Fulfilling Positive Stereotypical Expectations, Performance Boosts or

Performance Decrements?

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ABSTRACT (academic)

There is plenty of research on effects of negative stereotypes on performance, but less is known about effects of positive stereotypes. Research examining effects of positive stereotypes on performance has found mixed, often competing, results; positive stereotypes have been shown to lead to performance decrements, performance boosts, both boosts and decrements, or neither. One goal of the current study was to examine how domain identification, mode of stereotype activation, group membership of social referents, and valence of performance feedback (i.e. threat salience antecedents) influence whether positive stereotypes harm or benefit performance. I asserted that different combinations of the aforementioned variables would result in differential levels of threat salience, which I define as feelings of stress or pressure that arise from a dynamic interplay between performance motivation, anxiety and self-efficacy. Furthermore, as threat salience increased performance boosts from the positively stereotyped identity were expected to decrease and eventually lead to performance decrements. I also aimed to pinpoint the exact condition, or level of threat salience, that would lead to the switch from performance boosts to performance decrements (i.e. a tipping point).

The threat salience antecedents of social referent's group membership and feedback valence were combined to create a 2 (male/negative feedback vs female/positive feedback) X 2 (implicit activation vs explicit activation) design with a measured causal antecedent (domain identification). Participants took part in a laboratory study utilizing the positive stereotype that females are better than males at verbal ability tasks. Before arriving to the lab, participants were

required to complete measures of verbal ability domain identification. Upon arrival to the lab, participants completed one trial of verbal ability items before being exposed to one of the four combinations of threat salience antecedents; following the manipulations, participants completed a subsequent trial of verbal ability items. The results of the study did not support the hypotheses; greater threat salience was not found to lead to worse performance nor was there support for a tipping point whereby performance boosts shifted to performance decrements. Possible reasons for null findings are discussed along with implications of exploratory analyses.

ABSTRACT (general audience)

Research on the impact of positive stereotypes on performance has often resulted in mixed conclusions, with some research finding evidence for performance boosts, some finding evidence for performance decrements, and some finding both or neither. The current study sought to demonstrate that certain variables (i.e. domain identification, mode of stereotype activation, group membership of social referents, and valence of performance feedback) impact whether positive stereotypes lead to increases or decreases in performance outcomes through presenting differential threat salience. Threat salience essentially being feelings of pressure or worry about contradicting a positive stereotype; said feelings are believed to be the result of a dynamic interplay between motivation, self-efficacy, and anxiety about performance outcomes. I hypothesized that as threat salience increased then performance would decrease, eventually causing performance boosts from positive stereotypes to switch to performance decrements. Furthermore, I aimed to identify the exact level of threat salience that resulted in a switch from performance boosts to performance decrements (i.e. a tipping point). The study results did not provide support for the hypotheses, nor was I able to identify a tipping point whereby performance switched from boosts to decrements. Implications of exploratory analyses are discussed, along with possible explanations for null findings.

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Fulfilling Positive Stereotypical Expectations, Performance Boosts or

Performance Decrements?

Individuals often operate in high-pressure, high-competition environments. A potential source of pressure and anxiety related to achievement environments is self-identification with a stereotype. Stereotypes are beliefs about behaviors of individuals based on group membership. In terms of performance/achievement, stereotypes are the basis for differential performance expectations people hold for others based solely on social identity. As such, individuals likely strive to confirm positive stereotypes and disconfirm negative stereotypes. Previous research on the effects of stereotypes on performance has focused on deleterious effects of "stereotype threat", the desire to disconfirm negative stereotypes (Steele & Aronson, 1995). Few studies have addressed performance effects caused by the pressure to confirm positive stereotypical expectations.

Research on positive stereotype expectations has been mixed, showing evidence for performance decrements (Cheryan & Bodenhausen, 2000) and performance improvements labeled as "stereotype boost" effect (Dijksterhuis & van Knippenberg, 1998; Kray, Thompson, & Galinsky, 2001; Levy, 1996; Shih, Pittinsky, & Ambady, 1999), while some studies find neither (Inzlicht & Ben-Zeev, 2000; Keller). On the one hand, some studies have used multiple methods of stereotype activation and found both performance decrements and improvements (Saad, Meyer, Dhindsa & Zane, 2015; Shih, Ambady, Richeson, Fujita, & Gray, 2002; Shih, Wout, & Hambarchyan, 2015). The purpose of the current study is to further evaluate how pressure to confirm positively stereotyped attributes affects performance, what I label as "stereotype contradiction threat" (SCT). As an example of SCT, consider that people of Asian descent (for parsimony, "Asian" will be used to refer to individuals of Asian descent) are

stereotyped to be quantitatively skilled. An Asian is likely motivated to perform well on quantitative tasks so as to maintain the reputation/status of his/her Asian in-group relative to out-groups, but the desire to perform may also cause stress that interferes with task performance in spite of the motivation to confirm the stereotype.

Stereotype boost appears to occur when threat salience is low due to implicit activation of the positive stereotype, such as performing the affirming task (e.g., Gaither, Remedios, Schultz, & Sommers, 2015; Shih et al. 2002; Shih et al., 2015). I believe inducing SCT performance decrements requires greater threat salience about failing to confirm a positive stereotype (c.f. Cheryan & Bodenhausen, 2000). The current study examined threat salience as an antecedent of stereotype boost and SCT. I planned to demonstrate that increasing levels of threat salience would produce a tipping point whereby performance boosts changed over to performance decrements. The present study also attempted to establish a threat salience continuum based on different combinations of threat factors.

Social Identity Theory

According to social identity theory (SIT), people strive to confirm positive expectations and disconfirm negative expectations because they want their social group to compare favorably to other social groups (Hogg & Terry, 2000; Tajfel & Turner, 1986), in part because individuals' self-esteem and perceptions of self are influenced by group identification (Breckler & Greenwald, 1986; Brewer, 1979; Tajfel & Turner, 1979; Major, Spencer, Schmader, Wolfe & Crocker, 1998). SIT was first validated using "minimal group" designs where participants were assigned to one of two groups based on an arbitrary criterion. Participants in minimal group studies favor members of their own "in-group" over individuals assigned to the "out-group", even if there is no communication with either

in-group or out-group members (Tajfel, Billig, Bundy, & Flament, 1971). The natural

desire to possess a positive self-concept motivates individuals to maintain a positive

distinctiveness relative to out-groups (Hornesy, 2008). Furthermore, individuals desire to

act in ways aligned with their in-group norms (Festinger, 1942; Oyserman, 2009), which

are informed by stereotypes (Oyserman, 2009). This motivation for identity-congruency

happens consciously or subconsciously (Fischbach & Ferguson, 2007).

Performance Boost Evidence

Positive stereotypical expectations are typically complementary and a source of pride

among group members (Czopp, 2008). As mentioned previously, studies have shown that

positive stereotypes are beneficial to the performance of the target group (Gaither et al.,

2015; Saad et al., 2015; Shih et al., 2002; Shih et al., 1999). For example, Gaither et al.

(2015) found that activation of White identity for Black-White biracial individuals resulted

in better performance on a standardized test measuring verbal ability than Black identity

activation or identity neutral conditions. Similarly, Shih, Pittinsky, and Trahan (2006)

found that priming the gender of Asian-American females resulted in better verbal

performance relative to ethnic identity priming.

Stereotype Contradiction Threat

In contrast, other researchers have found motivation to confirm a positive stereotype

leads to performance decrements (Cheryan & Bodenhausen, 2000; Saad et al., 2015; Smith &

Johnson, 2006; Tagler, 2012). For example, Rosenthal and Crisp (2007) compared males'

performance on a math task when one positive stereotype (gender *or* school membership) was

activated versus two (gender *and* school membership). They found that activation of two

positive stereotypes lead to performance decrements in comparison to when one positive

stereotype was activated, implying a tipping point where positive expectations lead to performance decrements due to increasing threat salience. The assertion that threat salience reaches a tipping point where anxiety induced by motivation to confirm positive stereotypes leads to performance decrements parallels literature on "choking".

SCT and choking literature. Choking is when individuals fail to achieve performance levels commensurate with their capabilities because of increased pressure to perform well (Baumeister, 1984). For example, Baumeister (1984) observed lesser performance on a skillful coordination task when participants were offered a monetary incentive for better performance than when they were not offered an incentive. Baumeister (1984) defines pressure as "any factor or combination of factors that increases the importance of performing well on a particular occasion" (p.610). The most frequently used explanation for choking is that anxiety disrupts attention to task relevant cues (Baumeister & Showers, 1986; Markman, Maddox, & Worthy, 2006), and that individuals' insecurities about their capabilities to reach the desired outcomes, or lowered self-efficacy, creates anxiety and distractions (Ho, Driscoll, & Loosbrock, 1998).

In choking research, pressure is often induced through competition (Baumeister, 1984; Church, 1962; Shaw, 1958; Sanders, Baron, & Moore, 1978; Seta, Paulus & Risner, 1977), external incentives (Baumeister, 1984; McGraw & McCullers, 1974; McNamara & Fisch, 1964; Miller & Estes, 1961), or the presence of an audience (Baumeister, 1984; Martens & Landers, 1972; Sasfy & Okun, 1974; Seta et al., 1977; Wankel, 1972). Although there is a tendency to think about choking in the context of sports, choking effects have been found in the context of cognitive tasks, too (Glucksberg, 1962; McGraw & McCullers, 1974; McGraw & McCullers, 1979; McNamara & Fisch, 1964; Miller & Estes, 1961). For example, Baumeister, Hamilton and

Tice (1985) induced performance pressure through telling participants that scores on self-esteem and self-consciousness scales ("personality integration") had demonstrated a strong relationship with performance on anagram tasks in the past. Participants were then informed that their scores on the two measures indicated that they would perform very well on the anagram task. Those participants given expectations for success based on their personality integration scores did worse on the anagram task than those who did not have expectations for success from the researchers. I assert that SCT is a specific choking phenomenon caused by elevated concerns about confirming stereotypical positive performance expectations. Due to elevated concerns about performance outcomes, impacts of positive stereotypes on performance also strongly parallel impacts of negative stereotypes on performance (cf. Shih, Pittinsky, & Ho, 2012).

SCT and stereotype threat literature. Stereotype threat researchers have found performance decrements using both implicit and explicit stereotype activation strategies. Implicit stereotype activation can occur subliminally (Bargh, Chen, & Burrows, 1996) through subconscious priming tasks or through subtle manipulations of the stereotyped identity salience (Shih et al., 1999). An example of the latter is asking minority participants to indicate their race before an academic testing situation. In contrast, explicit manipulations induce high threat salience by mentioning the exact stereotype/performance expectations (Spencer, Steele, & Quinn, 1999; Aronson, Quinn, & Spencer, 1998).

Cognitive assessments used in stereotype threat research include Graduate Record Examination (GRE) scores (Steele & Aronson, 1995), personnel tests (Gonzales, Blanton, & Williams, 2002), verbal tests (Blascovich, Spencer, Quinn, & Steele, 2001), and athletic knowledge tests (Stone, Lynch, Sjomeling, & Darley, 1999), but researchers have also measured physiological reactance to threat using blood pressure (Blascovich et al., 2001).

Regardless of the manner of stereotype activation (i.e. implicit vs. explicit) or the nature of the dependent variable, the stereotype threat effect is robust. In contrast, SCT effects appear to be more likely in conditions of greater threat salience.

Threat Salience Model of SCT effects

The fundamental argument is that threat salience mediates the antecedents of SCT where threat salience is a function of the dynamic interplay among anxiety, self-efficacy, and achievement motivation. As self-efficacy decreases and achievement motivation increases, anxiety increases. If anxiety levels cross a threshold, anxiety likely creates a positive feedback loop whereby self-doubt increases as achievement motivation increases; the end result being a salient threat perception that interferes with task performance. In contrast, assuming the individual is task engaged, increases in self-efficacy prevent anxiety levels from reaching the threshold where a positive feedback loop is created, thereby lowering threat salience. Assuming anxiety levels remain below the anxiety threshold, as self-efficacy and achievement motivation further increases, threat salience is replaced by extreme confidence and achievement striving that leads to performance boosts. Given these arguments about threat salience, the exogenous variables included in the current study were chosen based on past research indicating that a causal antecedent affects anxiety and/or self-efficacy, and/or achievement motivation (see Figure 1). Ultimately, the chosen antecedent threat variables were: 1) relative feedback 2) social referent 3) stereotype activation 4) domain identification.
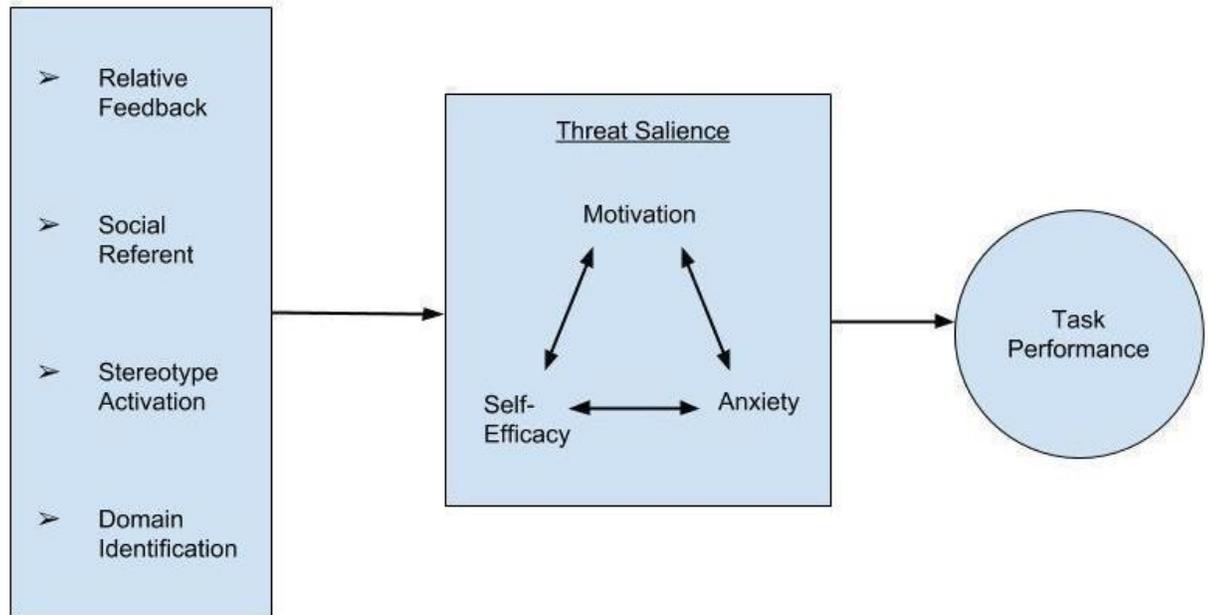
Figure 1. Model of relationships between threat antecedent variables and task performance.

Threat Salience Antecedents

To decrease the complexity of the research design, performance feedback and social referent

were merged into a single causal antecedent variable of "feedback and available social referent."

The goal in the experiment was to create a high threat salience versus low threat salience

condition for each independent variable *without consideration of the interaction of a variable*

with the other two variables. Alternatively stated, although each variable had what was

identified a high versus low threat condition, the effects of the independent variables were not

considered to be additive. Rather, perceptions of threat salience would be a function of the

interactions among the manipulated independent variables.

       Feedback and available social referent. Performance feedback serves a number of

purposes, including providing information to individuals regarding how well they are doing on a task (Alvero, Bucklin, & Austin, 2001) and allowing them the opportunity to adjust their performance based on the feedback information they receive (Daniels, 1994). Feedback can be given based solely on individuals' own performance or relative to others completing the same or similar tasks.

Effects of feedback on self-efficacy. In general, positive performance feedback increases self-efficacy (Fitz-simmons et al., 1991; McAuley, Duncan, Wraith, & Lettunich, 1991) and results in higher goals being set and deeper commitment to said goals (Escarti & Guzman, 1999). In contrast, negative feedback has also been shown to undermine performance through decreasing self-efficacy (Brockner, Derr, & Laing, 1987; Forbes, Duran, Leitner, & Magerman, 2015; Shrauger & Rosenberg, 1970). For example, Forbes et al (2015) found that women exposed to stereotype threat process negative feedback more deeply than positive feedback, and that depth of negative feedback processing mediated "bad" performance on future tasks.

Effects of feedback on motivation. Baumeister (1984) posits that positive and negative feedback affect motivation. For positive feedback, motivation is less affected when individuals are doing much better than social referents due to complacency, whereas motivation increases are greatest when performance is slightly better. Similarly, for negative feedback, achievement motivation increases when individuals are doing slightly worse than the referent because there remains a reasonable probability they can still out-perform social referents in subsequent performance trials; whereas, motivation is negatively affected by large discrepancies due to giving-up.

Social referent group membership. Not only does the nature of performance feedback matter, but the social comparison referent also matters. Holding other variables constant, relative

to an in-group member, the need to maintain positive distinctiveness from an out-group member increases motivation to perform well and competitive drive (Lount & Phillips, 2000; Stets & Burke, 2000; Tajfel & Turner, 1979). Additionally, as stated previously the need to act in identity congruent ways will lead to greater motivation increases when a stereotypically less capable out-group member is outperforming the target individual relative to another in-group member (Festinger, 1942).

High versus low threat salience. Ultimately, the goal of the feedback social referent manipulation in the current study was not to decrease motivation level by using large positive or large negative feedback discrepancies. Instead, small/moderate feedback discrepancies were used in an attempt to increase motivation for all subjects after receiving feedback. The threat salience manipulation was created through the pairing of social referent with feedback sign. More specifically, female subjects performing a task where females are considered superior performers over males received a small/moderate positive feedback discrepancy relative to a female referent versus a small/moderate negative feedback discrepancy relative to a male referent.

Positive stereotype activation. Research showing performance boost relies on implicit activations of the positive stereotype (Shih et al., 2002; Shih, Pittinsky, & Ho, 2012). The most common implicit activation method is asking participants questions requiring conscious thought about a stereotyped identity while not overtly mentioning stereotypes related to an individual's self-identity (Gaither et al. 2015; Moe, 2009; Shih et al. 2002; Shih et al. 2006; Shih et al. 2015; Swift, Abrams, & Marques, 2012). For example, Shih et. al. (1999) found Asian-American females performed better on a math test when asked about their language fluency. They argue that priming language fluency also activated positive expectations about quantitative

skills. In contrast, SCT effects occur when positive stereotypes are activated explicitly (Smith & Johnson, 2006; Tagler, 2012). For instance, Smith and Johnson (2006) found that among males, performance decrements on a math task occurred when participants were told that men have superior math skills relative to women. Although not examined directly in prior research, it is likely that explicit positive stereotype activation creates external performance expectations that lead to higher achievement motivation to validate the positive stereotype, but greater anxiety. Whereas, implicit positive stereotype activation likely increases self-efficacy (cf. Cheryan & Bodenhausen, 2000) but does not increase anxiety to the point of triggering the threat salience positive feedback loop. As such, the implicit stereotype activation condition was considered low threat salience and the explicit stereotype condition was considered high threat salience.

      Domain identification. Domain identification is the extent to which individuals incorporate a specific activity or knowledge into their self-concepts (Smith & Johnson, 2006), as well as their self-perceptions of ability surrounding a particular area of skill or knowledge (Steele, 1997). When individuals identify with a domain, the domain is an important and relevant aspect of their self-worth (Osborne, 1995; 1997). Additionally, the effect of domain identification on task performance is mediated by performance expectations (Rosenthal & Crisp, 2007; Saad et al., 2015; Smith & Johnson, 2006). It also is likely that domain identification affects individuals' motivations to perform well (Osborne & Jones, 2011) because the greater one identifies with a domain, the more his/her self-esteem is influenced by performance in the domain (c.f. Osborne, Kellow, & Jones, 2007). For example, identification with academics measured at the start of high school has been shown to be related to academic motivation; as domain identification increased, the depth of processing of course material and self-regulation increased, and there was higher goal-setting (Osborne & Rausch, 2001). In general, the

assumption was that threat salience increases as domain identification decreases.

Summary of causal antecedents. It is important to reiterate that each independent variable was manipulated to create high versus low threat salience conditions assuming that the other independent variables were held constant. However, there is clear evidence that supports our argument that threat salience is a function of the interplay between anxiety, achievement motivation, and self-efficacy, and that threat salience perceptions are not an additive function of all three independent variables.   For example, Saad et al., (2015) found that positive stereotype activation about Asians' math abilities led less math identified participants to perform worse, but led more math identified participants to perform better than when the stereotype was not activated. Less domain-identified individuals experience lower self-efficacy about their ability to meet expectations of the positive stereotypes likely resulting in anxiety about damaging the in-groups reputation and fear of negative repercussions from failing to meet performance standards (Ho et al., 1998). Smith and Johnson (2006) found performance decrements on a computer science task for males *not* identifying with computer science when a stereotype was explicitly primed about males' superior capabilities in the domain. In contrast, males *not* identifying with computer science performed better than those who *did* when they were told that both genders performed equally well on the task (stereotype nullification condition). In contrast, those high in domain identification were unaffected by the explicit stereotype activation and nullification of the stereotype.

Overview

In the current study, I will attempt to establish boundary conditions for SCT effects by demonstrating support for the aforementioned tipping point model based on threat salience. More specifically threat saliency will be manipulated through performance feedback combined

with the referent group membership (negative feedback—out-group vs. positive feedback—in-group), positive stereotype activation (implicit vs explicit) and domain identification. The goal of the current research is to attempt to show that increasing threat saliency produces a tipping point; before reaching a threat salience tipping point, stereotype boost will occur, but SCT will occur after the tipping point.

The current study will use the stereotype that women are superior to men on verbal tasks to demonstrate the proposed effects. In support of the use of said stereotype, women have been found to be superior to men on verbal ability tasks (Trahan & Quintana, 1990; Bleecker, Bolla-Wilson, Agnew, & Meyers, 1988; Kramer, Dellis, & Daniel, 1988) and a recent analysis of gender stereotypes showed that the belief that women are more verbally skilled than men remains (Castillo-Mayen & Montes-Bergen, 2014).

The tipping point argument will be tested through first assessing female participants' domain identification and then randomly assigning them to manipulations of feedback/social referent and stereotype salience. The study is a repeated measures design where the females will complete items that test verbal ability both before and after receiving feedback/referent group membership and stereotype salience manipulations. Hypotheses will be tested in the traditional ANOVA framework but the secondary goal is to draw broader conclusions about the validity of a tipping-points model to explain SCT effects.

Literature Review

Stereotypes are beliefs or expectations about others' behaviors based on their group membership(s); included in those expectations are beliefs about performance differentiation, i.e., social identities influence expectations about task success/failure. It is well established that

negative expectations cause performance decrements for members of the stereotyped group (for a review, see Schmader, John, & Forbes, 2008), but less is understood about the effects of positive performance stereotypes. Studies addressing positive expectations have shown performance boosts (Dijksterhuis & van Knippenberg, 1998; Kray et al., 2001; Levy, 1996; Shih et al., 1999), performance decrements (Cheryan & Bodenhausen, 2000), and sometimes neither boosts nor decrements (Inzlicht & Ben-Zeev, 2000; Keller, 2002). On the other hand, some studies have used multiple forms of positive stereotype activation and found both increases and decreases in task performance (Shih et al., 2002; Saad et al., 2015; Shih et al., 2015). In the current study, I seek to better understand the antecedents that determine whether positive stereotypes result in a performance boost or performance decrement due to SCT. Through combining varying levels of threat factors, the present study will attempt to establish a continuum of high to low threat, and define an order of importance for the threat factors' impact on performance outcomes.

Social Identity Theory

According to social identity theory (SIT), people desire favorable comparisons between their in-groups and out-groups to benefit their self-esteem, oftentimes leading to intergroup competition. This competition is exacerbated by performance expectations from stereotypes that lead to performance boosts in some situations and decrements in others. In order for intergroup comparisons to occur, individuals must first recognize themselves as part of a group. To clarify, social behavior occurs on a spectrum with interpersonal relations and intergroup relations at opposite ends (Tajfel, 1982; Tajfel & Turner, 1979). Whether interactions are interpersonal or intergroup depends in part on whether situations make personal or group identities more salient and whether individuals perceive themselves as part of the relevant group(s) (Stets & Burke, 2000,Hogg et al., 1995; Tajfel, 1982; Tajfel & Turner, 1979). Tajfel

and Turner (1979) assert that intergroup differentiations occur when: 1. Group membership is internalized, 2. Social situations prime evaluative intergroup comparisons, and 3. There are perceptions that out-groups are relevant to the comparisons being made. When the three factors align, people view themselves as part of a group, and awareness of membership in social categories imbues emotional allegiance and motivates assimilation to each group (Hogg & Abrams, 1988).

Group meaning is relational in that it comes from social comparison processes wherein individuals identify features and behavioral norms that define their in-groups relative to out-groups (Tajfel & Turner, 1979, 1986). Once norms and features are defined, social identification occurs wherein individuals internalize information about the groups to which they belong. Tajfel and Turner (1979) asserted that group membership informs a sense of self through providing a source of pride and self-esteem that is heavily influenced by comparisons made with out-groups. However, identification with a social group may also elicit expectations that negatively affect self-esteem (Ellemers, Kortekaas, & Ouwerkerk, 1999; Pyszynski, Greenberg, Solomon, Arndt, & Schimel, 2004) making it difficult to maintain favorable perceptions relative to out-groups (Hogg, 2001). If social comparison processes lead to negative in-group evaluations, individuals will attempt to dissociate from the group or increase the relative standing (Tajfel & Turner, 1979). Furthermore, it has been argued that the stronger the identification with a group, the more motivation individuals will have to enhance the group identity (Luhtanen & Crocker, 1992).

Stereotypes influence motivation and pressure experienced by group members because individuals strive to confirm or disconfirm stereotypes depending on whether the stereotypes are positive or negative, in order to maintain or increase their group's relative standing. Despite

this, only recently have researchers begun to focus on the effects of positive stereotypes on performance (Cheryan & Bodenhausen, 2000; Gaither et al., 2015; Moe, 2009; Rosenthal & Crisp, 2007; Shih et al., 2002; Shih et al., 2006; Shih et al., 2015; Smith & Johnson, 2006; Swift et al., 2012; Tagler, 2012). Moreover, as stated previously, there are mixed results regarding whether heightened motivation experienced by positively stereotyped groups leads to performance boosts or decrements.

Performance Boost Evidence

Performance boost effects are often demonstrated using individuals with dual identities where performance expectations for each identity are opposite (Gaither et al. 2015; Shih et al., 2006). For example, Gaither et al. (2015) randomly assigned biracial Black-White participants to either a Black-identity, White-identity, or no racial identity prime for which they had to write about the ethnic identity of their mother or father. Following the prime, participants were given a range of easy to hard verbal GRE questions and were told that the test was diagnostic of their verbal abilities and that the test would be difficult. The results showed that participants primed of their White identity solved more GRE questions correctly than those in the Black-identity prime and control condition; demonstrating that positive performance expectations can lead to performance boosts.

Shih, Pittinsky, and Trahan (2006) examined the effects of the positive stereotype that females do well in the verbal ability domain using Asian-American female participants. Participants were randomly assigned to either a female, Asian, or no identity salient condition. For the prime, participants were asked to complete surveys with questions relevant to the particular identity condition they were in, and in the control condition they were asked about young adult life. Participants were then asked to complete a verbal ability test drawn from a GRE

study guide. Shih et al. (2006) found small effects for those in the female identity salient condition answering more questions correctly than those in the Asian identity and control conditions.

Comparably, Shih, Pittinsky, and Ambady (1999) had Asian-American women complete a quantitative task. Participants were randomly assigned to either an ethnicity salient, gender salient, or a control condition. The conditions involved subtle activation of identities through having participants answer questions related to their gender, ethnicity, or unrelated questions for the control condition. Following the questionnaire, participants were given 20 minutes to complete questions from the Canadian Math Competition. Participants in the Asian-identity condition performed the best, followed by those in the control condition, while those in the gender-identity condition performed the worst.

Finally, Levy (1996) examined whether cultural stereotypes impact elderly individuals' performance on memory tasks. They ran participants individually and subconsciously primed them of either a positive cultural stereotype, "wise," or a negative one, "senile," about elderly people by flashing words on a computer screen. They found that participants primed of the "wise" stereotype had increases in their recall, while those in the negative stereotype condition showed performance decrements. In conclusion, the stereotype "boost" effect has been demonstrated for multiple groups and cognitive domains, but exactly when positive stereotypes will result in performance decrements instead of boosts remains unclear.

Stereotype Contradiction Threat

Performance decrements from positive stereotypes have also been found (Cheryan & Bodenhausen, 2000; Shih et al., 2002; Shih et al., 2015). For example, Cheryan and Bodenhausen (2000) found performance decrements after positive stereotype activation for

math performance of Asian-American females. Participants were given challenging quantitative GRE math questions in either a control, an ethnicity salient, or a gender salient condition. The manipulations were made salient by having each participant fill out a self-esteem scale related to their assigned condition; participants in the control condition responded to items that did not make reference to a referent group. Participants in the ethnicity salient condition scored lower than those in the control condition, and there were no differences in scores between the gender salient and control conditions. The abovementioned findings suggests that making membership salient for the social group expected to perform well leads to performance decrements rather than performance improvements. Looking to literature on the choking phenomenon can give insight into how pressure to perform can lead to performance decrements.

SCT and choking literature. Generally speaking, there is lack of agreement regarding the definition of choking. It should be noted that choking leads to poor performance, but choking is not the only explanation for poor performance (Weinberg & Gould, 2007). Baumeister and Showers (1986) define "choking" as lesser performance than an individual's capabilities due to interference from factors that increase pressure to perform. Pressure refers to any situational factor that motivates others to perform optimally. There has been increased interest on choking over the past few decades (Baumeister, 1984; Baumeister, Hamilton, & Tice, 1985; Baumeister, Hutton, & Cairns, 1990; Baumeister & Steinhilber, 1984; Beilock & Carr, 2005;Lewis & Linder, 1997; Masters, 1992; Mesagno, Harvey, & Janelle, 2012; Mesagno, Marchant, & Morris, 2008; Mesagno, Marchant, & Morris, 2009; Mesagno & Mullane-Grant, 2010; Schlenker, Phillips, Boniecki, & Schlenker, 1995a, 1996b; Wang, Marchant, Morris, & Gibbs, 2004) but research on choking began in the 1950's and 60's

(Agnew & Agnew, 1963; Besch, 1959; Church, 1962; Deese, Lazarus, & Keenan, 1953; Miller & Estes, 1961; Shaw, 1958).

Choking is often studied in the context of sports (Masters, 1992; Mesagno et al., 2012; Mesagno et al., 2008; 2009; Mesagno & Mullane-Grant, 2010; for a review, see Hill, Hanton, Matthews, & Fleming 2010). For example, Wang, Marchant, Morris and Gibbs (2004) examined choking in student basketball players. Participants were required to shoot free throws in either a low or high pressure condition. The high-pressure condition included a performance-based financial reward, presence of an audience, and video-taping; low-pressure participants shot free throws with only the research assistant as an onlooker during the task. Results showed that high-pressure participants made significantly fewer shots than those in the low-pressure condition.

Although choking is mostly studied in athletes, it has also been demonstrated in cognitively loaded tasks such as mazes (Agnew & Agnew, 1963), anagrams (Deffenbacher, 1978; Sarason, 1961; Vogel, Raymond, & Lazarus, 1959) copying tasks (Sanders et al., 1978), video games (Kimble & Rezabeck, 1992), learning tasks (Besch, 1959; Deese et al., 1953; Nicholson, 1958; Sarason, 1956; Taylor, 1958), and verbal and quantitative skill tasks (Paul & Eriksen, 1964). I assert that SCT is a specific type of choking in that performance pressure in SCT stems from individuals' identities. Like choking, when threat from high performance expectations is highly salient performance will suffer. Negative stereotypes are another source of pressure; consequently, stereotype threat literature provides additional evidence that decrements can stem from identity-based performance expectations.

SCT and stereotype threat literature. According to stereotype threat theory, negative stereotypes put pressure on group members that in turn negatively influences performance

(Steele & Aronson, 1995). More formally stated, stereotype threat is the psychological stress experienced by the risk of confirming a negative stereotype about one's in-group (Steele & Aronson, 1995). The stereotype threat phenomenon occurs when a negative stereotype is salient about a group for the domain in which group members are working (Aronson et al. 1999; Smith and Hung, 2008), and when group members perceive the task to be indicative of ability in that domain (Schmader et al., 2008). For example, making salient the stereotype that men are not as good as women on verbal tasks negatively affects men's verbal task performance, but math task performance is unaffected (Spencer et al., 1999).

Steele and Aronson (1995) began their research on stereotype threat in the context of race with experiments on Black and White undergraduate students. In the initial experiments, students were given 30 minutes to complete a test comprised of verbal ability questions from the Graduate Record Exam (GRE). Participants were either told that the test was indicative of their problem-solving ability, intellectual ability, or both; the argument being that presenting the test as a measure of intellectual ability would raise Blacks' fear of confirming the intellectual inferiority stereotype. Steele and Aronson (1995) found that Black students, and not White students performed worse on the test when it was represented as suggestive of their intellectual abilities instead of problem solving abilities.

Furthermore, the ways in which stereotype threat can be activated has received attention in stereotype threat literature (Aronson et al. 1999; Smith & White, 2002; Steele 1997; Steele and Aronson 1995). Implicit and explicit stereotype activation are both sufficient to induce stereotype threat effects (Smith & White, 2002). For instance, Smith and White (2002) exposed White female undergraduates to the stereotype that men outperform women in math using both an explicit and implicit manipulations. In the explicit activation condition, participants were

told outright about the stereotype, whereas in the implicit condition participants were given the math task without further comment about gender differences. There was also a "stereotype nullified" control group where participants were told that men and women perform at the same level on the math task.

Results showed that performance in both the implicit and explicit activation conditions were lower than the stereotype nullified condition, and that performance in the explicit and implicit conditions did not differ from each other. The occurrence of stereotype threat under conditions of implicit *and* explicit activation demonstrates the robust effects of the fear of confirming negative expectations on actual performance. I argue that in certain contexts, positive stereotypes pressure individuals through fear of disconfirming positive expectations, thereby leading to performance decrements.

Tipping Point Argument

I propose that the effects of positive performance stereotypes reach a point at which level of situational threat salience causes a change from performance boosts to performance decrements. Baumeister and Showers (1986) identified various factors that influence situational threat salience, including rewards or punishment for performance, audiences, competition from the presence of social referents, ego impact when performance is reflective of self-identity, and when a second chance to redeem less than ideal performance is unavailable.

In support of threat salience as the critical factor for whether positive stereotypes lead to performance improvements or decrements, Moe (2009) separated males into six groups for a two-part spatial ability task. Upon arrival to a lab, participants completed the first half of a spatial ability task. Then, before beginning the second half of the task there was either no mention of gender, a statement that women were superior on the task, or a statement that men

were superior on the task; one of the aforementioned statements was combined with a statement that said the second half of spatial ability questions was either easier than the first half of questions or harder than the first half of questions. They found that the males performed better on the second half of spatial ability questions when they were exposed to either of these combinations: 1) told that men were superior to women on the task + the second half of the task would be easy 2) no mention of gender + told that the second half would be more difficult. Moe's findings (2009) demonstrate that once threat reaches a certain level, in this case when there was increased motivation from a positive stereotype and lowered self-efficacy from anticipation of a difficult task, performance boosts were eliminated.

Furthermore, Rosenthal and Crisp (2007) had math-identified males at an academically esteemed school, complete a math task; participants were assigned to one of three conditions: 1) gender stereotype made salient 2) school stereotype made salient 3) both gender and school stereotypes made salient. Results showed that participants presented with two positive stereotypes suffered from performance decrements relative to those presented with only one positive stereotype. The above findings provides additional support for the notion that when performance pressure gets high enough, performance will decrease. There are a number of antecedents to threat salience, including feedback and the social comparisons of said feedback, stereotype activation, and domain identification.

Feedback social comparisons. Feedback is a potential threat source. Feedback can be provided in numerous ways, ranging from more proximal feedback such as meeting production quotas or more distal feedback such as promotions and pay raises. Performance feedback can influence people's self-efficacy and motivation on subsequent tasks. For example, both Fitzsimmons et al (1991) and McAuley et al (1991) found that participants' self-efficacy

increased following false positive feedback on athletic tasks. While Escarti and Guzman (1999) manipulated feedback on an athletic task to be either positive or negative, and then measured participants self-efficacy for a subsequent trial and allowed participants to choose the difficulty level of the task. They found that performance feedback was positively related with self-efficacy and choice of task difficulty.

Furthermore, individuals' self-efficacy and task motivation are often based on the comparisons of their performance feedback to that of peers. When individuals are unsure about how to assess their performance in a situation, they will compare themselves to others to evaluate their relative standing (Festinger, 1954). Additionally, Seta (1982) exposed female participants to differential feedback that they were performing better, worse, or the equal to a coactor on a reaction time task. Participants pressed a sequence of four buttons in a left to right sequence, for which there was little probability of error. Each sequence was considered as one response, and feedback was given through a tone that was said to increase in frequency as responses increased. Although not given instructions to attend to the coactor's feedback tone, participants were able to clearly hear tones intended for the coactor. Results showed that individuals did not compare their performance to coactors whose performance was greatly superior, greatly inferior, or comparable; only in the condition wherein the performance of the coactor was slightly superior did participants' motivation to perform well increase.

In summary, feedback on how an individual performs relative to social referents influences his/her task motivation. Performance slightly lower than social referents increases motivation most because there is a chance that the final social comparison will result in negative self-evaluation, but it is still plausible to for the actor to eliminate the performance gap and surpass the referent. This increase in motivation should be magnified when individuals are

socially comparing their performance to members of an out-group because people are motivated to perform well relative to out-group members.

Intergroup relations are often treated as a zero-sum game where status advances for one group means losses for another group, thereby leading to intergroup competition (Bernard, 1957; Boulding, 1963; Coser, 1956; Sherif, 1966; Sherif, Harvey, White, Hood, & Sherif, 1961). People are so highly motivated to compare favorably to others that arbitrary differences such as proximity of seats or color of clothing can lead to in-group/out-group categorization and intergroup competition (Tajfel, Billig, Bundy & Flament, 1971; Lemyre & Smith, 1985; Lount & Phillips, 2007; Oakes & Turner, 1980; Tajfel & Turner, 1979). This attempt to maintain or increase relative standing through social competition between otherwise arbitrary groups is often referred to in the literature as the "minimal group studies" (Turner, 1975; Billig & Tajfel, 1973; Lount & Phillips, 2007).

The initial minimal group study was carried out by Tajfel (1970) in which participants were shown clusters of dots on a screen and were told to estimate the number of dots. Half of the participants were told that some people tend to overestimate while others underestimate, and the other half were told that some people are more accurate than others in their estimations. Participants were then informed that the researchers were interested in examining the different kinds of judgments and that they would be separated into two groups based on the type of estimations they made. The groupings included underestimators opposed to overestimators and better estimators opposed to worse estimators. Participants were then allowed to allot rewards and penalties to either in-group or out-group members by distributing small amounts of money, and the only information given to participants were the group membership and number of group members for the other person. The results showed that participants were positively

biased towards in-group members when awarding money.

Similarly, Billig and Tajfel (1973) had teenage males participate in a two-part experiment for which they were shown two pictures and asked to indicate their preference between the two pictures and then allot rewards to coactors. More specifically, two groups were informed that the pictures were painted by two foreign painters, Klee or Kandinsky, but did not tell them which pictures corresponded to each of the artists (similarity groups). In two other groups, Klee and Kandinsky were not mentioned (non-similarity groups). For part two, the similarity groups were told whether they were in the group that preferred Klee or Kandinsky. In contrast, the non-similarity groups were told that part two had nothing to do with part one but were told that they would be randomly divided into 'group X' or 'group W'. Participants were then instructed to allot money to other participants based only on group membership. Evidence was found for in-group favoritism in the allotment of rewards, regardless of condition. Based on minimal group research, it is clear that bias and competition increases when individuals are in intergroup rather than intragroup situations. Moreover, the threat of negative evaluation relative to an out-group member further increases motivation when the negative evaluation violates group norms.

In other words, motivation to perform well is magnified when social comparison is "downward" to a less capable out-group member because individuals desire to behave in ways congruent with their identities. These identity-based motivations are informed by stereotypes (Oyserman, 2009), and intrinsic motivation to manifest identity-congruent behaviors indicates that stereotypes can guide goals and behavior outside of conscious awareness (Fischbach & Ferguson, 2007). Therefore, stereotypical expectations that an individual should outperform out-group members both consciously and subconsciously affect motivation and anxiety. For

example, if a typically high performing athlete was losing to an inferior opponent, the

motivation to beat the inferior opponent would be much stronger than if the athlete and opponent

were considered equal. For example, Festinger (1942) found that undergraduate students'

motivation to perform was greatest when they scored lower than high school students on a

cognitive task. In contrast, undergraduate students' motivation to perform was least when they

scored higher than graduate students.

The abovementioned findings validate the argument that individuals are motivated to

maintain positive standing relative to out-group members. Additionally, because individuals

desire to behave in ways that are identity-congruent (Oyserman, 2009), a positive in-group

stereotype will serve to further heighten the motivation when making a downward social

comparison. Consequently, feedback displaying positive/better performance relative to an in-

group member will elicit less threat salience (i.e. lesser motivation, higher self-efficacy, and

lower anxiety) than feedback displaying negative/worse performance relative to an out-group

member.

Positive stereotype activation. The manner of stereotype activation impacts the type of

performance effects the stereotype elicits (Lombardi, Higgins, & Bargh, 1987; Higgins, 1996;

Moskowitz & Roman, 1992; Shih et al., 2002; Shih et al., 2015). Implicitly activated

stereotypes are presented in such a way that participants are not made aware of the association

between the stereotype prime and their subsequent behavior, while explicitly activated

stereotypes are presented in such way that participants are made consciously aware of the

stereotype and its association with their subsequent behavior. One common method of implicit

stereotype activation is subliminal activation, wherein individuals are presented with

stereotype-relevant visual stimuli at a rapid pace in a way that is only processed subconsciously

(Banaji & Hardin, 1996; Bargh & Chartrand, 1999; Bargh & Pietromonaco, 1982). An example

of explicit stereotype activation is informing an individual of a stereotype outright. Previous

research shows that implicit priming of positive stereotypes leads to performance boosts while

explicit activation leads to performance decrements (Shih et al., 2002; Shih et al., 2015).

For example, Shih et al (2002) had Asian-American students randomly assigned to

either an implicit, explicit, or no-stereotype activation condition. Participants either

completed an ethnicity questionnaire (implicit condition), a stereotype evaluation

questionnaire (explicit condition), or a survey about entertainment preferences, which was

unrelated to ethnicity or cultural stereotypes (control). Following stereotype manipulations,

participants were allowed 20 minutes to complete a difficult math task. Results showed that

performance in the implicit condition was significantly higher than performance in the

control and explicit condition. However, performance in the explicit condition did not differ

from those in the control condition. While in a second study, Shih et al (2002) found that

subliminal priming of participants' Asian identities resulted in performance boosts on a math

task, and supraliminal priming, wherein words flashed on a screen long enough to be legible

to participants, led to performance decrements.

Differential performance outcomes stemming from implicit versus explicit stereotype

activation is likely due to the effects of anxiety, motivation, and self-efficacy on threat salience.

Implicit positive stereotype activation implies expectations for success held by the actor and

others; suggesting that inadequate performance will be less threatening relative to when

stereotypical expectations are explicitly communicated. Also, implicit activation likely boosts

self-efficacy in a task because it leads an actor to believe he/she *should* perform well without a

sense of obligation to perform well, which in turn reduces anxiety about task performance. In

contrast, explicit positive stereotype activation makes expectations for success apparent; performance that does not align with expectations likely is more threatening because standards were made clear to the actor and others. In other words, implicit positive stereotype activation provides self-efficacy boosts and lowered levels of anxiety leading to low levels of threat salience and greater feelings of confidence; while explicit positive stereotype activation produces high levels of threat salience because the anxiety experienced is likely to cross the threshold that produces the positive feedback loop whereby achievement motivation increases, but self-efficacy decreases.

Domain identification. Finally, domain identification likely is also an antecedent of threat salience. Domain identification influences career path choices (Hart & Smith, 2003; Smith, Morgan, & White, 2005) and how well individuals perform in the relevant domain (Aronson, Quinn, & Spencer, 1998; Candinu, Maass, Impagliazzo, & Latinotti, 2003; Steele, 1997). Furthermore, an individual's ability and enjoyment of a particular domain also affects anxiety, self-efficacy, and motivation when performing a domain-relevant task (see Osborne, Kellow, & Jones, 2007). As a result, stereotypical expectations will affect low and high domain identifiers differently (Aronson et al, 1999; Keller, 2007; Leyens, Desert, Croizet, & Darcis, 2000; Stone et al., 1999).

For example, Smith and Johnson (2006) examined the effect of positive stereotypes on performance and motivation as a function of domain identification. Male participants low and high in domain identification were told that the purpose of the study was to evaluate a new math exam. Before completing the math task, participants were given a domain identification questionnaire and then were reminded explicitly of the stereotype that men are superior to women in mathematics. Also, half of the men were told that initial evidence has shown the test

produced expected gender differences, and the other half of the men were told that initial evidence indicated that the both genders performed equally well on the test. Results showed that men low in domain identification choked under the pressure of positive performance expectations, and performed well in conditions wherein the stereotype was described as inapplicable, while those high in domain identification were unaffected in both cases.

Furthermore, when the positive stereotype was described as inapplicable to the task, low domain identifiers performed significantly better than high domain identifiers. Results from Smith and Johnson (2006) validate the argument that those low in domain identification are more sensitive to threat factors (i.e. threat factors more readily result in increased anxiety and lowered self-efficacy for low domain identifiers) from positive performance expectations than those high in domain identification. Nonetheless, high domain identifiers may still be affected by positive stereotype expectations.

As stated previously, Saad et al. (2015) activated the positive stereotype about Asian-Americans and math through asking high math-domain identifying participants questions related to their ethnic identity. The results showed that compared to a control condition, the stereotype activation benefited high domain identifiers' performance. Furthermore, Rosenthal and Crisp (2007) found that males who highly identified with math exhibited performance decrements when under pressure of two positive stereotypes, but performance was unaffected by pressure of one positive stereotype. In short, although both low and high domain identifiers feel performance pressure from positive stereotypes, low domain identifiers feel more threatened by positive performance expectations than high domain identifiers because they are more likely to experience lowered self-efficacy and increased anxiety about being successful in the relevant domain.

As stated, threat ranges from low to high on variables of performance feedback, social referents, stereotype salience, and domain identification. I assert that threat salience has a negative relationship with performance, in that higher situational threat leads to lower performance.

Overview

The present study will attempt to create a continuum of threat salience so as to empirically locate a tipping point where stereotype boost effects are replaced by SCT effects. Threat salience will be manipulated through varying levels of performance feedback and social referent group membership (negative feedback—out-group referent vs. positive feedback—in-group referent), stereotype activation (implicit vs. explicit), and domain identification as an individual difference antecedent that affects threat salience. The study will be conducted in two parts. First, participants will complete an online survey measuring domain identification. From the sample, only White females will be invited to participate in laboratory phase of the research. Only females will be recruited because the gender stereotype about women outperforming men on verbal ability tests will be used to establish the positive stereotypical characteristic. Research has found women to be superior to men on verbal ability tasks (Trahan & Quintana, 1990; Bleecker, Bolla-Wilson, Agnew, & Meyers, 1988; Kramer, Dellis, & Daniel, 1988). Although observed gender differences are oftentimes small (Hyde & Linn, 1988; Kaufman & Wang, 1992) and may be subsiding with time (Hyde & Linn, 1988), the belief that women are more verbally skilled than men remains (Castillo-Mayen & Montes-Bergen, 2014). Only Whites will be recruited in order to avoid the influence of any racial/ethnic stereotypes on threat salience and/or task performance.

When reporting to the laboratory, the participants will be randomly assigned to one of

four experimental conditions as a function of the performance feedback and social referent group membership independent variable and the stereotype activation manipulation. Once at the lab, participants will complete one trial of verbal ability test items, after which they will be exposed to the experimental manipulations. Finally, they will complete the second trial of verbal test items and performance differences between the first and second trials is the dependent variable used to test the tipping point model.

Hypotheses

Hypothesis 1: Relative to explicit stereotype activation, implicit stereotype activation will lead to higher performance on the verbal ability items.

Hypothesis 2: There will be a positive relationship between domain identification and performance on verbal ability items.

Hypothesis 3: There will be an interaction between stereotype activation and feedback/social referent type.

Hypothesis 3a: When stereotype activation is implicit, negative feedback relative to an out-group member will result in greater performance compared to positive feedback relative to an in-group member.

Hypothesis 3b: When stereotype activation is explicit, negative feedback relative to an out-group member will result in lower performance compared to those who receive positive feedback relative to an in-group member.

Hypothesis 4: There will be an interaction between domain identification and

feedback/social referent type.

> Hypothesis 4a: When domain identification is high, negative feedback relative to an out-group member will result in greater performance compared to positive feedback relative to an in-group member.

> Hypothesis 4b: When domain identification is low, negative feedback relative to an out-group member will result in lower performance compared to positive feedback relative to an in-group member.

Locating a Tipping Point

The pattern of support or non-support for the above hypotheses speak indirectly to the ultimate goal of establishing the approximate location of a tipping point on a continuum of threat salience whereby performance boosts transition to performance decrements. There is no available research that specifies whether a given source of threat salience is more threatening than another. Furthermore, a given level of a threat salience may result in performance boosts when occurring in conjunction with certain levels of the other threat salience variables, but that same given level may lead to performance decrements when occurring in conjunction with different levels of threat salience factors. As such, there is no formal hypothesis about the location of a tipping point; rather analyses to locate a tipping point will be exploratory.

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Methods

</div>

Participants

There was rolling recruitment for both parts one and two of the study. Approximately 350 college undergraduate students from a large mid-Atlantic university were recruited through the SONA experiment management system for part one. Males were allowed to participate in

part one, but only female participants were allowed to participate in part two. Out of those participants who completed part one, 85 White females were recruited for part two. Participation in part one resulted in .5 points extra credit, and participation in part two resulted in 1 point extra credit.

Design

Technically, the second study is a 2^4 incomplete block design because not all combinations of the causal antecedents of social referent and feedback were included in the design. Ultimately, the study design reduces to a fully crossed 2 (Negative Feedback—Out-Group vs. Positive Feedback—In-Group) X 2 (Implicit vs. Explicit) repeated measures factorial with domain identification as a measured continuous causal antecedent. For the ANOVA design, using G*Power, 80 participants is recommended to achieve power = .8 when assuming a correlation of .5 between measure 1 and measure 2, a moderate effect size (Cohen's $f = .25$), and the Type I error rate = .05.

Procedure

Upon registering to participate in part one, participants were presented with surveys about their domain identification along with additional surveys about their gender identification, dispositional self-consciousness, social anxiety, and competitive drive to mask the true purpose of the study. The surveys from part one were completed at least three days before participating in part two in order to avoid biasing participants' self-efficacy during the experimental session. Participants were randomly assigned to one of four conditions before arrival. Upon arrival to the laboratory, a female experimenter greeted participants and then directed them to a computer. The researcher then asked participants to read the informed consent form, and sign if they understood and agreed to the conditions. Participants were then

instructed to follow directions as presented on their computer, and to let the researcher know when they completed the first 15 minute trial so that the participant could record their score on the data sheet.

Participants then read the following study purpose and task description:

> The present study is designed to investigate which personal factors impact verbal ability. The first trial of verbal ability questions will last 15 minutes, after which you will report your number of correct answers on a data sheet. Please do your best to answer as many test items correctly as you can in the allotted amount of time. Your 15 minutes will begin immediately after the verbal ability task appears. Please click the "next" arrow to be redirected to the verbal ability task.

After completing trial one, participants were exposed to the experimental manipulations and then completed trial two. Upon completing trial two, participants were presented with the following debriefing statement:

> Thank you for your participation. Although your score on trial one was a true indicator of your performance, some minor deception was involved when explaining the purpose. The purpose of the study was to evaluate your task performance as a function of your feedback on trial one relative to others, knowledge of performance expectations, and your level of identification with the verbal ability domain. Furthermore, in order to compare how performance is differentially affected by negative and positive feedback, you were made to believe that your performance was slightly better or slightly worse than a previous participant. Your participation is greatly appreciated. If you have any questions about this study please inform the researcher before leaving the lab. We strongly urge you not to discuss this study with anyone else who will participate or who might participate in the future. Please understand that doing so could jeopardize the integrity of the research. Would you like to know the results of this study? If so, please provide your email below.

Online Assessments

Dispositional self-consciousness and social anxiety. Dispositional self-consciousness and social anxiety were measured using the 23-item scale created by Fenigstein, Scheier, and Buss (1975) (See Appendix A), which contains subscales for public and private self-consciousness, as well as social anxiety. The public self-consciousness subscale measures individuals' awareness of how they are being viewed by others. An example of an item

included in the public self-consciousness subscale is "I usually worry about making a good impression." While the private self-consciousness subscale measures individuals' awareness of their own cognitions, feelings, and motives. An example of an item included in the private self-consciousness subscale is "I'm constantly examining my motives." Finally, social anxiety is the level of discomfort that people feel in the presence of others. An example of an item included in the social anxiety subscale is "I have trouble working when someone is watching me." All items are on a scale ranging from 0 (extremely uncharacteristic) to 4 (extremely characteristic).

Competitive drive. Competitive drive was measured using the 19-item scale created by Helmreich & Spence (1978) (See Appendix B), which contains subscales for work, mastery and competitiveness. The work subscale measures individuals' desire to work hard and do a good job. An example of an item included in the work subscale is "I find satisfaction in exceeding my previous performance even if I don't outperform others." While the mastery subscale measures individuals' preference for difficult, challenging tasks and for meeting internally prescribed standards of excellence. An example of an item included in the private self-consciousness subscale is "If I am not good at something, I would rather keep struggling to master it than move on to something I may be good at." Finally, the competitiveness subscale measures individuals' enjoyment of interpersonal competition and desire to win. An example of an item included in the social anxiety subscale is "I enjoy working in situations involving competition with others." All items are on a scale ranging from 1 (strongly disagree) to 4 (strongly agree).

Gender identity. Importance of gender identity to participants' self-definitions was measured using items modified from the 16-item Collective Self-Esteem Scale developed by

Luhtanen and Crocker (1992) (See Appendix C). Example of the original items are as follows: "The social group I belong to is unimportant to my sense of what kind of person I am" (reverse coded), "The social group I belong to is an important reflection of who I am," "In general, belonging to my social group is an important part of my self-image," and "Overall, my group membership has very little to do with how I feel about myself." Instructing participants to respond to the scale while referencing a specific target group has shown not to impact scale psychometrics (Luhtanen & Crocker, 1992).

Other information. In order to gather extra information on participants' domain identification, participants were asked to provide self-reported SAT scores for math and verbal sections, as well as their major or intended major. As further indication of cognitive ability, participants were also asked to report their GPA. Lastly, participants were asked demographic questions about their race, gender, age, and year of college.

Experimental Task

Participants were presented with verbal Graduate Record Examination (GRE) type questions that ranged in difficulty. The questions were multiple choice and each item had five answer choices: four distractor items and one correct answer. For each of the two sections there was a question bank of 100 questions, with 200 questions in all to ensure that participants were unable to finish in the allotted time, even if they were guessing. Each section's question order was fixed so that questions were provided in the same order to each of the participants, and participants were unable to skip items. Additionally, the section presentation was counterbalanced in that some participants completed set one first and some completed set two first. The items were gathered from open access online resources of GRE practice questions.

Causal Antecedents

Feedback and social referent. Unbeknownst to the participant, the participant's score on the first trial of questions was sent to the researcher's email immediately after the trial was over. After trial one, the participants were led to believe that the data sheet for the results was accidentally left in another computer lab. The participant was informed that the researcher must leave the room briefly to retrieve it. While retrieving the data sheet from a separate room, the researcher checked her email for the participant's score on trial one. Depending on the experimental condition the participant was in, the researcher filled out the "past participant's score" to convey an upward or downward social comparison relative to the participant's trial one score. Upon returning to the lab, the researcher gave the participant the data sheet and the participant was instructed to fill in their information (time scheduled for study, race, gender, trial one score) below the "past participant's information". If the social referent was male, the participant saw that they answered two fewer items correctly than the male referent; if the social referent was female, the participant saw that they answered two more items correctly that the female referent.

Pilot study one. A one-part pilot study was conducted including only the feedback/social referent manipulation to: 1) Check whether participants notice the gender and score of the past participant 2) Check whether the manipulation raised any suspicions in participants 3) Qualitatively examine how the manipulation affects participants self-efficacy and motivation to perform. Participants signed up for the study under the premise that the study was examining personal factors contributing to verbal ability. Upon signing up and reporting to the lab, participants completed the first trial of verbal ability items, and were then exposed to the feedback/social referent manipulation. Directly after exposure to the

manipulation, participants were interviewed by the researcher (see Appendix D for interview questions) targeting the aforementioned goals. The study was adjusted according to participants' feedback, and then re-ran with the necessary adjustments until no more adjustments were needed.

Stereotype activation. In the implicit activation condition, the stereotype was activated when participants viewed performance feedback relative to another female or a male, as well as when they indicated their gender on the performance score data sheet. They then read the following text:

> Attention, please read the following instructions carefully.
>
> The present study is designed to investigate which personal factors impact verbal ability. The second trial of verbal ability questions will last 15 minutes, after which you will report your number of correct answers on a data sheet. Please do your best to answer as many test items correctly as you can in the allotted amount of time. Your 15 minutes will begin immediately after the verbal ability task appears. Please click the "next" arrow to be redirected to the verbal ability task.

In the explicit activation condition, participants were exposed to the same manipulations as those in the implicit activation condition, but they were also instructed to read the following text:

> Attention, please read the following instructions carefully as they are different from the instructions for trial 1.
>
> It is well-known that on average women score higher than men on measures of verbal ability. We will be using your scores from the next trial of questions to investigate which personal factors relate to gender differences in verbal ability. The second trial of verbal ability questions will last 15 minutes, after which you will report your number of correct answers on a data sheet. Please do your best to answer as many test items correctly as you can in the allotted amount of time. Your 15 minutes will begin immediately after the verbal ability task appears. Please click the "next" arrow to be redirected to the verbal ability task.

Pilot study two. A one-part pilot study was conducted including only the explicit stereotype activation manipulation to: 1) Check whether the manipulation raised any suspicions in participants 2) Qualitatively examine how the manipulation affected participants'

self-efficacy and motivation to perform. The procedure for pilot two was identical to pilot one, except after participants completed the first trial of verbal ability items, they filled in their performance data on a blank data collection sheet and were then exposed to the explicit stereotype activation manipulation. For the explicit manipulation, the procedure was identical to the aforementioned procedure used in the actual study. Directly after exposure to the stereotype activation, participants were interviewed by the researcher (see Appendix E for interview questions) with questions tailored to the goals of pilot two. Again, the study was adjusted according to participants' feedback, and then re-ran with the necessary adjustments until no more adjustments were needed.

Domain identification. Domain identification was measured during the pre-test for part one of the study. Domain identification information was collected for math, verbal, and academic ability using a 16-item scale developed by Smith and White (2001) (See Appendix F). The sum of responses to the 7-item verbal ability subscale was used to measure domain identification. Examples of the items included in the measure for verbal ability identification are "I learn things quickly in English classes," on a scale ranging from 1 (strongly disagree) to 5 (strongly agree), and "How much do you enjoy English-related subjects?" on a scale from 1 (not at all) to 5 (very much). Apart from the scale by Smith and White, the sum of responses to an additional set of 19 novel items (See Appendix G) about liking and skill for verbal ability tasks was used a measure of domain identification.

Dependent Variable

Given the nature of the verbal task, it was possible for participants to obtain similar or identical raw scores regardless of differentiation in item difficulty levels of correctly answered items. Simply put, raw scores provided everyone with an absolute number correct but did not

factor in item difficulty. It is evident that a participant who answered 10 easy items correctly out of 30 items, should not receive the same score as a participant who answered 10 hard items correctly out of 30 items. Therefore, participants were assigned weighted trial scores. Weighted item scoring was as follows: 1 point for a correct answer on an easy-level item, 2 points for a correct answer on a medium-level item, and 3 points for a correct answer on a hard-level item. Data on difficulty level for each item was provided by the resource that the verbal ability items were obtained from; furthermore, item difficulty was based on the percentage of people that attempted the item and answered it correctly (i.e. more people tend to get the easy items correct relative to the medium and hard items etc.).

Being that there were five response options for each verbal ability item, participants had 20% chance of answering correctly even if they are guessing. Therefore, the ratio of items answered correctly to the items attempted will be used to control for guessing. That said, trial one and trial two performance were both operationalized as the weighted percentage correct (i.e. weighted score correct divided by weighted score attempted). The dependent variable was performance change, which was operationalized as the difference between trial one performance and trial two performance (i.e. trial two performance minus trial one performance).

Results

Out of the 85 participants for part two: 21 were in the negative feedback/male referent with explicit stereotype activation condition, 20 were in the negative feedback/male referent with implicit stereotype activation condition, 22 were in the positive feedback/female referent with explicit stereotype activation condition, and 22 were in the positive feedback/ female referent with implicit stereotype activation condition. Table 1 shows the means, standard deviations, and

intercorrelations for domain identification, raw and weighted trial one and trial two performance, as well as gain scores (i.e. percent difference between trial one and trial two) across negative/male—implicit and negative/male—explicit conditions; table 2 contains the same information as table 1, but for the positive/female—implicit and positive/female—explicit conditions.

Cronbach's alpha for the 19 novel domain identification (DI) items, and the 7 items from Smith and White (2001) were .85 and .86, respectively; both demonstrating high internal consistency reliability. The novel DI items and those from Smith and White were highly correlated (r=.67, p<.05) and together, demonstrated high reliability (26 items; α = .89), therefore the items were combined to create a single domain identification score. The average of the z-scores for the domain identification composite scale correlated highly with the average of the unstandardized scores (r=.98, p<.01), therefore unstandardized score averages and standard deviations are reported in Table 1 and Table 2.

Due to logical justification for the weighted scoring scheme, results for analyses using the weighted scoring are presented. It is important to note that analyses utilizing raw scores produced similar results as weighted scores.

Preliminary Analysis

First, an ANCOVA examining the effects of the independent variables on trial one performance were assessed to ensure successful random assignment of participants to conditions. The main effects for stereotype activation, feedback/social referent, and domain identification were entered into the model first, followed by all two-way interactions, and finally the three-way interaction. As shown in table 3, full model explained 12% of the variance in trial one scores (R^2=.12), and only domain identification predicted trial one scores (β=.28, p<.05), therefore it

can be concluded that random assignment of subjects to conditions of the experimental

manipulations was successful.

As a preliminary check, the number of items attempted and number of items correct were

tested between trials. The results showed that participants attempted significantly more items on

trial two (*M*=55.8, *SD*=10.17) than on trial one (*M*=51.06, *SD*=10.17), $t(84)$=-9.27. Participants

also correctly answered significantly more items on trial two (*M*=29.518, *SD*=8.85) than on trial

one (*M*=28.14, *SD*=9.27), $t(84)$ = -2.27, p<.05.

Hypotheses Testing

As shown in table 4, an ANCOVA was performed with the main effects (domain

identification, stereotype activation, feedback/social referent) entered into the model first,

followed by all two-way interactions, and lastly the three-way interaction term; weighted gain

scores, which are percent increase or decrease between trial one and trial two weighted

percentage scores, were entered as the dependent variable. The three-way interaction term

entered in to model 3 was not significant, therefore results for model 2 were interpreted.

Stereotype activation main effect. The ANCOVA showed no effect of stereotype

activation on weighted gain scores (β=.005, p=.97), meaning that performance boosts or

decrements for trial two performance did not significantly differ between the implicit and

explicit stereotype activation conditions. The mean weighted gain scores were in line with

hypothesis 1. Implicit stereotype activation resulted in a mean gain score of -.1.56% (*SD*=10.14),

while explicit activation resulted in a mean gain score of -2.19% (*SD*=8.16). This means those in

the explicit stereotype activation conditions had slightly greater decrements on trial two than

those in the implicit stereotype activation conditions; this difference was not statistically

significant meaning that hypothesis 1 was not supported.

Domain identification main effect. As expected, domain identification showed a significant correlation with performance both for trial one weighted percentage scores (r = .24, p<.05) and trial two weighted percentage scores (r = .28, p<.05). This indicates that as domain identification increases, performance on the trials also increased. Therefore, hypothesis 2 was supported. However, the ANCOVA showed no effect of domain identification on weighted gain scores (β=.01, p=.93).

Stereotype activation by feedback/social referent. The ANCOVA showed no interaction between stereotype activation and feedback/social referent (β= -.054, p=.63). Furthermore the means of the gain scores were not in line with hypothesis 3a, when stereotype activation was implicit, negative feedback relative to males resulted in a mean weighted gain score of -.2.6% (*SD*=9.38) and positive feedback relative to females resulted in a mean gain score of -.61% (*SD*=10.91). The means of weighted gain scores were also not in line with hypothesis 3b, when stereotype activation was explicit, negative feedback relative to males resulted in a mean gain score of -1.51% (*SD*=6.96) and positive feedback relative to females resulted in a mean gain score of -2.84% (*SD*=9.28).. In conclusion, hypotheses 3, 3a and 3b were not supported.

Feedback/social referent by domain identification. The interaction between feedback/social referent and domain identification was not statistically significant (β= .15, p=.19). The mean of the weighted gain scores were not in line with hypothesis 4a, when domain identification was high, negative feedback relative to males resulted in a mean gain score of -3.61% (*SD*=8.29) and positive feedback relative to females resulted in a mean gain score of .27% (*SD*=10.89). For high domain identifiers, receiving negative feedback relative to males resulted in performance decrements on trial two, while receiving positive feedback relative to females

resulted in a very small performance boost. Weighted gain score means were also not in line with hypothesis 4b. When domain identification was low, negative feedback relative to males resulted in a mean gain score of -.82% (*SD*=8) and positive feedback relative to females resulted in a mean gain score of -4.35% (*SD*=8.44); meaning that for low domain identifiers, receiving positive feedback relative to females resulted greater performance decrements on trial two than receiving negative feedback relative to males, but again the interaction was not statistically significant. In conclusion, hypotheses 4, 4a, and 4b were not supported.

Exploratory Analyses

   Stereotype activation by domain identification. The ANCOVA showed a marginally significant interaction between stereotype activation and domain identification (β= -.22, p=.06). As shown in Figure 2, when domain identification was high, implicit stereotype activation resulted in a mean gain score of -.24% (*SD*=11.15) and explicit stereotype activation resulted in a mean gain score of -2.32% (*SD*=8.98). For high domain identifiers explicit stereotype activation lead to greater performance decrements than implicit stereotype activation. For low domain identifiers, implicit stereotype activation resulted in a mean gain score of -2.76 (*SD*=9.24) and explicit stereotype activation resulted in a mean gain score of -2.42% (*SD*=8.3). This means that contrary to those high in domain identification, low domain identifiers showed slightly greater performance decrements when the positive stereotype was activated implicitly rather than explicitly. While Figure 2 is based on high and low domain identification scores identified by the median splits, the correlations (see Tables 3 and 4) suggest that the positive correlation between weighted gain scores and implicit stereotype activation in the female/positive condition (r = .42, p < .05) is driving the marginally significant interaction; in all other conditions, the correlation between domain identification and weighted gain scores is negative and non-significant.

Locating a tipping point. One goal of the current study is to identify the level of threat salience whereby performance boosts give way to performance decrements (i.e. a tipping point). A curve-fitting technique was used to model the relationship between condition means in an attempt to locate a tipping point. First, condition mean gain scores were plotted from high to low (see Figure 2) and coded a number 1 through 8 relative to their ordering to produce the linear terms. The assigned numbers (i.e. 1 through 8 codes) were then squared to produce the squared terms, and cubed to produce the cubic terms; the linear, squared, and cubic terms were then regressed on to the mean gain scores. The linear terms were entered for model 1, the squared terms entered for model 2 and finally, the cubic terms were entered for model 3. The R^2 for the model with the linear terms was .94, the model with squared terms also resulted in an R^2 of .94, and lastly R^2 increased to .97 after the cubic term was entered into the regression but this increase did not result in significant F change.

Overall, the results show that the best fitting line was linear. As a final analysis, all possible comparison were examined using Tukey's test with type one error rate of $p < .05$, and none of the contrasts were significant; although it should be noted that the cell sizes used for this analysis were small and likely underpowered (see Figure 2). These results indicate that although the transition between positive and negative weighted gain scores occurs after the after the condition with the highest weighted gain score (i.e., negative feedback/male, low domain identification, with explicit stereotype activation), there are essentially no differences among conditions, and therefore no support for the tipping point model.

A secondary goal of the current research is to present an ordering of threat salience from greatest to least, for the purpose of identifying relative significance of threat salience antecedents for performance. Interestingly, high domain identifiers received the highest and lowest mean

gain scores; the highest mean gain score (2.38%) was demonstrated in the condition with implicit stereotype activation and female/positive feedback, and the lowest mean gain score (-6.35%) was demonstrated in the condition with implicit stereotype activation and male/negative feedback. These results suggest that for high domain identifiers, the male/negative feedback threat antecedent was more threatening to performance than the female/positive feedback. Regardless, non-significant contrasts indicate that there was essentially no differences between mean gain scores, and therefore no support that the threat salience construct has a meaningful impact on performance.

Discussion

The purpose of the current study was to identify how mode of stereotype activation, valence of feedback/group membership of social referent, and domain identification impact performance on positively stereotyped tasks. There was no support for the predicted main effects of stereotype activation and domain identification, the predicted interactions between stereotype activation and feedback/social referent, or the interaction between feedback/social referent and domain identification. Furthermore, results of an exploratory analysis on the interaction between stereotype activation and domain identification reached marginal significance. Contrary to past research demonstrating that low domain identifiers are relatively more impacted by positive stereotype activation (Saad et al., 2015; Smith & Johnson, 2006), the interaction showed a trend for implicit stereotype activation to lead to better performance on the second trial than explicit stereotype activation for high domain identifiers in the female/positive feedback conditions.

Although marginally significant results must be interpreted with caution, this interaction is consistent with the notion that high domain identifiers are more invested in performance, and therefore will be more sensitive to threats posed by explicit stereotype activations (i.e. explicit

activation of positive stereotypes makes failure to fulfill expectations more threatening), and more likely to benefit from identity validation provided by implicit stereotype activation (i.e. implicit activation of positive stereotypes provides confidence boosts). Lastly, no support was found for the existence of a tipping point whereby performance boosts shift to performance decrements due to differential threat salience levels. Furthermore, it should be noted that had there been a tipping point, it would likely vary depending on characteristics of the population. For example, men are generally more competitive than women, which could mean that the negative feedback relative to an outgroup member may be more motivating for men than it is for women. Lastly, there was lack of evidence for mean weighted gain score differences among conditions also provides no support for the threat salience construct as a whole.

Performance decrements observed for all of the conditions but one, point to some possible explanations for lack of significant findings. One major possible explanation is the general popularity of the stereotype that women are better in the verbal ability domain than men. To clarify, the stereotype that women are better at verbal ability tasks relative to men is likely not as pervasive in society as other positive stereotypes, such as "males are better at math and science than women", or "Asians are better at math than other ethnic groups." Being that the positive stereotype used for the current study is less common and the gender differences in this domain may be subsiding with time (Hyde & Linn, 1988), the possibility of contradicting the positive stereotype may not have been threatening enough to produce the expected effects. Moreover, those who were less aware of the positive stereotype may not have been primed in the implicit activation condition, and may have found the stereotype less valid in the explicit activation condition.

Theories of choking assume that actors are motivated to perform well on the target task(s) (Baumeister, 1984); without motivation to perform optimally, it is unlikely that the threat antecedent variables will lead to performance pressure necessary for the predicted effects to occur. It is possible that participants in the current study were not motivated to perform well on the task because they were awarded extra credit regardless of their performance outcomes, and had no extra incentive to perform well other than outperforming the social referent and fulfilling expectations set by the positive stereotype.

In contexts where performance has a greater impact on personal identity formation and life outcomes (i.e. occupations, classes relevant to students' majors etc.), outperforming a social referent or fulfilling subgroup performance expectations may provide enough task motivation, but in lab settings wherein individuals receive the desired reward just for participating, greater incentive to perform well is likely needed. The observed decrements for a majority of conditions may also be attributed to ego depletion, which occurs when individuals expend all of their self-control resources and are no longer able to perform optimally on subsequent tasks requiring self-control/concentration. Simply put, trial one could have used all of the mental resources needed to perform well on trial two. Although ego depletion is a plausible explanation, it is not likely the reason for performance decrements because each trial lasted only 15 minutes, and participants had a short break between trials.

Another possible explanation for lack of support for the hypotheses is that the manipulations were not strong enough; for example, the ambiguity of the performance feedback could have negatively impacted the results. Participants were led to believe they answered two more or two less questions correctly relative to the "past participant," without receiving any information about how many questions the past participant attempted. This means that

participants may have inferred that "past participants" answered more or less items correctly not because they were better at the task, but because they attempted more or less items, which could have made the feedback manipulation less impactful.

Furthermore, when participants provided their scores on the "data collection sheets" they only wrote the number of items they answered correctly without indicating the number of items they attempted; this combined with the fact that there was an overall increase in the number of items attempted from trial one to trial two means that participants may have also inferred that their performance was dependent on how many items they answered correctly, regardless of how many they attempted. The observed increases in the number of items attempted was not met with a proportionate increase in items answered correctly, thus negatively affect scores.

Showing an overall increase in number of items attempted by participants from trial one to trial two is not diagnostic of changes in test-taking strategies or changes in motivation. Participants may have attempted more items in trial two because they concentrated less on each item, or participants may have attempted more items in trial two due to a desire to increase performance, or the increase in attempted items may simply be a function of task familiarity.

Additionally, for most research examining effects of social comparisons, the referents (i.e. confederates or other participants) are physically present during the study (Lount, Parks, Kerr, Messe, & Seok, 2008; Lount & Phillips, 2000; Seta, 1982). In the current study participants were shown information about the social referent on a datasheet; the physical presence of an in-group or out-group referent could have strengthened the manipulation through making the social referent more tangible and through making the social comparison feel more personal (Lount et al., 2008).

Future Directions

The purpose of the current study was to demonstrate that threat salience antecedents, based on a positively stereotyped identity, could lead to performance boosts at some levels and performance decrements at other levels. Given that participants are awarded extra credit for participation in lab studies regardless of effort expended during the laboratory task, extra performance incentives may be needed to motivate participants to perform optimally. Future research should look to increase motivation through methods such as telling participants that researchers can tell if they are putting forth effort on the task, and that those who try on the task will be provided with some monetary reward or more extra credit. One other way to ensure participants are motivated to perform well would be to run the study in a "real-world" context, in which case performing optimally will be critical to whether participants obtain their desired outcomes. Unfortunately, due to risks of negatively impacting participants' performance, it could be considered unethical to complete this study in high stakes situations and may prove difficult to obtain consent from organizations and individuals. This in mind, focusing on increasing motivation in lab settings is likely the best first step.

Additionally, future research should examine whether effects are present when threat salience manipulations are stronger than they were in the current study. One way to make the feedback manipulation stronger is to give more concrete feedback. For example, requiring all participants to complete all items in a trial and then informing them that the social referent answered more or less items correctly implies that the social referent's superior/inferior performance was not a function of how many items they attempted. This may require the inclusion of items with no correct answer and items with obvious answers, in order to always allow the social referent to answer more or less items correctly than the participant. Furthermore, inclusion of confederate(s) or other participants to act as social referents may be another future

direction; physical presence vs information on paper about the referent may be a moderator of social comparison effects. Another possible future direction is matching the gender of the researcher with the gender of the social referent to make gender commonalities and differences more salient and impactful.

Lastly, whether or not the stereotype already exists consciously or subconsciously in the mind of the perceiver is likely important to whether or not the stereotype will impact performance. That said, future research should examine the effects of more pervasive positive stereotypes. Stereotypes with greater prevalence in society are more likely to exist beforehand in minds of perceivers, and therefore will be viewed as more believable/relevant by participants when presented explicitly, and are more likely to operate subconsciously when activated implicitly.

Conclusion

Past research findings have been mixed regarding whether positive stereotypes result in performance decrements or performance boosts; the current study aimed to demonstrate how threat salience could impact observed performance outcomes and identify a tipping point whereby performance boosts shift to performance decrements. Current research findings did not support threat salience as a key determinant of performance outcome valence in the context of positive stereotypes. Understanding whether positive stereotypes present an advantage or disadvantage to target groups is meaningful for how we evaluate their performance in general, and relative to individuals who are not a part of the target group. Furthermore, mode of stereotype activation and domain identification are two variables examined most when researching positive stereotype effects (Cheryan & Bodenhausen, 2000; Keller, 2002; Shih et al., 2002; Shih et al., 2015; Smith & Johnson, 2006), although in real-world performance contexts

there will be many other factors present that can impact performance. That in mind, further

research is needed to determine how other relevant factors (i.e. social comparison, social

referents, etc.) interact with stereotype activation and domain identification to influence

performance outcomes.

References

Agnew, N., & Agnew, M. (1963). Drive level effects on tasks of narrow and broad attention. *Quarterly Journal of Experimental Psychology*, *15*(1), 58-62. doi:10.1080/17470216308416552

Alvero, A. M., Bucklin, B. R., & Austin, J. (2001). An objective review of the effectiveness and essential characteristics of performance feedback in organizational settings (1985-1998). *Journal of Organizational Behavior Management*, *21*(1), 3-29. doi:10.1300/J075v21n01_02

Aronson, J., Lustina, M. J., Good, C., Keough, K., Steele, C. M., & Brown, J. (1999). When white men can't do math: Necessary and sufficient factors in stereotype threat. *Journal of experimental social psychology*, *35*(1), 29-46. doi:10.1006/jesp.1998.1371

Aronson, J., Quinn, D. M., & Spencer, S. J. (1998). Stereotype threat and the academic underperformance of minorities and women. In J. K. Swim & C. Stangor (Eds.), *Prejudice: The target's perspective* (pp. 83-103). New York: Academic.

Banaji, M. R., & Hardin, C. D. (1996). Automatic stereotyping. *Psychological science*, *7*(3), 136-141. doi:10.1111/j.1467-9280.1996.tb00346.x

Bargh, J. A., & Chartrand, T. L. (1999). The unbearable automaticity of being. *American psychologist*, *54*(7), 462-479. doi:10.1037/0003-066X.54.7.462

Bargh, J. A., Chen, M., & Burrows, L. (1996). Automaticity of social behavior: Direct effects of trait construct and stereotype activation on action. *Journal of personality and social psychology*, *71*(2), 230.-244. doi:10.1037/0022-3514.71.2.230

Bargh, J. A., & Pietromonaco, P. (1982). Automatic information processing and social perception: The influence of trait information presented outside of conscious awareness

on impression formation. *Journal of personality and Social psychology*, *43*(3), 437-449. doi:10.1037/0022-3514.43.3.437

Baumeister, R. F. (1984). Choking under pressure: self-consciousness and paradoxical effects of incentives on skillful performance. *Journal of personality and social psychology*, *46*(3), 610-620. doi:10.1037/0022-3514.46.3.610

Baumeister, R. F., Hamilton, J. C., & Tice, D. M. (1985). Public versus private expectancy of success: Confidence booster or performance pressure?. *Journal of personality and social psychology*, *48*(6), 1447-1457. doi:10.1037/0022-3514.48.6.1447

Baumeister, R. F., Hutton, D. G., & Cairns, K. J. (1990). Negative effects of praise on skilled performance. *Basic and applied social psychology*, *11*(2), 131-148. doi:10.1207/s15324834basp1102_2

Baumeister, R. F., & Showers, C. J. (1986). A review of paradoxical performance effects: Choking under pressure in sports and mental tests. *European Journal of Social Psychology*, *16*(4), 361-383. doi:10.1002/ejsp.2420160405

Baumeister, R. F., & Steinhilber, A. (1984). Paradoxical effects of supportive audiences on performance under pressure: The home field disadvantage in sports championships. *Journal of personality and social psychology*, *47*(1), 85-93. doi:10.1037/0022-3514.47.1.85

Beilock, S. L., & Carr, T. H. (2005). When high-powered people fail: Working memory and "choking under pressure" in math. *Psychological science*, *16*(2), 101-105. doi:10.1111/j.0956-7976.2005.00789.x

Beilock, S. L., Kulp, C. A., Holt, L. E., & Carr, T. H. (2004). More on the fragility of performance: choking under pressure in mathematical problem solving. *Journal of*

Experimental Psychology: General, *133*(4), 584-600. doi:10.1037/0096-3445.133.4.584

Bernard, J. (1957). The sociological study of social conflict. In International Sociological

Association (Ed.), *The nature of conflict* (pp. 33–118). Paris: UNESCO.

Besch, N. F. (1959). Paired-associates learning as a function of anxiety level and shock. *Journal*

of personality, *27*(1), 116-124. doi:10.1111/j.1467-6494.1959.tb01823.x

Billig, M. and Tajfel, H. (1973). Social categorization and similarity in intergroup behaviour.

European Journal of Social Psychology, 3(1), 27-52. doi:10.1002/ejsp.2420030103

Blascovich, J., Spencer, S. J., Quinn, D., & Steele, C. (2001). African Americans and high

blood pressure: The role of stereotype threat. *Psychological science*, *12*(3), 225-229.

doi:10.1111/1467-9280.00340

Bleecker, M. L., Bolla-Wilson, K., Agnew, J., & Meyers, D. A. (1988). Age-related sex

differences in verbal memory. *Journal of clinical psychology*, *44*(3), 403-411.

doi:10.1002/1097-4679(198805)44:3<403::AID-JCLP2270440315>3.0.CO;2-0

Boulding, K. (1963). *Conflict and defense: A general theory*. New York: Harper.

Breckler, S. J. & Greenwald, A. G. (1986). Motivational facets of the self. In Higgins E. T.,

Sorrentino R. (Eds.), *Handbook of motivation and cognition* (pp. 145-164). New York:

Guilford Press.

Brewer, M. B. (1979). In-group bias in the minimal intergroup situation: A cognitive-

motivational analysis. *Psychological bulletin*, *86*(2), 307-324. doi:10.1037/0033-

2909.86.2.307

Brockner, J., Derr, W. R., & Laing, W. N. (1987). Self-esteem and reactions to negative

feedback: Toward greater generalizability. *Journal of Research in Personality*, *21*(3),

318-333. doi:10.1016/0092-6566(87)90014-6

Cadinu, M., Maass, A., Impagliazzo, L., & Latinotti, S. (2003). Stereotype threat: The effect of expectancy on performance. *European Journal of Social Psychology*, *33*(2), 267-285. doi:10.1002/ejsp.145

Castillo-Mayén, R., & Montes-Berges, B. (2014). Analysis of current gender stereotypes. *Anales de Psicología/Annals of Psychology*, *30*(3), 1044-1060. doi:10.6018/analesps.30.2.138981

Cheryan, S., & Bodenhausen, G. V. (2000). When positive stereotypes threaten intellectual performance: The psychological hazards of "model minority" status. *Psychological Science*, *11*(5), 399-402. doi: 10.1111/1467-9280.00277

Church, R. (1962). The effects of competition on reaction time and palmar skin conductance. *Journal of Abnormal and Social Psychology*, *65*(1), 32-40. doi:10.1037/h0041901

Coser, L. A. (1956). *The functions of social conflict.* Glencoe, IL: Free Press.

Czopp, A. M. (2008). When is a compliment not a compliment? Evaluating expressions of positive stereotypes. *Journal of Experimental Social Psychology*, *44*(2), 413–442. doi:10.1016/j.jesp.2006.12.007

Daniels, A. C. (1994). *Bringing out the best in people: How to apply the astonishing power of positive reinforcement.* New York: McGraw-Hill.

Deese, J., Lazarus, R. S., & Keenan, J. (1953). Anxiety, anxiety reduction, and stress in learning. *Journal of Experimental Psychology*, *46*(1), 55-60. doi:10.1037/h0055880

Deffenbacher, J. L. (1978). Worry, emotionality, and task-generated interference in test anxiety: An empirical test of attentional theory. *Journal of Educational Psychology*, *70*(2), 248-254. doi: 10.1037/0022-0663.70.2.248

Dijksterhuis, A., & van Knippenberg, A. (1998). The relation between perception and behavior,

or how to win a game of Trivial Pursuit. *Journal of Personality and Social Psychology, 74*(4), 865–877. doi: 10.1037/0022-3514.74.4.865

Ellemers, N., Kortekaas, P., & Ouwerkerk, J. W. (1999). Self-categorization, commitment to the group and social self-esteem as related but distinct aspects of social identity. *European Journal of Social Psychology. 29*(2-3), 371-389. doi:10.1002/(SICI)1099-0992(199903/05)29:2/3<371::AID-EJSP932>3.0.CO;2-U

Escarti, A., & Guzman, J. F. (1999). Effects of feedback on self-efficacy, performance, and choice in an athletic task. *Journal of Applied Sport Psychology*, *11*(1), 83-96. doi:10.1080/10413209908402952

Fenigstein, A., Scheier, M. F., & Buss, A. H. (1975). Public and private self-consciousness: Assessment and theory. *Journal of Consulting and Clinical Psychology*, *43*(4), 522-527. doi:10.1037/h0076760

Festinger, L. (1942). Wish, expectation, and group standards as factors influencing level of aspiration. *The Journal of Abnormal and Social Psychology*, *37*(2), 184-200. doi:10.1037/h0060328

Festinger, L. (1954). A theory of social comparison processes. *Human relations*, *7*(2), 117-140. doi:10.1177/001872675400700202

Fishbach, A., & Ferguson, M. J. (2007). The goal construct in social psychology. In A. W. Kruglanski & E. T. Higgins (Eds.), *Social psychology: Handbook of basic principles* (pp. 490-515). New York: Guilford Press.

Fitzsimmons, P. A., Landers, D. M., Thomas, J. R., & van der Mars, H. (1991). Does self-efficacy predict performance in experienced weightlifters?. *Research Quarterly for Exercise and Sport*, *62*(4), 424-431. doi:10.1080/02701367.1991.10607544

Forbes, C. E., Duran, K. A., Leitner, J. B., & Magerman, A. (2015). Stereotype threatening

    contexts enhance encoding of negative feedback to engender underperformance and

    anxiety. *Social Cognition*, *33*(6), 605-625. doi:10.1521/soco.2015.33.6.605

Gaither, S. E., Remedios, J. D., Schultz, J. R., & Sommers, S. R. (2015). Priming White identity

    elicits stereotype boost for biracial Black-White individuals. *Group Processes &*

    Intergroup Relations, *18*(6), 778-787. doi: 10.1177/1368430215570504

Glucksberg, S. (1962). The influence of strength of drive on functional fixedness and perceptual

    recognition. *Journal of experimental psychology*, *63*(1), 36-41. doi:10.1037/h0044683

Gonzales, P. M., Blanton, H., & Williams, K. J. (2002). The effects of stereotype threat and

    double-minority status on the test performance of Latino women. *Personality and social*

    psychology bulletin, *28*(5), 659-670. doi:10.1177/0146167202288010

Gucciardi, D. F., Longbottom, J. L., Jackson, B., & Dimmock, J. A. (2010). Experienced

    golfers' perspectives on choking under pressure. *Journal of sport and exercise*

    psychology, *32*(1), 61-83. doi:10.1123/jsep.32.1.61

Hart, T., & Smith, J. L. (2003, May). Gender-related stereotype threat: Are men affected too?

    Paper presented at the annual meeting of the Denman Undergraduate Research Forum,

    Columbus, OH. Cited in: Smith, J. L., & Johnson, C. S. (2006). A stereotype boost or

    choking under pressure? Positive gender stereotypes and men who are low in domain

    identification. *Basic and Applied Social Psychology*, *28*(1), 51-63. doi:

    10.1207/s15324834basp2801_5

Higgins, E. T. (1996). Knowledge activation: Accessibility, applicability, and salience. In E. T.

    Higgins & A. W. Kruglanski (Eds.), *Social psychology: Handbook of basic principles*

    (pp. 133-168). New York: Guilford Press.

Hill, D. M., Hanton, S., Matthews, N., & Fleming, S. (2010). Choking in sport: A review. *International Review of Sport and Exercise Psychology, 3*(1), 24-39. doi:10.1080/17509840903301199

Ho, C. P., Driscoll, D. M., & Loosbrock, D. L. (1998). Great expectations: The negative consequences of falling short. *Journal of Applied Social Psychology*, *28*(19), 1743-1759. doi:10.1111/j.1559-1816.1998.tb01344.x

Hornsey, M. J. (2008). Social identity theory and self-categorization theory: A historical review. *Social and Personality Psychology Compass*, *2*(1), 204-222. doi:10.1111/j.1751-9004.2007.00066.x

Hogg, M. A. (2001). Social categorization, depersonalization, and group behavior. In M. A. Hogg & R. S. Tinsdale (Eds.), *Blackwell handbook of social psychology: Group processes* (pp. 56-85). Oxford, UK: Blackwell Publishers Ltd. doi:10.1002/9780470998458.ch3

Hogg, M. A. & Abrams, D. (1988). *Social Identifications:A Social Psychology of Intergroup Relations and Group Processes*. London: Routledge.

Hogg, M. A., & Terry, D. J. (2000). Social identity and self-categorization processes in organizational contexts. *Academy of management review*, *25*(1), 121-140. doi:10.5465/AMR.2000.2791606

Hogg, M. A., Terry, D. J., & White, K. M. (1995). A tale of two theories: A critical comparison of identity theory with social identity theory. *Social psychology quarterly*, *58*(4), 255-269. doi:10.2307/2787127

Hyde, J. S., & Linn, M. C. (1988). Gender differences in verbal ability: A meta-analysis. *Psychological Bulletin, 104*(1), 53-69. doi:10.1037/0033-2909.104.1.53

Inzlicht, M., & Ben-Zeev, T. (2000). A threatening intellectual environment: Why females are

    susceptible to experiencing problem-solving deficits in the presence of males.

    Psychological Science, *11*(5), 365-371. doi:10.1111/1467-9280.00272

Kaufman, A. S., & Wang, J. J. (1992). Gender, race, and education differences on the K-BIT at

    ages 4 to 90 years. *Journal of Psychoeducational Assessment*, *10*(3), 219-229.

    doi:10.1177/073428299201000302

Keller, J. (2002). Blatant stereotype threat and women's math performance: Self-handicapping

    as a strategic means to cope with obtrusive negative performance expectations. *Sex

    Roles*, *47*(3), 193-198. doi:10.1023/A:1021003307511

Keller, J. (2007). Stereotype threat in classroom settings: The interactive effect of domain

    identification, task difficulty and stereotype threat on female students' maths

    performance. *British Journal of Educational Psychology*, *77*(2), 323-338.

    doi:10.1348/000709906X113662

Kimble, C. E., & Rezabek, J. S. (1992). Playing games before an audience: Social facilitation or

    choking. *Social Behavior and Personality: an international journal*, *20*(2), 115-120.

    doi:10.2224/sbp.1992.20.2.115

Kramer, J. H., Delis, D. C., & Daniel, M. (1988). Sex differences in verbal learning. *Journal of

    Clinical Psychology*, *44*(6), 907-915. doi:10.1002/1097-4679(198811)44:6<907::AID-

    JCLP2270440610>3.0.CO;2-8

Kray, L. J., Thompson, L., & Galinsky, A. (2001). Battle of the sexes: Gender stereotype

    confirmation and reactance in negotiations. *Journal of Personality and Social

    Psychology, 80*(6), 942–958. doi:10.1037/0022-3514.80.6.942

Lemyre, L., & Smith, P. M. (1985). Intergroup discrimination and self-esteem in the minimal

group paradigm. *Journal of Personality and Social Psychology*, *49*(3), 660-670. doi:10.1037/0022-3514.49.3.660

Levy, B. (1996). Improving memory in old age through implicit self-stereotyping. *Journal of Personality and Social Psychology, 71*, 1092–1107. doi:10.1037/0022-3514.71.6.1092

Lewis, B. P., & Linder, D. E. (1997). Thinking about choking? Attentional processes and paradoxical performance. *Personality and Social Psychology Bulletin*, *23*(9), 937-944. doi:10.1177/0146167297239003

Leyens, J. P., Désert, M., Croizet, J. C., & Darcis, C. (2000). Stereotype threat: Are lower status and history of stigmatization preconditions of stereotype threat?. *Personality and Social Psychology Bulletin*, *26*(10), 1189-1199. doi:10.1177/0146167200262002

Lombardi, W. J., Higgins, E. T., & Bargh, J. A. (1987). The role of consciousness in priming effects on categorization: Assimilation versus contrast as a function of awareness of the priming task. *Personality and Social Psychology Bulletin*, *13*(3), 411-429. doi:10.1177/0146167287133009

Lount Jr, R. B., Park, E. S., Kerr, N. L., Messé, L. A., & Seok, D. H. (2008). Evaluation concerns and the Köhler effect: The impact of physical presence on motivation gains. *Small Group Research*, *39*(6), 795-812. doi: 10.1177/1046496408323215

Lount, R. B., & Phillips, K. W. (2007). Working harder with the out-group: The impact of social category diversity on motivation gains. *Organizational Behavior and Human Decision Processes*, *103*(2), 214-224. doi:10.1016/j.obhdp.2007.03.002

Lu, A., Feng, Y., Yu, Z., Tian, H., Hong, X., & Zheng, D. (2015). Anxiety and mind wandering as independent consequences of stereotype threat. *Social Behavior and Personality: an international journal*, *43*(4), 537-558. doi:10.2224/sbp.2015.43.4.537

Luhtanen, R., & Crocker, J. (1992). A collective self-esteem scale: Self-evaluation of one's social identity. *Personality and social psychology bulletin*, *18*(3), 302-318. doi:10.1177/0146167292183006

Major, B., Spencer, S., Schmader, T., Wolfe, C., & Crocker, J. (1998). Coping with negative stereotypes about intellectual performance: The role of psychological disengagement. *Personality and social psychology bulletin*, *24*(1), 34-50. doi:10.1177/0146167298241003

Markman, A. B., Maddox, W. T., & Worthy, D. A. (2006). Choking and excelling under pressure. *Psychological Science*, *17*(11), 944-948. doi:10.1111/j.1467-9280.2006.01809.x

Martens, R. and Landers, D. M. (1972). Evaluation potential as a determinant of coaction effects. *Journal of Experimental Social Psychology*, *8*(4), 347-359. doi:10.1016/0022-1031(72)90024-8

Masters, R. S. W. (1992). Knowledge, nerves and know-how: The role of explicit versus implicit knowledge in the breakdown of a complex motor skill under pressure. *British Journal of Psychology, 83*(3), 343-358. doi:10.1111/j.2044-8295.1992.tb02446.x

McAuley, E., Wraith, S., & Duncan, T. E. (1991). Self-efficacy, perceptions of success, and intrinsic motivation for exercise. *Journal of applied social psychology*, *21*(2), 139-155. doi:10.1111/j.1559-1816.1991.tb00493.x

McGraw, K. O., & McCullers, J. C. (1974). The distracting effect of material reward: An alternative explanation for the superior performance of reward groups in probability learning. *Journal of Experimental Child Psychology*, *18*(1), 149-158. doi:10.1016/0022-0965(74)90096-4

McGraw, K. O., & McCullers, J. C. (1979). Evidence of a detrimental effect of extrinsic

    incentives on breaking a mental set. *Journal of Experimental Social Psychology*, *15*(3),

    285-294. doi:10.1016/0022-1031(79)90039-8

McNamara, H. J., & Fisch, R. I. (1964). Effect of high and low motivation on two aspects of

    attention. *Perceptual and Motor Skills*, *19*(2), 571-578. doi:10.2466/pms.1964.19.2.571

Mesagno, C., Harvey, J. T., & Janelle, C. M. (2012). Choking under pressure: The role of fear

    of negative evaluation. *Psychology of Sport and Exercise*, *13*(1), 60-68.

    doi:10.1016/j.psychsport.2011.07.007

Mesagno, C., Marchant, D., & Morris, T. (2008). A pre-performance routine to alleviate

    choking in "choking-susceptible" athletes. *The Sport Psychologist*, *22*(4), 439-457.

    doi:10.1123/tsp.22.4.439

Mesagno, C., Marchant, D., & Morris, T. (2009). Alleviating choking: The sounds of

    distraction. *Journal of Applied Sport Psychology*, *21*(2), 131-147.

    doi:10.1080/10413200902795091

Mesagno, C., & Mullane-Grant, T. (2010). A comparison of different pre-performance routines

    as possible choking interventions. *Journal of Applied Sport Psychology*, *22*(3), 343-360.

    doi:10.1080/10413200.2010.491780

Miller, L. B., & Estes, B. W. (1961). Monetary reward and motivation in discrimination

    learning. *Journal of Experimental Psychology*, *61*(6), 501-504. doi:10.1037/h0040489

Moè, A. (2009). Are males always better than females in mental rotation? Exploring a gender

    belief explanation. *Learning and Individual Differences*, *19*(1), 21-27.

    doi:10.1016/j.lindif.2008.02.002

Moskowitz, G. B., & Roman, R. J. (1992). Spontaneous trait inferences as self-generated

primes: implications for conscious social judgment. *Journal of personality and social psychology*, *62*(5), 728-738. doi:10.1037//0022-3514.62.5.728

Nicholson, W. M. (1958). The influence of anxiety upon learning: Interference or drive increment?. *Journal of Personality*, *26*(3), 303-319. doi:10.1111/j.1467-6494.1958.tb01587.x

Oakes, P. J., & Turner, J. C. (1980). Social categorization and intergroup behaviour: Does minimal intergroup discrimination make social identity more positive?. *European Journal of Social Psychology*, *10*(3), 295-301. doi:10.1002/ejsp.2420100307

Osborne, J. W. (1995). Academics, self-esteem, and race: A look at the underlying assumptions of the disidentification hypothesis. *Personality and Social Psychology Bulletin*, *21*(5), 449-455. doi:10.1177/0146167295215003

Osborne, J. W. (1997). Race and academic disidentification. *Journal of Educational Psychology*, *89*(4), 728-735. doi:10.1037/0022-0663.89.4.728

Osborne, J. W. (2007). Linking stereotype threat and anxiety. *Educational psychology*, *27*(1), 135-154. doi:10.1080/01443410601069929

Osborne, J. W., & Jones, B. D. (2011). Identification with academics and motivation to achieve in school: How the structure of the self influences academic outcomes. *Educational Psychology Review*, *23*(1), 131-158. doi: 10.1007/s10648-011-9151-1

Osborne, J. W., Kellow, J. T., & Jones, B. D. (2007). Identification with academics, stereotype threat, and motivation to achieve in school. *Standards in education: Sociocultural influences on motivation and learning*, 119-146.

Osborne, J. W., & Rausch, J. L. (2001). Identification with Academics and Academic Outcomes in Secondary Students. Paper presented at AERA, Seattle WA, 2001: ERIC Institute of

Education Services

Oudejans, R. R., Kuijpers, W., Kooijman, C. C., & Bakker, F. C. (2011). Thoughts and attention of athletes under pressure: skill-focus or performance worries?. *Anxiety, Stress, & Coping*, *24*(1), 59-73. doi:10.1080/10615806.2010.481331

Oyserman, D. (2009). Identity-based motivation: Implications for action-readiness, procedural-readiness, and consumer behavior. *Journal of Consumer Psychology*, *19*(3), 250-260. doi:10.1016/j.jcps.2009.05.008

Paul, G. L., & Eriksen, C. W. (1964). Effects of test anxiety on "real-life" examinations. *Journal of Personality*, *32*(3), 480-494. doi:10.1111/j.1467-6494.1964.tb01353.x

Pyszczynski, T., Greenberg, J., Solomon, S., Arndt, J., & Schimel, J. (2004). Why do people need self-esteem? A theoretical and empirical review. *Psychological bulletin*, *130*(3), 435-468. doi:10.1037/0033-2909.130.3.435

Rosenthal, H. E., & Crisp, R. J. (2007). Choking under pressure: When an additional positive stereotype affects performance for domain identified male mathematics students. *European Journal of Psychology of Education*, *22*(3), 317-326. doi:10.1007/BF03173429

Saad, C. S., Meyer, O. L., Dhindsa, M., & Zane, N. (2015). Domain identification moderates the effect of positive stereotypes on Chinese American women's math performance. *Cultural Diversity and Ethnic Minority Psychology*, *21*(1), 162-167. doi:10.1037/a0038428

Sanders, G. S., Baron, R. S., & Moore, D. L. (1978). Distraction and social comparison as mediators of social facilitation effects. *Journal of Experimental Social Psychology*, *14*(3), 291-303. doi:10.1016/0022-1031(78)90017-3

Sarason, I. (1956). Effect of anxiety, motivational instructions, and failure on serial learning.

    Journal of Experimental Psychology, *51*(4), 253-260. doi:10.1037/h0049019

Sarason, I. (1961). The effects of anxiety and threat on the solution of a difficult task. *The*

    Journal of Abnormal and Social Psychology, *62*(1), 165-168. doi:10.1037/h0043924

Sasfy, J., & Okun, M. (1974). Form of evaluation and audience expertness as joint determinants

    of audience effects. *Journal of Experimental Social Psychology*, *10*(5), 461-467.

    doi:10.1016/0022-1031(74)90014-6

Schlenker, B. R., Phillips, S. T., Boniecki, K., & Schlenker, D. R. (1995a). Championship

    pressures: Choking or triumphing in one's own territory? *Journal of Personality and*

    Social Psychology, 68(4)*,* 632-643. doi:10.1037/0022-3514.68.4.632

Schlenker, B. R., Phillips, S. T., Boniecki, K., & Schlenker, D. R. (1995b). Where is the home

    choke? *Journal of Personality and Social Psychology, 68*(4)*,* 649-652.

    doi:10.1037/0022-3514.68.4.649

Schmader, T. (2002). Gender identification moderates stereotype threat effects on women's

    math performance. *Journal of Experimental Social Psychology*, *38*(2), 194-201.

    doi:10.1006/jesp.2001.1500

Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat

    effects on performance. *Psychological review*, *115*(2), 336-356. doi: 10.1037/0033-

    295X.115.2.336

Seta, J. J. (1982). The impact of comparison processes on coactors' task performance. *Journal*

    of Personality and Social Psychology, *42*(2), 281-291. doi: 10.1037/0022-3514.42.2.281

Seta, J. J., Paulus, P. B., & Risner, H. T. (1977). The effects of group composition and

    evaluation on task performance. *Bulletin of the Psychonomic Society*, *9*(2), 115-117.

doi:10.3758/BF03336947

Shaw, M. (1958). Some motivational factors in cooperation and competition. *Journal of Personality, 26*(2)*,* 155-169. doi:10.1111/j.1467-6494.1958.tb01577.x

Sherif, M. (1966). *Group conflict and co-operation: Their social psychology*. London: Routledge & Kegan Paul.

Sherif, M., Harvey, O., White, B. J., Hood, W. R., & Sherif, C. W. (1961). *Intergroup conflict and cooperation: the Robbers' Cave experiment.* Norman, OK: University of Oklahoma Book Exchange.

Shih, M., Ambady, N., Richeson, J. A., Fujita, K., & Gray, H. M. (2002). Stereotype performance boosts: the impact of self-relevance and the manner of stereotype activation. *Journal of personality and social psychology*, *83*(3), 638-647. doi: 10.1037//0022-3514.83.3.638

Shih, M., Pittinsky, T. L., & Ambady, N. (1999). Stereotype susceptibility: Identity salience and shifts in quantitative performance. *Psychological science*, *10*(1), 80-83. doi:10.1111/1467-9280.00111

Shih, M.., Pittinsky, T. L., & Ho, G. C. (2012). Stereotype boost: Positive outcomes from the activation of positive stereotypes. In M. Inzlicht & T. Schmader (Eds.), *Stereotype threat: Theory, process, and application* (pp. 141-156). New York: Oxford University Press.

Shih, M., Pittinsky, T. L., & Trahan, A. (2006). Domain-specific effects of stereotypes on performance. *Self and Identity*, *5*(1), 1-14. doi: 10.1080/15298860500338534

Shih, M., Wout, D. A., & Hambarchyan, M. (2015). Predicting performance outcomes from the manner of stereotype activation and stereotype content. *Asian American Journal of*

Psychology, *6*(2), 117-124. doi: 10.1037/a0037707

Shrauger, J. S., & Rosenberg, S. E. (1970). Self-esteem and the effects of success and failure

feedback on performance. *Journal of Personality*, *38*(3), 404-417. doi:10.1111/j.1467-

6494.1970.tb00018.x

Smith, C. S., & Hung, L. C. (2008). Stereotype threat: Effects on education. *Social Psychology*

of Education, *11*(3), 243-257. doi: 10.1007/s11218-008-9053-3

Smith, J. L., & Johnson, C. S. (2006). A stereotype boost or choking under pressure? Positive

gender stereotypes and men who are low in domain identification. *Basic and Applied*

Social Psychology, *28*(1), 51-63. doi: 10.1207/s15324834basp2801_5

Smith, J. L., Morgan, C. L., & White, P. H. (2005). Investigating a measure of computer

technology domain identification: A tool for understanding gender differences and

stereotypes. *Educational and Psychological Measurement*, *65*(2), 336-355.

doi:10.1177/0013164404272486

Smith, J. L., & White, P. H. (2001). Development of the domain identification measure: A tool

for investigating stereotype threat effects. *Educational and Psychological Measurement*,

61(6), 1040-1057. doi:10.1177/001316401128774627

Smith, J. L., & White, P. H. (2002). An examination of implicitly activated, explicitly

activated, and nullified stereotypes on mathematical performance: It's not just a woman's

issue. *Sex Roles*, *47*(3), 179-191. doi: 10.1023/A:1021051223441

Spencer, S., Steele, C. M., & Quinn, D. (1999). Stereotype threat and women's math

performance. *Journal of Experimental Social Psychology, 35,* 4-28.

doi:10.1006/jesp.1998.1373

Steele, C. M. (1997). A threat in the air: How stereotypes shape intellectual identity and

performance. *American psychologist*, *52(6)*, 613-629. doi:10.1037/0003-066X.52.6.613

Steele, C. M., & Aronson, J. (1995). Stereotype threat and the intellectual test performance of

   African Americans. *Journal of personality and social psychology*, *69*(5), 797- 811.

   doi:10.1037/0022-3514.69.5.797

Stets, J. E., & Burke, P. J. (2000). Identity theory and social identity theory. *Social psychology*

   quarterly, 224-237. doi:10.2307/2695870

Stone, J., Lynch, C. I., Sjomeling, M., & Darley, J. M. (1999). Stereotype threat effects on

   Black and White athletic performance. *Journal of personality and social psychology*,

   77(6), 1213-1227. doi:10.1037/0022-3514.77.6.1213

Swift, H. J., Abrams, D., & Marques, S. (2012). Threat or boost? Social comparison affects

   older people's performance differently depending on task domain. *Journals of*

   Gerontology Series B: Psychological Sciences and Social Sciences, *68*(1), 23-30.

   doi:10.1093/geronb/gbs044

Tagler, M. J. (2012). Choking under the pressure of a positive stereotype: Gender identification

   and self-consciousness moderate men's math test performance. *The Journal of social*

   psychology, *152*(4), 401-416. doi:10.1080/00224545.2011.615353

Tajfel, H. (1970). Experiments in intergroup discrimination. *Scientific American*, *223*(5), 96-

   103. doi:10.1038/scientificamerican1170-96

Tajfel, H. (1982). Social psychology of intergroup relations. *Annual review of psychology*,

   33(1), 1-39. doi:10.1146/annurev.ps.33.020182.000245

Tajfel, H., Billig, M. G., Bundy, R. P., & Flament, C. (1971). Social categorization and

   intergroup behaviour. *European journal of social psychology*, *1*(2), 149-178.

   doi:10.1002/ejsp.2420010202

Tajfel, H., & Turner, J. C. (1979). An integrative theory of intergroup conflict. In W. G. Austin

    & S. Worchel (Eds.) *The social psychology of intergroup relations*, (pp. 33- 47).

    Monterey, Cal: Brooks/Cole Pub. Co.

Tajfel, H., & Turner, J. C. (1986). The social identity theory of intergroup behavior. S. Worchel

    & W. G. Austin (Eds) *Psychology of intergroup relations* (pp. 276-193). Chicago:

    Nelson.

Taylor, J. A. (1958). The effects of anxiety level and psychological stress on verbal learning.

    The Journal of Abnormal and Social Psychology, *57*(1), 55-60. doi:10.1037/h0044946

Trahan, D. E., & Quintana, J. W. (1990). Analysis of gender effects upon verbal and visual

    memory performance in adults. *Archives of Clinical Neuropsychology*, *5*(4), 325-334.

    doi:10.1016/0887-6177(90)90012-E

Turner, J. C. (1975). Social comparison and social identity: Some prospects for intergroup

    behaviour. *European journal of social psychology*, *5*(1), 1-34.

    doi:10.1002/ejsp.2420050102

Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987).

    Rediscovering the social group: A self-categorization theory. New York, NY: Basil

    Blackwell.

Vogel, W., Raymond, S., & Lazarus, R. S. (1959). Intrinsic motivation and psychological stress.

    The Journal of Abnormal and Social Psychology, *58*(2), 225-233.

    doi:10.1037/h0043112

Wang, J., Marchant, D., Morris, T., & Gibbs, P. (2004). Self-consciousness and trait anxiety as

    predictors of choking in sport. *Journal of Science and Medicine in Sport*, *7*(2), 174-185.

    doi:10.1016/S1440-2440(04)80007-0

Wankel, L. M. (1972). Competition in motor performance: An experimental analysis of

   motivational components. *Journal of Experimental Social Psychology*, *8*(5), 427-437.

   doi:10.1016/0022-1031(72)90068-6

Weinberg, R. S., & Gould, D. (2007). *Foundations of Sport and Exercise Psychology, 3E*.

   Champaign, IL: Human Kinetics.

Table 1. Descriptives and Intercorrelations for Negative/Male Conditions

Variable	Implicit M	SD	Explicit M	SD	1	2	3	4	5	6	7
1. Domain Identification	3.34	0.52	2.46	0.47	-	0.295	0.106	-0.199	0.337	0.109	-0.238
2. Pre-test %	54.22	13.16	55.43	9.22	0.318	-	0.704**	-0.198	0.884**	0.678**	-0.065
3. Post-test %	52.01	11.49	53.42	10.88	0.237	0.718**	-	0.557**	0.706**	0.981**	0.579**
4. Raw % Gain Score	-2.21	9.38	-2.01	7.88	-0.156	-0.523**	0.217	-	-0.060	0.562**	0.876**
5. Weighted Pre-test %	44.55	11.58	45.33	8.15	0.373	0.979**	0.688**	-0.531*	-	0.722**	-0.136
6. Weighted Post-test %	41.95	11.39	43.82	9.98	0.329	0.683**	0.974**	0.235	0.667**	-	0.587**
7. Weighted % Gain Score	-2.6	9.38	-1.51	6.96	-0.061	-0.379	0.333	0.940**	-0.425	0.392	-

Note: Correlations below the diagonal are for the implicit stereotype activation condition (N=20) and correlations above the diagonal are for explicit stereotype activation (N=21). *p<.05, **p<.01.

Table 2. *Descriptives and Intercorrelations for Positive/Female Conditions*

Variable	Implicit		Explicit		1	2	3	4	5	6	7
	M	SD	M	SD							
1. Domain Identification	3.7	0.51	3.4	0.5	-	0.374	0.323	-0.144	0.429*	0.337	-0.181
2. Pre-test %	53.75	12.15	55.02	13.28	-0.003	-	0.793**	-0.485*	0.963**	0.763**	-0.397
3. Post-test %	52.58	12.42	52.76	11.74	0.294	0.704**	-	0.148	0.761**	0.972**	0.165**
4. Raw % Gain Score	-1.17	9.45	-2.26	8.18	0.391	-0.360	0.408	-	-0.471*	0.156	0.881**
5. Weighted Pre-test %	43.79	11.29	46.41	13.38	-0.068	0.981**	0.616**	-0.453*	-	0.738**	-0.484
6. Weighted Post-test %	43.18	11.65	43.57	12.04	0.332	0.623**	0.963**	0.464*	0.547**	-	0.234
7. Weighted % Gain Score	-0.61	10.91	-2.84	9.28	0.424*	-0.349	0.391	0.963**	-0.45*	0.501*	-

Note: Correlations below the diagonal are for the implicit stereotype activation condition (N=22) and correlations above the diagonal are for explicit stereotype activation (N=22). *p<.05, **p<.01.

Table 3. All Independent Variables and Interactions on Weighted Trial 1 Scores

	Model 1		Model 2		Model 3	
	β	*p*	β	*p*	β	*p*
Main Effects						
Stereotype Activation	0.096	0.337	0.081	0.467	0.062	0.575
Feedback/Social Referent	-0.021	0.849	0.005	0.962	0.014	0.897
Domain Identification	0.247	0.026	0.283	0.014	0.278	0.015
Two-Way Interactions						
Stereotype Activation X Feedback/Social Referent			0.091	0.417	0.093	0.404
Stereotype Activation X Domain Identification			0.132	0.244	0.121	0.278
Feedback/Social Referent X Domain Identification			-0.057	.613	-0.047	0.672
Three-Way Interaction						
Stereotype Activation X Feedback/Social Referent X Domain Identification					0.172	0.115
R^2/adj. R^2	0.257/0.066		0.309/0.095		0.353/0.124	

Note: N=85.

Table 4. All Independent Variables and Interactions on Weighted Gain Scores

|	Model 1		Model 2		Model 3	
	β	*p*	β	*p*	β	*p*
Main Effects						
Stereotype Activation	-0.031	0.780	0.005	0.967	0.02	0.863
Feedback/Social Referent	0.011	0.574	-0.034	0.763	-0.041	0.716
Domain Identification	0.051	0.653	0.01	0.929	0.014	0.899
Two-Way Interactions						
Stereotype Activation X Feedback/Social Referent			-0.054	0.634	-0.055	0.625
Stereotype Activation X Domain Identification			-0.215	0.061	-0.207	0.071
Feedback/Social Referent X Domain Identification			0.151	.186	0.143	0.208
Three-Way Interaction						
Stereotype Activation X Feedback/Social Referent X Domain Identification					-0.136	0.222
R^2/adj. R^2	0.00/-0.03		0.07/0.00		0.09/0.01	

Note: N=85.
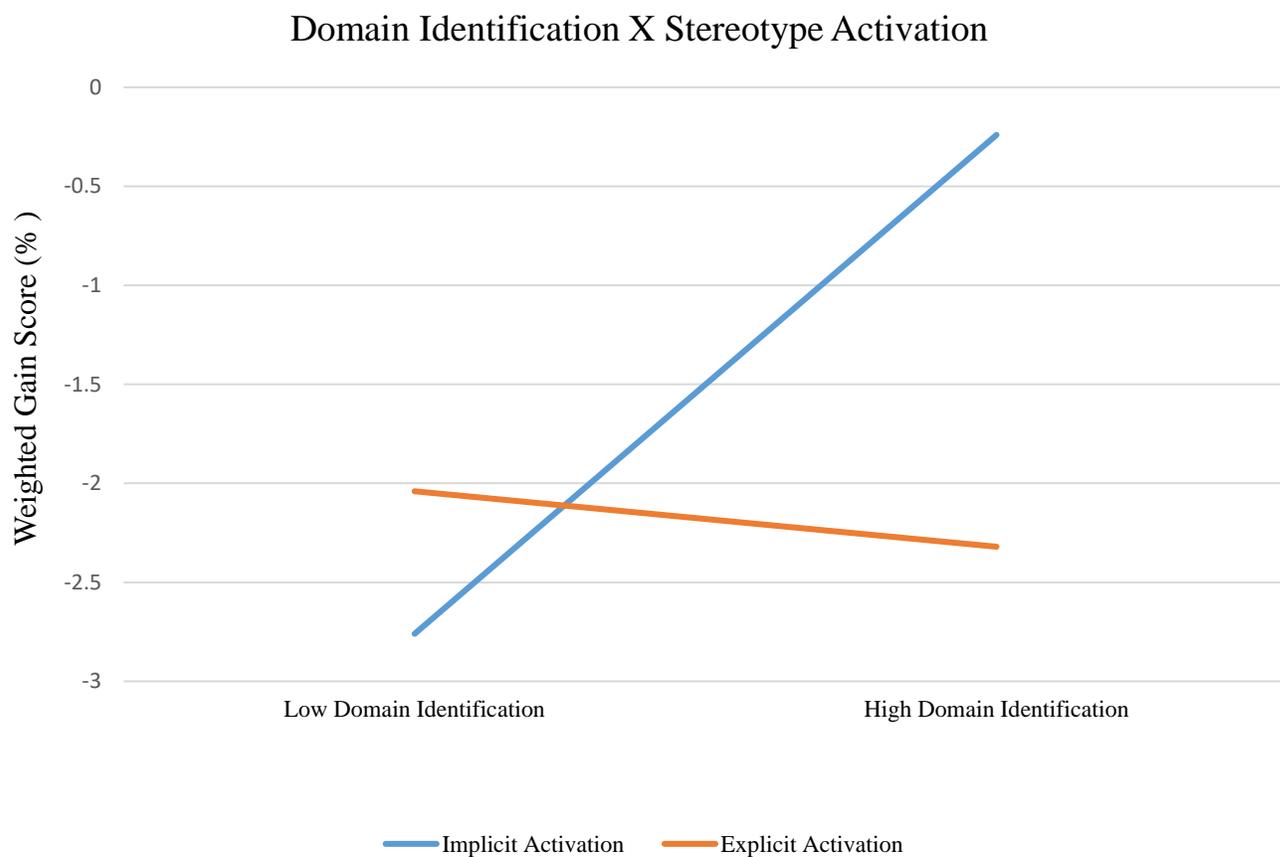
Figure 2. The interaction of domain identification and stereotype activation for weighted gain scores.
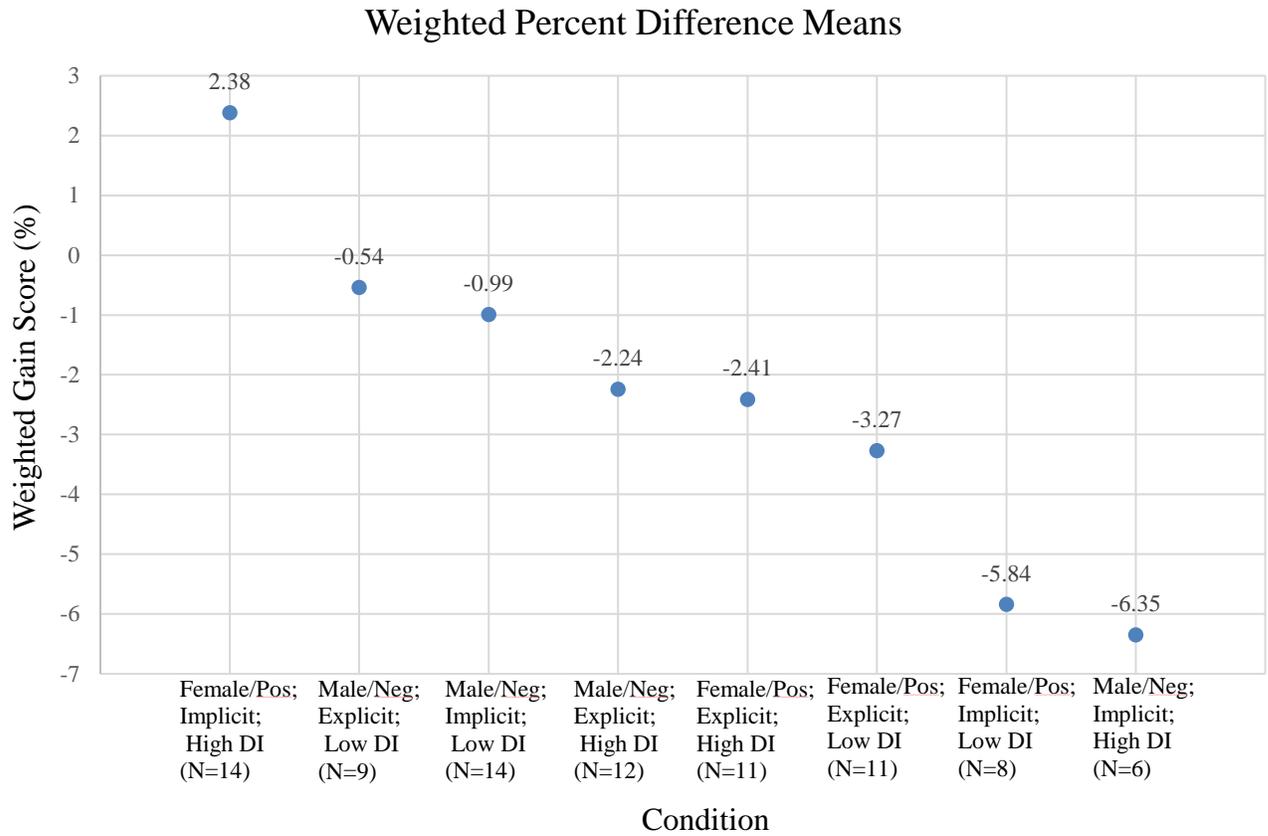
Figure 3. Distribution of weighted gain score means by condition

Appendix A

Fenigstein, Scheier, & Buss (1975) Private and Public Self-Consciousness Scale

Instructions: Using the following scale, please indicate the number that best describes how characteristic each of the statements below are of you.

Scale: 0-Extremely Uncharacteristic 1-Uncharacteristic 2-Neither Uncharacteristic or Characteristic 3-Characteristic 4-Extremely Characteristic

Private Self-Consciousness Items
[ ] I'm always trying to figure myself out.
[ ] Generally, I'm not very aware of myself. [R]
[ ] I reflect about myself a lot.
[ ] I'm often the subject of my own fantasies.
[ ] I never scrutinize myself. [R]
[ ] I'm generally attentive to my inner feelings.
[ ] I'm constantly examining my motives.
[ ] I sometimes have the feeling that I'm off somewhere watching myself.
[ ] I'm alert to changes in my mood.
[ ] I'm aware of the way my mind works when I work through a problem.

Public Self-Consciousness Items
[ ] I'm concerned about my style of doing things.
[ ] I'm concerned about the way I present myself.
[ ] I'm self-conscious about the way I look.
[ ] I usually worry about making a good impression.
[ ] One of the last things I do before I leave my house is look in the mirror.
[ ] I'm concerned about what other people think of me.
[ ] I'm usually aware of my appearance

Social Anxiety Items
[ ] It takes me time to overcome my shyness in new situations.
[ ] I have trouble working when someone is watching me.
[ ] I get embarrassed very easily.
[ ] I don't find it hard to talk to strangers. [R]
[ ] I feel anxious when I speak in front of a group.
[ ] Large groups make me nervous.

These items are scored on a Likert scale and sums are computed for scoring. "R" indicates reverse-coded items. Higher scores indicate higher levels of each of the subcategories.

Appendix B
Helmreich & Spence (1978) Work and Family Orientation

Instructions: Please indicate how much you agree with each of the following statements.

Scale: 1-Strongly Disagree 2-Somewhat Disagree 3-Neither Agree Nor Disagree 4-Somewhat Agree 5-Strongly Agree

Work
[ ] It is important to me to do my work as well as I can even if it isn't popular with my coworkers.
[ ] I find satisfaction in working as well as I can.
[ ] There is satisfaction in a job well done.
[ ] I find satisfaction in exceeding my previous performance even if I don't outperform others.
[ ] I like to work hard.
[ ] Part of my enjoyment in doing things is improving my past performance.

Mastery
[ ] I would rather do something at which I feel confident and relaxed than something which is challenging and difficult. [R]
[ ] When a group I belong to plans an activity, I would rather direct it myself than just help out and have someone else organize it.
[ ] I would rather learn easy, fun games than difficult, thought games. [R]
[ ] If I am not good at something, I would rather keep struggling to master it than move on to something I may be good at.
[ ] Once I undertake a task, I persist.
[ ] I prefer to work in situations that require a high level of skill.
[ ] I more often attempt tasks that I am not sure I can do than tasks that I believe I can do.
[ ] I like to be busy all the time.

Competitiveness
[ ] I enjoy working in situations involving competition with others.
[ ] It is important to me to perform better than others on a task.
[ ] I feel that winning is important in both work and games.
[ ] It annoys me when other people perform better than I do.
[ ] I try harder when I am in competition with other people.

 These items are scored on a Likert scale and sums for each subscale are computed for scoring. "R" indicates reversed-coded items. Higher scores indicate higher levels of: a) the desire to work hard and do a good job (work), b) preference for difficult challenging tasks and for meeting internally prescribed standards of excellence (mastery) and c) enjoyment of interpersonal competition and desire to win (competitiveness).

Appendix C
Luhtanen & Crocker (1992) Collective Self-Esteem Scale

Instructions: We are all members of different social groups or social categories. One of such social groups or categories is gender. We would like you to consider your membership in the particular group or category of gender, and respond to the following statements on the basis of how you feel about that group and your membership in it. There are no right or wrong answers to any of these statements. We are interested in your honest reactions and opinions. Please read each statement carefully and respond to the following scale.

Scale: 1-Strongly Disagree 2-Disagree 3-Disagree Somewhat 4-Neutral 5-Agree Somewhat 6-Agree 7-Strongly Agree

Membership
[ ] I am a worthy member of the gender group I belong to.
[ ] I feel I don't have much to offer to the gender group I belong to. [R]
[ ] I am a cooperative participant in the gender group I belong to.
[ ] I often feel I'm a useless member my gender group. [R]

Private
[ ] I often regret that I belong to the gender group I do. [R]
[ ] In general, I'm glad to be a member of the gender group I belong to.
[ ] Overall, I often feel that the gender group of which I am a member is not worthwhile.
[ ] I feel good about the gender group I belong to.

Public
[ ] Overall, my gender group is considered good by others.
[ ] Most people consider my gender group, on the average, to be more ineffective than other social groups. [R]
[ ] In general, others respect the gender group that I am a member of.
[ ] In general, others think that the gender group I am a member of is unworthy. [R]

Identity
[ ] Overall, my gender group membership has very little to do with how I feel about myself. [R]
[ ] The gender group I belong to is an important reflection of who I am.
[ ] The gender group I belong to is unimportant to my sense of what kind of person I am. [R]
[ ] In general, belonging to my gender group is an important part of my self-image.

These items are scored on a Likert scale and sums are computed for scoring. "R" indicates reversed-coded items. Higher scores indicate more identification with the gender.

Appendix D
Pilot Study One Interview Questions

Note: Notes on participants' verbal responses were typed by researchers.

1. Describe your experience and reaction to this experiment:
2. How confident do you feel about your verbal abilities?
3. How motivated do you feel to perform well on a second trial of verbal ability items?
4. How well do you think you did on the test in relation to other participants who have also completed this study?
5. Did you notice the trial one score of the previous participant?
    5a. What was the score of the previous participant on trial one?
6. Did you notice the gender of the previous participant?
    6a. What was the gender of the previous participant?
7. What did you believe was the purpose of this study?
8. How believable did you find your trial one feedback?
9. Did you have any suspicions about any of the researcher's actions?
10. Did you have any suspicions about the purpose of any parts of the study or the study as a whole?
11. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 4 less than the previous participant's score?
12. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 8 less than the previous participant's score?
13. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 15 less than the previous participant's score?
14. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 4 more than the previous participant's score?
15. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 8 more than the previous participant's score?
16. How motivated would you be to perform on a second trial of verbal ability items if you discovered your score on the first trial was 15 more than the previous participant's score?

Appendix E
Pilot Study Two Interview Questions

Note: Notes on participants' verbal responses were typed by researchers.

1. Describe your experience and reaction to this experiment:
2. How confident do you feel about your verbal abilities?
3. How motivated do you feel to perform well on a second trial of verbal ability items?
4. How well do you think you did on the test in relation to other participants who have also completed this study?
6. What did you believe was the purpose of this study?
7. Did you have any suspicions about the reasoning provided for completing a second trial?
8. Did you have any suspicions about any of the researcher's actions?
9. Did you have any suspicions about the purpose of any parts of the study or the study as a whole?
10. How strongly do you believe that gender differences exist in verbal ability?
11. How confident are you that you *would* do better than a male on the second trial?

Appendix F
Smith and White (2001) Domain Identification Survey

Instructions: Using the following scale, please indicate the number that best describes how much you agree with each of the statements below.

Scale: 1-Strongly Disagree 2-Moderately Disagree 3-Neither Disagree nor Agree 4-Moderately Agree 5-Strongly Agree

[ ] I learn things quickly in English classes [E]
[ ] Mathematics is one of my best subjects [M]
[ ] English is one of my best subjects [E]
[ ] I get good grades in English [E]
[ ] I have always done well in Math [M]
[ ] I am hopeless in English classes [E,R]
[ ] I get good grades in Math [M]
[ ] I do badly in tests of Mathematics [M, R]

Instructions: Please indicate the number that best describes you for each of the statements below using the following scale:

Scale: 1-Not At All 2-Somewhat 3-Very Much

[ ] How much do you enjoy Math-related subjects? [M]
[ ] How much do you enjoy English-related subjects? [E]
[ ] How likely would you be to take a job in a math related field? [M]
[ ] How much is Math to the sense of who you are? [M]
[ ] How important is it to you to be good at Math? [M]
[ ] How important is it to you to be good at English? [E]
[ ] Compared to other students, how good are you at Math? [M]
        1. Very poor 2. Poor 3. About the same 4. Better than average 5. Excellent
[ ] Compared to other students, how good are you at English? [E]
        1. Very poor 2. Poor 3. About the same 4. Better than average 5. Excellent

These items are scored on a Likert scale and sums are computed for scoring. "R" indicates reverse-coded items; "E" indicates items summed for the English domain; "M" indicates items summed for the Math domain. Higher scores indicate more identification with the domain.

Appendix G
Domain Identification Novel Items

Instructions: Using the following scale, please indicate the number that best describes how much you agree with each of the statements below.

Scale: 1-Strongly Disagree 2-Moderately Disagree 3-Neither Disagree nor Agree 4-Moderately Agree 5-Strongly Agree

Ability Items
[ ] I am good at tasks related to verbal ability
[ ] I tend to comprehend anything that I read
[ ] I did well in English-related subjects in grad school
[ ] If I went into a field that relied heavily on reading, I would excel
[ ] If I went into a field that relied heavily on writing, I would excel
[ ] I am above average when it comes to my understanding of the English language
[ ] I have a good vocabulary
[ ] I am articulate when I speak
[ ] I consider myself to be a good writer
[ ] I do well on verbal portions of standardized tests

Preference/Liking Items
[ ] I feel that reading comprehension is important to my success
[ ] Reading is an important part of who I am
[ ] Writing is an important part of who I am
[ ] It is not important to me that I continue to improve my verbal ability skills [R]
[ ] I enjoy growing my vocabulary
[ ] I enjoy using verbal skills
[ ] I believe I could do without strong verbal ability skills
[ ] I preferred English to other subjects in grade school
[ ] I believe that verbal ability skills are relevant to the career I want to have

These items are scored on a Likert scale and sums are computed for scoring. "R" indicates reversed-coded items. Higher scores indicate more identification with the domain.