affect the magnitude of effect sizes. Because regulation of state self-esteem may involve changing cognitions or behaviors to realign current feelings with desired feelings, changing affect should be more difficult than changing behaviors or cognitions. In essence,

responses measuring affect should be more strongly related to the threat than responses measuring cognition and behavior. For example, following negative feedback about academic competence, it should be harder for people to report that they are feeling happy than that they are good at music because reflecting on mood requires more consideration of the threat that has just occurred. As a result, we might expect to see more compensating in domains of cognition and behavior than in affect, particularly among people with high self-esteem.

Low Self-Esteem Plasticity Model. Some evidence points to greater plasticity among people with low self-esteem than among people with high self-esteem. That is, people with low self-esteem are influenced more heavily by the information they receive from their environment than people with high self-esteem (Brockner, 1983; J. D. Campbell & Lavelle, 1993). This theoretical perspective receives further support from evidence that people with high self-esteem have clearer self-concepts than individuals with low self-esteem (J. D. Campbell, 1990). As a result, people with low self-esteem—who tend to have less clear self-concepts—should be more likely to view threatening information as useful and, therefore, should be more affected by it.

If this theory explains differences between people with high and low self-esteem, we would expect to see consistent breaking responses by people with low self-esteem. That is, people with low self-esteem should shift their self-views to be in line with the information they are currently receiving about the self. People with high self-esteem, on the other hand, should be relatively unaffected by threat. Rather than breaking or compensating, they should demonstrate resistance effects. This pattern of responses should be consistent across levels of ego threat and response domain.

Self-Esteem as Stake Model. A final model that might explain how people with low and high self-esteem might differ in the regulation of state self-esteem in response to threat focuses on the amount of discrepancy that receiving a threat evokes. This model assumes that people with low self-esteem have lower standards for positive self-views than people

with high self-esteem and that threat therefore leads to larger discrepancy for people with high self-esteem. As a result, people with high trait self-esteem have more at risk because their standards and typical experiences are more positive than are those of people with low self-esteem. Furthermore, people with low self-esteem expect to perform more poorly than do people with high self-esteem (e.g., McFarlin & Blascovich, 1981). Importantly, implicit in this model is that threat leads to breaking responses when they trigger self-regulation. We address the potential for people with high self-esteem to react to threat by compensating in the self-esteem as resource model.

Although such vulnerability may be most evident among people with highly contingent self-worth (e.g., Kernis, Lakey, & Heppner, 2008), for the purposes of this meta-analysis one might still predict that people with high trait self-esteem in general might evidence more negative reactions to threat. Support for this theory would be obtained if people with high self-esteem demonstrated larger breaking reactions to threat than did people with low self-esteem. This perspective would predict that people with low self-esteem—because the threat would not be discrepant from their expectations—would demonstrate resistance reactions to threat.

Summary of the Meta-Analysis

We conducted a meta-analysis to examine how people with high and low trait self-esteem engage in the regulation of state self-esteem after experiencing a threat to self-worth. Here, we introduce operational definitions of threat and the moderators used to examine the utility of six theoretical explanations for differences in self-esteem regulation.

Method

Operationalization of Threat. In the meta-analysis, we focused specifically on four manipulations of threat. First, we included studies that manipulated threat by providing negative feedback to participants. Second, we included studies that used social exclusion or rejection as threat. Third, we included studies that used cognitive dissonance as threat. And finally, we included studies in which mortality salience was used to threaten self-worth. We also included in the meta-analysis studies in which participants recalled past experiences of each of these four threats. Several studies using recall of past threat have demonstrated that participants respond to remembering past threat similarly to when they experience a current threat (e.g., Brown, 1998; Gardner, Pickett, & Brewer, 2000; Murray, Holmes, MacDonald, & Ellsworth, 1998).

Literature Search. To identify articles relevant to the study, we searched PsycINFO using the search terms *self-esteem and threat*, *self-esteem and exclusion*, *self-esteem and negative feedback*, *mortality salience and self-esteem*,

and *self-esteem and cognitive dissonance*. After gathering these articles, we searched their reference sections and found any relevant articles. Next, we used PsycINFO to conduct author searches for the names of those who had authored multiple articles. We also searched the reference sections of relevant review articles (e.g., Burke et al., 2010; W. K. Campbell & Sedikides, 1999). Finally, we sent an email to the Society for Personality and Social Psychology listserv requesting any unpublished studies relevant to the analyses. We searched for articles through December 2009.

Criteria for Study Inclusion. We included a study in the meta-analysis if it met three criteria. First, the study had to contain a measurement of trait self-esteem.¹ Second, the study had to contain either an actual or a recalled threat to self-esteem. Studies that included only a future threat (e.g., giving a speech) were not included in the analysis. Finally, the study had to contain enough information for an effect size to be calculated by self-esteem group (high vs. low). Studies that included only participants who were known to be low or high in self-esteem were included in the analysis but contributed effect sizes only for the self-esteem group included in the study.

Coding and Effect Size Calculations. Two independent coders separately coded each study. They agreed on 97% of the separate codes.² Of the disagreements, 21% were about response domain and 16% were about the form of the threat. Disagreements were discussed and resolved.

In this meta-analysis, we were interested in the effect of threat across levels of trait self-esteem. We used Cohen's *d* to measure the standardized difference between the mean of participants in the threat condition and the mean of participants in the nonthreat condition. For studies that included a neutral or no-feedback control group in addition to a success or esteem-boosting group, we calculated the average effect size between the threat group and each of these two groups. We calculated two effect sizes per outcome for studies that included both low and high self-esteem groups and one effect size per outcome for studies that included only pre-screened low or high self-esteem groups. Two separate coders calculated each effect size. If disagreements arose, they compared calculations and resolved them. Effect sizes were coded as positive if they demonstrated a compensating response and negative if they demonstrated a breaking response.

A total of 103 studies met the criteria for study inclusion. These were published in 71 articles and contained a total of 18,444 participants. We calculated a total of 349 effect sizes, 167 for low self-esteem and 182 for high self-esteem. After collapsing across outcome, most studies contributed more than one effect size, one for people with high self-esteem and one for people with low self-esteem. These effect sizes, along with how each study was coded, are reported in Table 4.

Table 4. Effect Sizes, Outcomes, and Coded Moderators for Studies Used in the Meta-Analysis

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Aspinwall and Taylor (1993), Study 1	Other	Affect	Private	Self	Irrelevant	Affect	2.68	1.21
Aspinwall and Taylor (1993), Study 2	Negative feedback	Self-evaluations	Private	Self	Relevant	Cognition	-0.10	-0.31
Baldwin and Wesley (1996)	Mortality salience	Evaluations of others	Private	Other	Irrelevant	Cognition	0.47	-0.37
Baumeister and Tice (1985), Study 1	Negative feedback	Experimenter rating	Public	Other	Relevant	Cognition	0.43	0.65
		Humiliation	Public	Self	Relevant	Affect	-0.67	-1.07
		Intrinsic motivation	Public	Self	Relevant	Behavior	0.55	-0.47
Baumeister and Tice (1985), Study 2	Negative feedback	Task performance	Public	Self	Relevant	Behavior	-0.01	0.40
Baumeister, Heatherton, and Tice (1993), Study 3	Negative feedback	Self-regulation	—	Self	Irrelevant	Behavior	-1.15	0.07
Baumgardner, Kaufman, and Levy (1989), Study 2	Negative feedback	Evaluator rating	Private	Other	Relevant	Cognition	0.75	0.50
Baumgardner et al. (1989), Study 3	Negative feedback	Evaluator rating	Private	Other	Relevant	Cognition	0.35	0.35
		State self-esteem	Private	Self	Relevant	Affect	-0.35	-0.04
Brockner (1979)	Negative feedback	Task performance	Public	Self	Irrelevant	Behavior	-0.15	0.26
Brockner et al. (1983), Study 2	Negative feedback	Task performance	Public	Self	Relevant	Behavior	0.18	-0.01
Brockner and Chen (1996)	Negative feedback	Evaluations of others	Private	Other	Relevant	Cognition	0.37	0.20
		Internal attributions	Private	Self	Relevant	Cognition	0.34	0.14
Brockner, Derr, and Laing (1987), Study 1	Negative feedback	Task performance	Private	Self	Relevant	Behavior	-0.90	-1.33
Brockner et al. (1987), Study 2	Other	Evaluations of other	Private	Self	Relevant	Cognition	0.04	-0.72
Brown (1988), Study 1	Other	Internal attributions	Private	Self	Relevant	Cognition	-0.30	-0.41
Brown (1988), Study 2	Other	Internal attributions	Private	Self	Relevant	Cognition	-0.77	-0.73
Brown, Collins, and Schmidt (1988), Study 2	Negative feedback	In-group evaluations	Private	Self	Irrelevant	Cognition	0.06	0.09
		Out-group evaluations	Private	Other	Irrelevant	Cognition	0.25	0.47
Brown and Dutton (1995), Study 1	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.60	-0.96

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Brown and Dutton (1995), Study 2	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.33	-0.51
		Self-ratings	Private	Self	Relevant	Cognition	0.26	-0.44
Brown, Dutton, and Cook (2001), Study 2	Negative feedback	Self-ratings	Private	Self	Relevant	Cognition	0.61	-0.21
Brown et al. (2001), Study 3	Negative feedback	Self-ratings	Private	Self	Relevant	Cognition	0.61	-0.19
Brown and Gallagher (1992), Study 2	Negative feedback	Evaluations of others	—	Other	Irrelevant	Cognition	0.63	-0.13
		Self-evaluations	—	Self	Irrelevant	Cognition	0.61	0.13
Brown and Smart (1991), Study 1	Negative feedback	Academic self-evaluations	Public	Self	Relevant	Cognition	-0.07	-0.31
		Social self-evaluations	Public	Self	Irrelevant	Cognition	0.80	-0.99
Brown and Smart (1991), Study 2	Negative feedback	Helping	Public	Other	Irrelevant	Behavior	0.55	-0.41
		Academic self-evaluations	Public	Self	Relevant	Cognition	-0.17	-0.21
		Social self-evaluations	Public	Self	Relevant	Cognition	0.59	-0.82
Bushman et al. (2009)	Negative feedback	Direct aggression	Public	Other	Relevant	Behavior	1.05	0.47
		Indirect aggression	Public	Other	Irrelevant	Behavior	0.19	0.24
J. D. Campbell, Chew, and Scratchley (1991)	Other	Internal attributions	Private	Self	Relevant	Cognition	0.57	-0.28
Crocker (1993)	Negative feedback	Recall	Public	Other	Relevant	Cognition	1.47	-0.88
Crocker, Thompson, McGraw, and Ingerman (1987), Study 1	Negative feedback	Other ratings	Public	Other	Relevant	Cognition	0.75	0.16
Crocker et al. (1987), Study 2	Other	In-group favoritism	Public	Other	Relevant	Cognition	0.93	-0.22
Dittes (1959)	Exclusion	Attraction	Public	Self	Relevant	Affect	0.00	-0.59
Dodgson and Wood (1998), Study 1	Negative feedback	Ratings of performance	Public	Self	Relevant	Cognition	-1.47	-1.46
		Self-ratings	Public	Self	Irrelevant	Cognition	0.15	-0.07
Dodgson and Wood (1998), Study 2	Negative feedback	Self-ratings	Public	Self	Irrelevant	Cognition	-0.66	-0.77
Dunning and Beauregard (2000)	Negative feedback	Evaluations of others	Private	Other	Relevant	Cognition	-0.99	-0.42
		Self-evaluations	Private	Self	Relevant	Cognition	-0.09	-0.10

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Exline and Lobel (1997)	Other	Affiliation with others	Private	Self	Irrelevant	Cognition	0.33	-0.13
Feick and Rhodewalt (1997)	Negative feedback	Attributions	Private	Self	Relevant	Cognition	0.31	0.10
Fitch (1970)	Negative feedback	Internal attributions	Public	Self	Relevant	Cognition	0.70	0.06
Gailliot, Schmeichel, and Maner (2007), Study 2 ^a	Mortality salience	Worldview defense	Private	Other	Irrelevant	Cognition	0.45	—
Gibbons, Eggleston, and Benthin (1997)	Cognitive dissonance	Perceived risk	Private	Self	Relevant	Cognition	0.75	0.22
Gibbons and McCoy (1991), Study 1	Negative feedback	Affect	Private	Self	Irrelevant	Affect	-0.15	-0.70
Gibbons and McCoy (1991), Study 1	Negative feedback	Attraction	Private	Other	Irrelevant	Affect	0.28	0.04
Gibbons and McCoy (1991), Study 1	Negative feedback	Other evaluation	Private	Other	Irrelevant	Cognition	0.29	0.03
Gibbons and McCoy (1991), Study 1	Negative feedback	Social comparison	Private	Both	Irrelevant	Cognition	0.34	-0.25
Gibbons and McCoy (1991), Study 2	Negative feedback	Affect	Private	Self	Irrelevant	Affect	-0.78	-0.32
Gibbons and McCoy (1991), Study 2	Negative feedback	Social comparison	Private	Both	Irrelevant	Cognition	-0.02	-0.47
Harmon-Jones et al. (1997), Study 2 ^a	Mortality salience	Worldview defense	Private	Other	Irrelevant	Cognition	-0.05	—
Heatherton, Herman, and Polivy (1991)	Negative feedback	Self-regulation	Public	Self	Irrelevant	Behavior	0.21	-0.57
Heatherton and Vohs (2000), Study 1	Negative feedback	Antagonism	Public	Other	Irrelevant	Behavior	-0.65	-0.11
		State self-esteem	Public	Self	Relevant	Affect	0.03	-0.35
Heatherton and Vohs (2000), Study 2	Negative feedback	Antagonism	Public	Other	Irrelevant	Behavior	-0.69	0.29
		Affect	Public	Self	Relevant	Affect	-0.10	-0.41
Hoyle, Insko, and Moniz (1992), Study 1	Negative feedback	Attraction	Public	Other	Irrelevant	Affect	-0.07	3.04
Hoyle et al. (1992), Study 2	Negative feedback	Attraction	Public	Other	Irrelevant	Affect	0.20	-0.11
S. C. Jones, Knurek, and Regan (1973), Study 2	Exclusion	Attraction Partner choice	Public Public	Self Self	Relevant Relevant	Affect Behavior	0.15 0.47	1.15 1.43

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Jussim, Yen, and Aiello (1995)	Negative feedback	Attributions	Public	Both self and other	Relevant	Cognition	0.40	-0.53
Kernis, Brockner, and Frankel (1989)	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.24	-0.90
		Internal attributions	Private	Self	Relevant	Cognition	0.10	-0.40
Kernis, Cornell, Sun, Berry, and Harlow (1993), Study 1	Negative feedback	Affect	Public	Self	Relevant	Affect	-0.92	-0.68
		Attraction	Public	Other	Relevant	Affect	1.94	1.13
		Evaluator ratings	Public	Other	Relevant	Cognition	1.66	0.46
		Perceived feedback accuracy	Public	Other	Relevant	Cognition	1.26	0.62
Koch and Shepperd (2008), Study 1	Exclusion	Internal attributions	Public	Self	Relevant	Cognition	0.45	0.53
		State self-esteem	Public	Self	Relevant	Affect	-0.85	-0.62
Koch and Shepperd (2008), Study 2	Exclusion	State self-esteem	Public	Self	Relevant	Affect	-0.81	-0.64
Korman (1968), Study 1	Negative feedback	Task liking	Private	Other	Relevant	Affect	0.72	0.18
Korman (1968), Study 2	Negative feedback	Task liking	Private	Other	Relevant	Affect	0.39	-0.01
Korman (1968), Study 3	Negative feedback	Task liking	Private	Other	Relevant	Affect	0.13	0.06
Lammers and Becker (1992)	Cognitive dissonance	Proarguing	Public	Other	Relevant	Cognition	0.12	0.03
Landeau and Greenberg (2006), Study 1	Mortality salience	Self-ratings	Private	Self	Irrelevant	Cognition	0.49	-0.06
Landeau and Greenberg (2006), Study 2	Mortality salience	Self-ratings	Private	Self	Irrelevant	Cognition	0.61	-0.18
Landeau and Greenberg (2006), Study 3	Mortality salience	Risk taking	Private	Self	Irrelevant	Behavior	0.68	-0.35
McFarlin, Baumeister, and Blascovich (1984), Study 1	Negative feedback	Self-regulation	Public	Self	Relevant	Behavior	0.02	0.00
McGregor, Gailliot, Vasquez, and Nash (2007), Study 1	Mortality salience	Worldview defense	Private	Other	Irrelevant	Cognition	1.21	-0.07
McGregor et al. (2007), Study 3	Mortality salience	Personal zeal	Private	Self	Irrelevant	Cognition	0.38	-0.26

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
McGregor, Nash, and Inzlicht (2009)	Negative feedback	Approach motivation	Public	Self	Irrelevant	—	1.10	-0.44
Miller and Taubman-Ben-Ari (2004)	Mortality salience	Risk taking	Private	Self	Irrelevant	Cognition	0.06	0.00
Millimet and Gardner (1972)	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.52	-0.37
		Attributions	Private	Both self and other	Relevant	Cognition	0.46	0.54
Moreland and Sweeney (1984)	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.27	-0.38
		Evaluation of test	Private	Other	Relevant	Cognition	0.19	0.18
		External attributions	Private	Other	Relevant	Cognition	0.24	0.21
		Internal attributions	Private	Self	Relevant	Cognition	0.17	0.18
		Performance	Private	Self	Relevant	Behavior	0.25	0.55
		Recall	Private	Self	Relevant	Cognition	-0.17	-0.26
Murray, Holmes, MacDonald, and Ellsworth (1998), Study 1	Recall of negative event	Relationship evaluations	Private	Other	Relevant	Cognition	-0.83	-0.17
Murray et al. (1998), Study 2	Recall of negative event	Relationship dependence	Private	Self	Relevant	Cognition	-0.55	0.28
		Relationship evaluations	Private	Other	Relevant	Cognition	0.22	-0.47
Murray et al. (1998), Study 3	Recall of negative event	Relationship dependence	Private	Self	Relevant	Cognition	-0.04	-0.10
		Relationship evaluations	Private	Other	Relevant	Cognition	0.15	-0.41
Murray et al. (1998), Study 4	Negative feedback	Relationship dependence	Public	Self	Relevant	Cognition	0.28	-0.44
		Relationship evaluations	Public	Other	Relevant	Cognition	-0.05	-0.59
Nadler (1983) ^a	Negative feedback	Internal attributions	Private	Self	Relevant	Cognition	4.39	—
		Self-evaluations	Private	Self	Relevant	Cognition	-2.07	—
Perez (1973)	Negative feedback	Task performance	Public	Self	Relevant	Behavior	0.23	-0.26
Rhodewalt, Morf, Hazlett, and Fairfield (1991), Study 1	Negative feedback	External attributions	Public	Other	Relevant	Cognition	0.00	1.09
		Internal attributions	Public	Self	Relevant	Cognition	1.15	0.61
Rudich and Vallacher (1999), Study 1	Negative feedback	Desire for interaction	Private	Other	Relevant	Affect	1.76	0.66
		Perceived feedback accuracy	Private	Other	Relevant	Cognition	1.38	0.06

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Rudich and Vallacher (1999), Study 2	Negative feedback	Desire for interaction	Private	Other	Relevant	Affect	0.62	0.85
		Perceived feedback accuracy	Private	Other	Relevant	Cognition	0.77	-0.32
Rudich and Vallacher (1999), Study 4	Negative feedback	Perceived feedback accuracy	Private	Other	Relevant	Cognition	0.39	-0.24
Ryckman and Rodda (1972)	Negative feedback	Task performance	Private	Self	Relevant	Behavior	0.57	-0.58
Schlenker, Soraci, and McCarthy (1976)	Negative feedback	External attributions	Public	Other	Relevant	Cognition	0.70	0.04
Schlenker, Weigold, and Hallam (1990)	Negative feedback	Self-ratings	Public	Self	Relevant	Cognition	-0.18	-0.23
		Evaluation of test	Public	Other	Relevant	Cognition	0.59	0.65
Schmeichel et al. (2009), Study 1	Mortality salience	Worldview defense	Private	Other	Irrelevant	Cognition	0.19	0.54
Schmeichel et al. (2009), Study 3	Mortality salience	Self-evaluations	Private	Self	Irrelevant	Cognition	0.45	-0.40
Shrauger and Lund (1975)	Negative feedback	Evaluator ratings	Public	Other	Relevant	Cognition	0.94	0.02
		Excuse making	Public	Other	Relevant	Cognition	-0.69	0.21
		Perceived feedback accuracy	Public	Other	Relevant	Cognition	0.76	0.26
Shrauger and Rosenberg (1970)	Negative feedback	Task performance	Public	Self	Relevant	Behavior	-2.08	-1.35
		Self-evaluations	Public	Self	Relevant	Cognition	-1.91	-1.86
Silverman (1964a)	Negative feedback	Conformity	—	Self	Irrelevant	Behavior	0.58	0.76
Silverman (1964b)	Negative feedback	Learning	—	Self	Relevant	Cognition	-0.44	0.41
Sommer and Baumeister (2002), Study 1	Exclusion	Self-evaluations	Private	Self	Irrelevant	Cognition	0.75	-1.12
Sommer and Baumeister (2002), Study 2	Exclusion	Self-evaluations	Private	Self	Irrelevant	Cognition	0.38	-0.96
Sommer and Baumeister (2002), Study 3	Exclusion	Self-regulation	Private	Self	Irrelevant	Behavior	0.35	-0.70
Spencer, Steele, & Lynch (1993) Study 1	Negative Feedback	Dissonance Reduction	Private	Self	Irrelevant	Cognition	-0.08	0.42
Stake, Huff, and Zand (1995), Study 2	Other	Affect	—	Self	Relevant	Affect	-4.20	-4.63
		Self-evaluations	—	Self	Relevant	Cognition	-2.17	-2.65
Stone (2003)	Cognitive dissonance	Attitude change	Public	Self	Relevant	Cognition	0.35	0.14

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Stone and Cooper (2003)	Cognitive dissonance	Attitude change	Public	Self	Relevant	Cognition	0.42	0.45
Stotland, Thorley, Thomas, Cohen, and Zander (1957)	Negative feedback	Concern with expectations	Private	Self	Relevant	Cognition	0.03	0.01
		Performance ratings	Private	Self	Relevant	Cognition	-0.71	-0.99
Swann, Griffen, Predmore, and Gaines (1987)	Negative feedback	Affect	Public	Self	Relevant	Affect	-0.64	-0.51
		Attraction to evaluator	Public	Other	Relevant	Affect	1.35	0.69
		Evaluation of test	Public	Other	Relevant	Cognition	0.97	—
		External attributions	Public	Other	Relevant	Cognition	1.53	-0.69
		Internal attributions	Public	Self	Relevant	Cognition	0.97	—
Sweeney and Wells (1990)	Negative feedback	Affect	Private	Self	Relevant	Affect	-0.39	-0.87
		Attributions	Private	Both self and other	Relevant	Cognition	0.77	0.33
Taubman-Ben-Ari and Findler (2006)	Mortality salience	Anticipated mental hardships	Private	Self	Irrelevant	Cognition	-0.10	-0.18
		Anticipated physical hardships	Private	Self	Irrelevant	Cognition	-0.56	0.04
		Motivation to join army	Private	Self	Irrelevant	Cognition	0.32	-0.26
Vohs and Heatherton (2001), Study 2	Negative feedback	Accomplishment recall	Public	Other	Relevant	Cognition	-0.68	-0.15
Vohs and Heatherton (2003)	Other	Social recall	Public	Other	Irrelevant	Cognition	-0.41	0.52
		Depression	Private	Both self and other	Irrelevant	Behavior	0.20	-0.60
Warren (1976)	Negative feedback	Likeability	Private	Both self and other	Irrelevant	Behavior	-0.07	0.30
		Recall	Private	Self	Relevant	Cognition	-0.84	-1.17
Wood, Giordano-Beech, and Ducharme (1999), Study 1 ^a	Negative feedback	Social comparisons sought	Private	Other	Irrelevant	Behavior	0.73	—
Wood et al. (1999), Study 2 ^a	Negative feedback	Interest in social comparisons	Private	Self	Irrelevant	Cognition	0.77	—
		Social comparisons sought	Private	Other	Irrelevant	Behavior	0.73	—

(continued)

Table 4. (continued)

Source	Type of threat	Outcome	Public or private	Self- or other-directed responses	Response relevant or irrelevant to threat	Response domain	<i>d</i> for high self-esteem	<i>d</i> for low self-esteem
Wood, Giordano-Beech, Taylor, Michela, and Gaus (1994), Study 1	Negative feedback	Evaluations of others	Private	Other	Relevant	Cognition	-1.65	-0.73
		Self-ratings	Private	Self	Relevant	Cognition	-0.54	-0.40
		Social comparisons sought	Private	Both self and other	Relevant	Behavior	0.31	-0.57
Wood et al. (1994), Study 2	Negative feedback	Evaluations of others	Public	Other	Relevant	Cognition	0.36	0.27
		Self-ratings	Public	Self	Relevant	Cognition	-0.06	-0.64
		Evaluation of test	Public	Other	Relevant	Cognition	3.32	2.46
		Social comparisons sought	Public	Both self and other	Relevant	Behavior	1.87	-0.78

Note: Positive effect sizes indicate compensating and negative effect sizes indicate breaking.
 a. These studies contributed effect sizes for high self-esteem groups only.

Because multiple effect sizes were extracted from studies, we had to manage concerns of nonindependence. We handled this concern in different ways across analyses. At the first level of analysis, we were interested in examining whether people respond to threat by compensating, resisting, or breaking and whether trait self-esteem moderated the nature of responses. At this level, we calculated the average effect size across all outcomes for both low self-esteem and high self-esteem groups. Because there was no overlap in the participants included in each of these groups (i.e., no participant could be labeled as both having high self-esteem and having low self-esteem in the same study), these averaged effect sizes were independent.

At the second level of analysis, we examined moderators overall and within level of self-esteem. When studies contained effect sizes at more than one level of a moderator (e.g., contained both an affective and a behavioral outcome), we excluded them from the analysis of that particular moderator.

Moderators. To examine how well theoretical models of self-esteem regulation predict responses to threat, we coded moderator variables that reflected level of ego threat present and type of response measured in each study.

Ego threat. We coded three variables to represent ego threat. One variable was a characteristic of the threat administered in each study and two were characteristics of the responses measured in the study. First, we coded whether the threat was administered in public or in private. In some cases, negative feedback was administered when

experimenters directly informed participants that they had not performed very well on the test. In other cases, participants learned of their poor performance from a computer that had scored their test. We expected that public threats might increase the magnitude of the threat because they involve increased attention on the negative information about the self and highlight potential relational devaluation (Duval & Wicklund, 1972; Leary et al., 1995). Furthermore, in their recent review, Leary and colleagues (2009) suggested that this is a prominent way in which threats to self-worth differ. By examining the effect of both public and private threats, we can provide some clarity on this issue.

Next, we coded two characteristics of the responses offered in each study. First, we coded whether the responses were directed at the self or were directed at an external figure (whether an actual person, luck, or a computer). We expected that responses directed at the self would constitute greater ego threat because they would require people to focus on the very target that had just been threatened. Because these should have focused attention on the threat, we expect that indirect responses—those oriented toward others rather than the self—should reduce the salience of the threat.

Following the same reasoning, we coded whether the responses measured in each study were relevant or irrelevant to the threat. That is, we coded whether the threat and response were in the same domain or whether they were in different domains. For instance, participants may have

received negative information about their verbal fluency skills and been asked to evaluate others' verbal fluency. This would be a response that is relevant to the threat. In other cases, the response was in a different domain from the threat. Participants may have received negative information about their academic skills but been asked to reflect on their social skills. Reactions may differ if the responses are relevant or irrelevant to the initial threat because it may be harder to ignore the information carried by a threat if the response serves as a reminder of the threat. Because of this, we expected that responses that were relevant to the threat would constitute stronger ego threat.

Response domain. Studies measured participants' emotions, behaviors, or thoughts. Emotions and affective responses fluctuate rapidly in response to threat. In fact, many studies used affect as a manipulation check (e.g., Aspinwall & Taylor, 1993). Other studies measuring affect asked participants to report their feelings or attraction toward others. Several studies measured behaviors, including both positive (e.g., helping) and negative (e.g., aggression) behaviors. Finally, studies measured responses that were cognitive in nature. Such responses included evaluating oneself or the abilities of another as well as making attributions for the cause of the failure (for additional examples, see Table 4).

Results

Analytic Strategy. We used Comprehensive Meta-Analysis (Version 2) to conduct our analyses (Borenstein, Hedges, Higgins, & Rothstein, 2005). We use a fixed effects model to estimate reactions to threat. Fixed effects models assume that variability in the effect sizes is attributed only to participant-level error (Lipsey & Wilson, 2001). When significant heterogeneity among effect sizes exists, this assumption is violated and a decision about how to model the data must be made. We continued to conduct our analyses using a fixed effects model because we were following the assumption that the variability among effect sizes at the study level was from systematic differences among studies. We focused our moderator analyses on identifying these sources of variability.

Primary Analyses. Collapsing across level of self-esteem, the overall effect size of responding to threat was $d(k = 103) = 0.06$ (95% confidence interval [CI] = 0.03/0.09) using a fixed effects model. This effect size, although small, is significantly different from zero, suggesting that studies overall reported findings that people respond to threat by compensating. However, significant heterogeneity existed among the effect sizes, $Q_w(102) = 926.56, p < .001$.

We used a fixed effects model to test whether trait self-esteem moderated effect sizes. The level of trait self-esteem of the group accounted for a significant amount of this heterogeneity, $Q_B(1) = 83.12, p < .001$. The mean effect size for people with high self-esteem was $d(k = 103), = 0.19$ (95% CI = 0.15/0.23), and the mean effect size for people with low

Table 5. Point Estimates (in Cohen's d) as a Function of Level of Threat and Level of Trait Self-Esteem

Moderator	Ego threat			
	High		Low	
	HSE	LSE	HSE	LSE
Public vs. private	0.26***	0.01	0.19***	-0.13***
k	40	40	58	53
Self vs. other	0.06	-0.23***	0.42***	0.13**
k	52	51	24	21
Relevant vs. irrelevant	0.19***	-0.11***	0.24***	-0.02
k	61	60	31	27

Note: HSE = high self-esteem; LSE = low self-esteem.

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

self-esteem was $d(k = 98), = -0.08$ (95% CI = -0.12/-0.04). These results indicate that people with high trait self-esteem tend to engage in compensating in response to threat, whereas people with low trait self-esteem tend to break in response to threat. Because significant heterogeneity continued to exist within each self-esteem group, $Q_w(102) = 611.60, p < .001$ for high self-esteem and $Q_w(97) = 590.90, p < .001$ for low self-esteem, we examined other potential moderators of the effect sizes.

Moderator Analyses

Threat intensity. To examine whether trait self-esteem and intensity of threat predicted variability in effect sizes, we conducted an analysis with four levels: low self-esteem and low threat, high self-esteem and low threat, low self-esteem and high threat, and high self-esteem and high threat. Across all operationalizations of threat, this variable explained significant variability in the effect sizes.

Together, trait self-esteem and publicly versus privately administered threat predicted significant variability, $Q_B(3) = 108.26, p < .001$. As Table 5 shows, people with high self-esteem did not vary across level of threat, $Q_B(1) = 2.11, p = .15$. They compensated in response to both public and private threats. People with low self-esteem, however, differed in their responses to public and private threats, $Q_B(1) = 10.91, p = .001$. When threats were private (low threat), they demonstrated breaking. In contrast, when threats were public (high threat), those with low self-esteem demonstrated resistance.

Our next analyses focused on characteristics of the response that might represent threat. First, we examined whether trait self-esteem and response target influenced the magnitude of effect sizes. We assumed responses targeted at the self constituted high threats and responses targeted away from the self constituted low threat. Again, we found a

Table 6. Point Estimates (in Cohen's *d*) as a Function of Response Domain Threat and Level of Trait Self-Esteem

Response domain	Level of self-esteem	
	High	Low
Affect	0.07	-0.12*
<i>k</i>	10	10
Behavior	0.14**	-0.02
<i>k</i>	16	15
Cognition	0.29***	-0.03
<i>k</i>	54	51

* $p < .05$. ** $p < .01$. *** $p < .001$.

significant interaction with trait self-esteem and level of threat, $Q_B(3) = 154.86$, $p < .001$. As Table 5 shows, level of threat affected the responses of people with high self-esteem, $Q_B(1) = 47.12$, $p < .001$, such that when responses were targeted at others (less threat), they compensated for the threat, but when the responses were targeted at the self (more threat), they evidenced resistance. Likewise, level of threat influenced effect sizes among people with low self-esteem, $Q_B(1) = 43.08$, $p < .001$. When responses were targeted at the self, people with low self-esteem demonstrated breaking reactions to threat, and when responses were targeted at others, people with low self-esteem demonstrated compensating reactions.

Finally, we examined whether trait self-esteem and response domain influenced the magnitude of effect sizes. We assumed that responses that were in the same domain as, or relevant to, the original threat constituted a high threat condition whereas responses that were in a different domain, or irrelevant to, the original threat constituted a low threat situation. We found a third interaction between threat intensity and trait self-esteem, $Q_B(3) = 101.20$, $p < .001$. As Table 5 shows, people with high self-esteem compensated when responses were both irrelevant and relevant, $Q_B(1) = 1.27$, $p = .26$. Similarly, people with low self-esteem responded similarly to relevant and irrelevant threats, $Q_B(1) = 3.52$, $p = .06$. Although they demonstrated breaking to relevant threats and resistance to irrelevant threats, these reactions were not significantly different from each other.

Response domain. Together, level of self-esteem and response domain significantly explained heterogeneity in the observed effect sizes, $Q_B(5) = 84.61$, $p < .001$. As Table 6 shows, response domain did not significantly affect the reactions of people with low self-esteem to threat, $Q_B(2) = 1.94$, $p = .38$. Although they did demonstrate breaking affective responses, these reactions were not significantly different than the resistance reactions that they showed in cognitions and behaviors. The effect sizes for people with high self-esteem, however, differed when they were in affective, cognitive, and behavioral domains, $Q_B(2) = 14.68$, $p < .001$. People with high self-esteem demonstrated resistance reactions in

Table 7. Point Estimates (in Cohen's *d*) as a Function of Type of Threat and Level of Trait Self-Esteem

Type of threat	Level of self-esteem	
	High	Low
Cognitive dissonance	0.44***	0.22**
<i>k</i>	4	4
Exclusion	-0.04	-0.54***
<i>k</i>	7	7
Existential terror	0.29***	-0.08*
<i>k</i>	12	10
Negative feedback	0.20***	-0.03
<i>k</i>	66	63

* $p < .05$. ** $p < .01$. *** $p < .001$.

affect and compensating reactions in their behaviors and cognitions.

Ancillary Analyses

Type of threat. Along with the main goals of examining different reactions to threat by people with high and low self-esteem, our data provided an opportunity to examine whether people respond differently to various types of threat. Sources of potential threat include negative feedback about one's competence, behavior that is inconsistent with attitudes or beliefs, mortality salience, or social rejection and exclusion. Following reasoning from the sociometer model of self-esteem (Baumeister & Leary, 1995), we expected that social exclusion would be a stronger and more severe threat than receiving negative feedback, existential terror, or experiencing cognitive dissonance. As shown in Table 7, combined with level of trait self-esteem, type of threat did predict significant heterogeneity of variance, $Q_B(7) = 113.19$, $p < .001$. Furthermore, type of threat predicted significant heterogeneity of variance among both people with high self-esteem, $Q_B(3) = 14.54$, $p = .002$, and people with low self-esteem, $Q_B(3) = 31.30$, $p < .001$. For people with high self-esteem, threats of negative feedback, cognitive dissonance, and existential terror led to compensation, whereas threats of social exclusion led to resistance. For people with low self-esteem, threats of social exclusion led to large breaking responses, whereas threats of negative feedback and existential terror led to resistance effects. Finally, for people with low self-esteem, cognitive dissonance threats led to compensation.

Group classification strategy. This meta-analysis has the potential to answer questions regarding how people are classified as having low or high self-esteem. Most samples are negatively skewed and have a sample mean well above the midpoint on the scale of measurement (Brockner, Derr, & Laing, 1987; Kernis et al., 1993). Many people who are categorized as having low self-esteem may actually have moderate levels of self-worth (Aspinwall & Taylor, 1993; Rudich & Vallacher, 1999). We examined whether classification strategies explained variability in the resulting effect sizes.

Specifically, we suspect that studies that used liberal classification strategies (e.g., median splits) would be the most likely to demonstrate compensating reactions by people who had been assigned to the low self-esteem group. We might expect less breaking by low self-esteem people classified by a median split because their self-esteem might be moderate or moderately high rather than truly low.

Overall, method of classifying individuals as high or low in trait self-esteem influenced effect sizes, $Q_B(3) = 80.52$, $p > .001$. For people with high self-esteem, classification strategy did not affect effect sizes, $Q_B(1) = 0.03$, $p = .87$, such that both classification by median split, $d(k = 32) = 0.05$, and classification by a stringent cutoff, $d(k = 38) = 0.06$, led to compensating. However, for groups of low self-esteem, classification strategy influenced resultant effect sizes, $Q_B(1) = 25.92$, $p < .001$. Classification to groups using a median split yielded resistance responses, $d(k = 32) = 0.00$, whereas classification to groups using a more stringent strategy yielded breaking responses, $d(k = 34) = -0.13$.

Conclusions

Across 103 studies, people with high self-esteem engaged in more compensating reactions to threat than did people with low self-esteem. Even when people with low self-esteem did engage in compensating reactions, they never did so to as large an extent as those with high self-esteem. Furthermore, we found no situations in which people with high self-esteem demonstrated breaking reactions to threat. People with high self-esteem, when faced with negative information about the self, were more likely and/or better able to respond in ways that minimized the extent to which that threat might immediately influence self-feelings. In contrast, people with low self-esteem demonstrated largely breaking or resisting responses and were only occasionally able to react to threat in esteem-protective ways.

In this article, we were particularly interested in identifying potential explanations for these pervasive differences among reactions to threat by people with low and high self-esteem. To this end, we examined six potential models of reactions to threat, each framed in the context of a theoretical perspective. Our results allow us to make some conclusions about the utility of these models in explaining reactions to threat. First, our results rule out the explanation that people with high self-esteem have more at stake when they approach threatening information. Had self-esteem served as a stake, it would have acted as a risk factor and we would have seen large breaking reactions to threat by people with high self-esteem. Instead, we saw only resistance or compensating reactions. Furthermore, our results rule out the possibility that people with low self-esteem are more plastic than people with high self-esteem. Had self-esteem reduced plasticity, we would have expected to see only resistance reactions among people with high self-esteem and only breaking reactions

among people with low self-esteem. We found too many compensating reactions among people with high self-esteem and too many resistance reactions among people with low self-esteem to support the notion that self-esteem reduces plasticity. Although plasticity may account for some reactions to threat, it certainly does not seem to be a dominant explanation for why people with low and high self-esteem differ in their reactions to threat.

Two explanations for differences across levels of self-esteem focused on self-esteem as a resource. These approaches received different amounts of support. One possibility was that self-esteem prevented people from noticing threat. According to this perspective, we would have expected threats to bounce off the backs of those with high self-esteem but to significantly and negatively affect those with low self-esteem. This pattern received only partial support. Although we did find evidence of breaking among people with low self-esteem, people with high self-esteem did not merely fail to notice threats. Rather, in many circumstances, the experience of threat led to compensating reactions among people with high self-esteem. Such reactions would not be likely to occur if people were oblivious to—or unaware of—the threats.

An alternative way in which self-esteem might be viewed as a resource is in dealing with reactions to threat. Rather than preventing people from noticing threat, factors associated with high self-esteem might assist people in the immediate restoration of desired self-views. People with high self-esteem have a larger and more accessible pool of positive self-related thoughts on which to draw when their self-worth feels threatened (J. D. Campbell, 1990; Spencer et al., 1993). We found moderate support for this hypothesis. People with high self-esteem, as demonstrated by the frequency of their compensating reactions, were better able to make immediate attempts at restoring desired self-views than were their counterparts with lower levels of self-esteem. This particular hypothesis was interesting to examine in conjunction with the severity of the threats that occurred. When threat was operationalized as a public (as compared to a private) threat and as a response irrelevant (as compared to relevant) to the initial threat, people with high self-esteem regulated state self-esteem equally well across level of threat. When threats were operationalized as self-directed rather than other-directed responses, people with high self-esteem regulated state self-esteem better when threat was low (i.e., responses were directed at the self). However, even under situations of high threat, people with high self-esteem demonstrated resisting reactions. Further evidence for this perspective comes from the reactions of people with low self-esteem. Across two indicators (direction of responses and threat relevance of responses), people with low self-esteem demonstrated breaking reactions when threat was high and resisting reactions when threat was low. Only when threat was delivered in private did people with low self-esteem break in response to a low level of threat.

Finally, our results allowed us to investigate whether self-enhancement or self-verification processes predicted the differences between individuals with low and high levels of self-esteem. Overall, we found very little support for self-enhancement theory in explaining reactions to self-threats. Although people with high self-esteem tended to self-enhance by compensating, people with low self-esteem demonstrated compensating only in response to cognitive dissonance. Social exclusion, negative feedback, and mortality salience threats elicited resistance or breaking responses from people with low self-esteem. Even when threat was low, participants with low self-esteem demonstrated breaking or resistance responses. Self-enhancement theory, in particular, would predict that self-enhancement would be evidenced in affective responses. However, when responses were affective, people demonstrated the least compensation. Although self-enhancement might explain the compensating reactions by people with high self-esteem, it cannot account for the differences that we found across level of self-esteem.

The predictions drawn from self-verification theory received more support than did those made according to self-enhancement theory. Specifically, we saw that people with high self-esteem tended to improve their state self-esteem by compensating whereas people with low self-esteem tended to break and therefore experience no benefit to immediate self-feelings. Furthermore, consistent with self-verification theory, the largest differences between people with high and low self-esteem were found among cognitive responses. In cognitive domains, we saw strong compensating reactions among people with high self-esteem and resistance reactions among people with low self-esteem. That is, after experiencing threat, people with high self-esteem strived to change the situation to receive more positive—and also more self-consistent—information about the self. The cognitive strivings of people with low self-esteem, however, seemed largely unaffected by the experience of threat.

Overall, our analyses yielded the most support for two explanations of reactions to threat: that self-esteem is a resource and that threat elicits self-verification responses. However, given our observed pattern of results, another possibility worth noting is that people with low self-esteem actually *want* to self-enhance but, because they lack the resources of those with high self-esteem, are unable to do so (e.g., Blaine & Crocker, 1993). What appears to be a self-verification motivation among people with low self-esteem might actually be an impaired self-enhancement motivation. That is, people with low self-esteem may desire positive information about themselves, even in cognitive domains, but be unable to regulate their thoughts, feelings, and behaviors to allow such an experience to occur. Further research is needed to understand the resources (e.g., positive and accessible self-related cognitions; increasingly complex self-systems) involved with possessing high self-esteem and if providing those resources to people with low self-esteem (e.g., without

directly raising their self-esteem) increases their self-enhancement behaviors or if self-verification patterns continue to be a better predictor of responses to self-threats.

Our analyses also provide important insight into the issue of how one decides to classify participants as having low or high self-esteem. People labeled as having high self-esteem evidenced similar defensive reactions regardless of how they were classified. People labeled as having low self-esteem, however, differed according to how they were classified. When a stringent classification strategy was used, people with low self-esteem demonstrated breaking reactions to threat. However, when a median split was used, people displayed fewer breaking reactions than when a stringent cutoff was used. The point estimate for people classified as having low self-esteem by a median split did not differ from zero. This suggests that the strategy of labeling people according to a median split is poor. Along with the statistical limitations of using a median split, our results reveal a theoretical flaw with the practice of classifying people who have relatively positive self-views as having low self-esteem. One result of this classification strategy is that such people may engage in reactions to threat that are more similar to people who have higher reported levels of self-esteem.

The focus of our analysis has been at the level of initial reaction to threat. We have been most interested in how initial reactions to threat might aid people in the regulation of state self-esteem. However, our analysis did not provide for an account of potential downstream consequences of such self-regulatory strategies. Although people with high trait self-esteem effectively defended themselves initially against such threats, the strategies employed may convince those with high self-esteem that they do not have weakness or faults (McCrea, 2008). By avoiding such weaknesses, people with high self-esteem may do themselves a disservice by prohibiting personal growth in domains of self-importance. Instead, people with high self-esteem might be better served by strategies such as self-improvement or realigning expectations about the self. Such strategies might lead to the attainment of ultimately more self-regulatory as well as performance goals.

Our analysis also does not speak to the issue of whether the regulatory patterns that people with high self-esteem use to manage state self-esteem are advantageous. At times, these strategies certainly benefitted both the individual completing them and others around them (e.g., Brown & Smart, 1991), whereas at other times such regulatory strategies might have led to the harm of others through either aggression or deprecation (e.g., Brockner & Chen, 1996; Crocker, Thompson, McGraw, & Ingerman, 1987). One possibility that we have not explored is that people with low self-esteem attempt to restore self-esteem by focusing on their relationships, whereas people with high self-esteem attempt to restore self-esteem by focusing on their individual qualities (Vohs & Heatherton, 2001). Future research needs to

examine whether these strategies are effective ways of managing state self-esteem.

In this article, we have adopted a nontraditional approach to examining the utility of a theory. Rather than testing whether a theory predicts behavior in a variety of situations, we have examined whether multiple theories predict what happens in one very specific situation. Because of the abundance of perspectives on self-esteem, how trait self-esteem affects responses to threat is an interesting case to examine using this method. By shifting our attention to this one particular situation, we have taken advantage of the vast amount of research conducted on self-esteem, and as a result, we are able to make conclusions about several explanations for the influence of trait self-esteem on behavior. Future research should be conducted to examine whether these theoretical models explain behavior at other points in time as well. For instance, self-enhancement may better explain how people think about information they might receive as opposed to how people respond to information they have received. Research that uses our method of comparing multiple theoretical perspectives simultaneously might provide insight into the complicated nature of trait self-esteem in predicting and explaining behaviors across and within situations.

Importantly, the model we introduce here is one of self-regulation of self-esteem. This model hinges on the assumption that most people have standards for high—or higher—self-esteem. Although this complicated issue is outside the scope of this article, many have suggested that people with both high and low self-esteem desire to have positive self-worth (Baumeister & Tice, 1985; Gibbons & McCoy, 2001; Pyszczynski et al., 2004; Sedikides & Strube, 1997). To the extent that this assumption is invalid, the differences we find between people with low and high self-esteem may be biased. That is, a self-regulatory process may explain the reactions of those with high self-esteem, but a different process may be at play for those with low self-esteem.

In sum, our meta-analysis provides an extensive review of how people with low and high self-esteem differ in reactions to threat. People with high self-esteem tend to compensate for threat whereas people with low self-esteem tend to break in response to threat. Our analyses examine multiple explanations for these differences and provide support for both a self-verification and self-esteem as resource explanation. People strive to maintain a sense of equivalence between their desired self-views and the information they experience in the world around them. Importantly, this meta-analysis enhances what is known about trait self-esteem. Self-esteem can have an important role as a moderator—in this case, as a moderator of responses to threat—that can make the difference between compensating and breaking.

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Notes

1. We included both global (e.g., the Rosenberg Self-Esteem Scale) and specific (e.g., Shrauger & Lund, 1975) self-esteem in the meta-analysis. We also included both explicit (e.g., the Janis-Field Revised Inventory) and implicit and automatic measures of self-esteem (e.g., the Name-Letter Inventory; Schmeichel et al., 2009).
2. Assuming that the chance of agreement was 50%, Cohen's kappa for the coding of studies was .94, which demonstrates almost perfect agreement. The 50% expected agreement assumption is conservative because it assumes that there were only two response options for each choice. In reality, several of our coding categories involved three or four choices.

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