

BEHAVIORAL CORRELATES OF METASTEREOTYPES: THE RELATIONSHIP
BETWEEN IMPRESSION MANAGEMENT AND SUPERVISOR PERCEPTIONS OF
WOMEN IN STEM

By

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DEDICATION

This is dedicated to my friends and family, especially my parents, Tim Gilrane and Marixie Gilrane; my sister, Victoria Gilrane; and the Kingsters for their unwavering support and encouragement over the years.

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ABSTRACT

BEHAVIORAL CORRELATES OF METASTEREOTYPES: THE RELATIONSHIP BETWEEN IMPRESSION MANAGEMENT AND SUPERVISOR PERCEPTIONS OF WOMEN IN STEM

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Women are currently underrepresented in science, technology, engineering and mathematics (i.e., STEM fields; Beutel & Nelson, 2005; Wilson, 2004), and while researchers have explored several reasons for the scarcity of women in STEM, a growing literature has investigated the influence of stereotypes. Extending this literature, the current study investigates the role of metastereotypes (i.e., STEM women's perceptions about how others stereotype their in-group, Vorauer, Main, & O'Connell, 1998) on two forms of impression management: self-promotion and ingratiation (Bolino & Turnley, 1999). In addition, the current research examines supervisor reactions to these impression management behaviors. The moderating roles of the referent outgroup (i.e., peers, subordinates, supervisors) and metastereotype consciousness are also investigated. Results suggest that the referent outgroup influences the relationship between metastereotype content and impression management behaviors, such that STEM women

are more likely to engage in compensatory behaviors when the referent outgroup is supervisors. Further, evidence suggests that STEM women were more likely to engage in impression management to counter negative metastereotypes when they were highly conscious of how others viewed their ingroup than when they possess low metastereotype consciousness. In addition, competence-related impression management behaviors (i.e., self-promotion) were negatively related to supervisor ratings of likeability, but this relationship was mitigated to the extent that women engaged in warmth-related impression management (i.e., ingratiation). This research contributes to our understanding of STEM women's experiences as well as the integral role of metastereotypes in predicting behaviors, and, in turn, the relationship between these behaviors and others' perceptions. The implications of these findings for STEM women and the institutions in which they are employed are also discussed.

INTRODUCTION

“I wish I knew how to implement some effective behaviors to counteract stereotypes. I think the only effective behavior is to just plain be brilliant, but I think I'm not brilliant enough...” (Study Participant, Professor at Ivy League University)

Women have made strides in the traditionally male-dominated fields of science, technology, engineering, and mathematics (STEM); some estimates suggest that women have been awarded approximately 50% of all undergraduate degrees in engineering and science (Drummond, 2010). Despite this improvement, women comprise less than one-third of STEM faculty positions (National Science Board, 2008). In addition, while research has demonstrated that STEM men and women demonstrate equal levels of career commitment, women are more likely to turnover than their male counterparts. Moreover, these findings have also indicated that women's attrition is related to dissatisfaction with research support, advancement opportunities, and service obligations (Walters & McNeely, 2010; Xu, 2008). Indeed, research has demonstrated that STEM women tend to be promoted at a slower rate than men (Lane, 1999; Valian, 1999). This incongruity speaks to the challenge of women's retention and advancement in STEM (Drury, Siy, & Cheryan, 2011).

A growing literature has suggested that stereotypes are to blame for the underrepresentation of women in the STEM professoriate (Ceci, Williams, & Barnett,

2009; Cheryan, Siy, Vichayapai, Drury, & Kim; Eccles, 2011; Dasgupta, 2011b; Diekman, Clark, Johnston, Brown, & Steinberg, 2011; Shapiro & Williams, 2012). Specifically, these stereotypes not only color others' perceptions of the target, but they also influence the target's perceptions of how she is stereotyped by the out-group, which may influence her actions and, in turn, other's appraisals (Torres & Charles, 2004).

Extending this research, I examine the relationship between stereotypes and STEM women's behaviors, which may ultimately result in poor evaluations from outgroup members (see Figure 1). Specifically, I first discuss metastereotypes, which emerge from beliefs regarding how one's in-group is stereotyped by out-group members. I describe research showing that the specific content of metastereotypes differs depending on the referent out-group (Vorauer, Main, & O'Connell, 1998) and propose that women in STEM may have different perceptions about how various male out-groups, such as subordinates, peers, and supervisors, stereotype STEM women. The current study contributes to the metastereotype literature that has yet to paint a clear picture of the moderators and outcomes of metastereotypes (see Anseel, 2011) by specifically examining the referent outgroup (i.e., subordinates, peers, supervisors) and metastereotypes consciousness as moderators of the relationship between metastereotypes and impression management behavior.

Second, I investigate the behavioral responses to STEM women's metastereotypes. Specifically, I anticipate that STEM women will be motivated to refute negative metastereotypes (Hopkins et al., 2007) and emphasize positive metastereotypes by engaging in impression management (IM, Bolino & Turnley, 1999) behaviors. An

investigation of these relationships extends extant theoretical literature on the role of stereotypes for STEM women. Specifically, recent research has posited that as a result of stereotype threat STEM women are likely to behave in *alignment* with gender stereotypes (Schmader, Johns & Forbes, 2008). The current study goes beyond stereotype threat theory by proposing a theoretical mechanism that investigates the behaviors in which STEM women may engage to *counteract* negative metastereotypes. Indeed, the motivation to be “brilliant” to offset stereotypes is reflected in the participant quotation cited above.

Last, the use of these IM strategies; however, may result in an unanticipated “backlash effect” (Rudman, 1998, p. 629), in which engaging in strategies to enhance perceptions of competence may result in higher competence evaluations at the expense of being seen as unlikeable, while demonstrating warmth may come at the expense of perceptions of competence. In essence, women in stereotypically masculine occupations, such as STEM, may be caught in a double bind (Camden & Witt, 1983, p. 260) in which they are penalized if they are too competent or warm, yet also penalized if they do not possess these characteristics.

STEM Women’s Metastereotypes

Introduced by Vorauer and colleagues (1998), the term metastereotype combines the concept of stereotypes, which are “exaggerated beliefs” about the characteristics of another group (Allport, 1954, p. 187), and metaperceptions, which refer to individuals’ views about how they are perceived by others (Kenny & DePaulo, 1993; Vorauer & Claude, 1998; Vorauer & Miller, 1997; Vorauer & Ross, 1998) to reflect “a person's

beliefs regarding the stereotype that out-group members hold about his or her own group” (Vorauer et al., 1998, p. 917). Although metastereotype research originally focused on the metastereotypes of majority or dominant social groups (Vorauer et al., 1998; Vorauer, Hunter, Main, & Roy, 2000), metastereotypes of socially disadvantaged groups have since been examined (Judd, Park, Yzerbyt, Gordijn & Muller, 2005; Klein, Pohl & Ndagijimana, 2007; Yzerbyt, Provost & Corneille, 2005). Metastereotypes differ from self-stereotypes due to their relational component (Vorauer et al., 1998). Specifically, metastereotypes may differ depending on the referent outgroup. For example, the metastereotype that the Dutch have of the French (i.e., when French people are the outgroup) may be different than the metastereotype that the Dutch have of the Germans (i.e., when German people are the outgroup, Vorauer et al., 1998; 2000).

Like self-stereotypes, however, metastereotypes may be positive, negative or neutral (Anseel, 2011). Despite the variety of valences that metastereotypes may hold, the majority of metastereotype research has focused on negative metastereotypes (Owuamalam & Zagefka, 2011; Vorauer et al., 1998). For instance, in their seminal study, Vorauer and colleagues (1998) found that negative metastereotypes were related to negative emotions and decreased self-esteem. In the next section, I delineate two integral components of STEM women’s metastereotypes: metastereotype content and metastereotype consciousness. In so doing, I also highlight the importance of the referent outgroup.

Metastereotype Content

The content of metastereotypes often reflects the specific nature of the stereotypes that others have of certain groups. Specifically, scholars have proposed that people are often aware of the stereotypes that others hold about their ingroup (Klein & Azzi, 2001; Tajfel, 1981). Indeed, Sigleman and Touch (1997) found that metastereotypes are closely related to actual stereotypes.

Gender stereotypes. Gender stereotypes, which refer to “socially shared beliefs about what qualities can be assigned to individuals based on their membership in the female or male half of the human race” (Lips, 2008, p.2), are often described in terms of Powell and Butterfield’s (1979) agency–communion paradigm (Bakan, 1966; Eagly, 1987). Specifically, women are expected to possess communal attributes (e.g., kind, nurturing, caring, understanding, Burgess & Borgida, 1999; Eagly, 1987; Prentice & Carranza, 2002; Williams & Best, 1990), while men are expected to have agentic attributes (e.g., dominant, competitive, or achievement oriented, Dodge, Gilroy, & Fenzel, 1995; Eagly & Karau, 2002; Glick, Zion, & Nelson, 1988). These communal and agentic stereotypes correspond with Fiske and her colleagues’ (Fiske, Cuddy & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002) universal dimensions of warmth and competence, respectively, with women being stereotyped as high on warmth (i.e., communion) and low on competence (i.e., agency). Drawing from this research, the content of STEM women’s metastereotypes likely varies along dimensions of competence (Dodge et al., 1995; Eagly & Karau, 2002; Glick et al., 1988) and warmth (Burgess & Borgida, 1999; Eagly, 1987; Prentice & Carranza, 2002; Williams & Best, 1990).

As explicated by Vorauer and colleagues (1998), however, an individual's metastereotype may differ depending on the outgroup in question. For STEM women, their metastereotype content may vary according to whether they are thinking about their male subordinates, peers, or supervisors as a function of power dynamics.

Referent outgroup. Although power may elicit several different meanings (Fiol, O'Connor, & Aguinis, 2001; French & Raven, 1959, 1960; Gelfand, Erez, & Aycan, 2007; Ravlin & Thomas, 2005), in the current study, power reflects a person's capacity or perceived capacity to have authority over others (Fiol et al., 2001). This conception of power is often referred to as social power (Van Dijke & Poppe, 2006). Recently, scholars have explored the role of power (or lack thereof) in metastereotyping (Lamers, Gordign, & Otten, 2008). Specifically, powerless individuals are often motivated to avert threats and prevent losses (Keltner, Gruenfeld, & Anderson, 2003). In order to be successful at this task, the powerless must be able to predict threats and losses. As such, the powerless are likely to estimate how powerful outgroup members perceive or stereotype them. In other words, the powerless are likely to engage in metastereotyping (Vorauer et al., 2000).

Power in the context of gender stereotypes has also received considerable attention. Specifically, research has indicated that although stereotypes towards women have changed over time (Diekmann & Eagly, 2000), the power distribution generally remains in favor of men (Carli, 1999, 2001; Diekmann, Goodfriend, & Goodwin, 2004; Kanter, 1977; Ragins & Sundstrom, 1989; Sagrestano, 1992). This research suggests that while gender stereotypes are shifting, women still have less power in comparison to their

male counterparts. Indeed, scholars have proposed that stereotypes concerning men's agency and competence and women's deficiency in these qualities are at the root of gender differences in power (Ragins & Sundstrom, 1989). Therefore, all else being equal, STEM women may hold the metastereotype that their male peers or supervisors perceive them as less powerful and, therefore, less competent. With regard to their subordinates, however, STEM women's metastereotypes may reflect high power or competence. Specifically, women may gain power through other means, such as their occupational roles (e.g., women in the military, Wood & Eagly, 2002). Similarly, women may also obtain power by occupying leadership positions (Ridgeway & Walker, 1995); as such, STEM women may expect their subordinates to view them as highly competent and powerful. Therefore, I hypothesize that *STEM women's competence metastereotype will vary as a function of the male referent outgroup. Specifically, competence metastereotypes will be lowest when the referent outgroup is superiors, higher when the referent outgroup is peers, and highest when the referent outgroup is subordinates* (Hypothesis 1).

With regard to the communal/warmth stereotype dimension, research suggests that women must often sacrifice warmth at the cost of competence (Heilman & Okimoto, 2007; Heilman, Wallen, Fuchs, & Tamkins, 2004); therefore, women may believe that those who view them as powerful or competent may also view them as less warm. As such, I expect *STEM women's warmth metastereotype to vary as a function of the male referent outgroup. Specifically, warmth metastereotypes will be highest when the referent*

outgroup is superiors, lower when the referent outgroup is peers, and lowest when the referent outgroup is subordinates (Hypothesis 2).

Metastereotype Consciousness

A second component of STEM women's metastereotypes is metastereotype consciousness, which is defined as the extent to which individuals are persistently self-conscious about how others stereotype them (Pinel, 1999; Ryan, 2010). I expect that metastereotype consciousness will vary depending on whether the referent outgroup consists of male subordinates, peers, or supervisors. Specifically, I expect STEM women to experience greater metastereotype consciousness when they perceive the referent outgroup as having more power than themselves. Previous research demonstrates that powerless individuals strive to avert threats to their ingroup (Keltner, Gruenfeld, & Anderson, 2003). In an effort to ward off external threats, powerless people will try to anticipate how powerful outgroup members perceive or stereotype their ingroup. In other words, STEM women will be more conscious of metastereotypes when the referent outgroup is more powerful (i.e., when the referent outgroup is male peers or supervisors).

A second reason that STEM women may be more conscious of metastereotypes when the referent outgroup is powerful comes from research suggesting that powerless individuals are more likely to engage in perspective taking (Galinsky, Magee, Inesi, & Gruenfeld, 2006) and that metastereotyping involves perspective taking (Vorauer et al., 2000). Indeed, a recent study demonstrated that power is negatively associated with metastereotype activation and that this relationship is mediated by perspective taking (Lamers et al., 2008). Extending this research, I contend that powerlessness elicits not

only the emergence of dormant metastereotypes, but it also engenders the more chronic, persistent consciousness of these metastereotypes. Specifically, I hypothesize that *STEM women's metastereotype consciousness will vary as a function of the male referent outgroup. Specifically, STEM women will be most conscious of metastereotypes when the referent outgroup is superiors, less conscious when the referent outgroup is peers, and least conscious when the referent outgroup is subordinates (Hypothesis 3).*

Behavioral Responses to Metastereotypes

Metastereotype content and consciousness have serious implications as these cognitions may influence the actions of STEM women. Indeed, previous research has demonstrated that metastereotypes can influence behavior (Klein & Azzi, 2001; Kamans, Gordijn, Oldenhuis, & Otten, 2009; Sigleman & Touch, 1997). In the following sections, I delineate several impression management tactics as a behavioral response to STEM women's metastereotypes. In addition, I describe theoretical processes to explain why STEM women would engage in these strategies.

Theoretical Mechanisms

Metastereotypes may influence actions toward the outgroup (Frey & Tropp, 2006; Shelton & Richeson, 2006). One explanation for how metastereotypes relate to behaviors is provided by self-verification theory, which has explored how individuals understand and manage others' views of them (Goffman, 1959; Kenny, 1994; Schlenker, 1980; Swann, 1987). Specifically, individuals desire to be viewed in a way that is consistent with their self-concept, that is, they aspire to be viewed positively (Swann, 1987). In addition, the self-presentation (Baumeister, 1982) and impression management

(Schlenker, 1980) literatures demonstrate that people will engage in behavioral strategies to maintain their positive self-image. Therefore, as an effort to preserve a positive self-concept, I predict that STEM women will employ impression management techniques to elicit favorable perceptions and confirm positive metastereotypes from others.

Complementary to self-verification theory, stereotype reactance theory specifies the process through which people react against negative stereotypes (Kray, Thompson, & Galinsky, 2001). Stereotype reactance theory is an extension of psychological reactance theory (Brehm, 1966), which suggests that people respond to threats to freedom by defending their freedom more assertively. In turn, stereotype reactance theory postulates that negative stereotypes lead targets to “react by engaging in behaviors that are counter to those prescribed by the stereotype” (Kray et al., 2001, p. 949). Indeed, researchers have found that individuals are motivated to refute “mean” stereotypes (Hopkins et al., 2007, p. 779). Further, the implications of negative *and* positive metastereotypes have been examined by Klein and Azzi (2001), who found that, as an effort to ward off the negative repercussions of metastereotypes, individuals emphasize the positive aspects of the metastereotype while downplaying the negative components. Specifically, the authors contend that targets will engage in a “selective-confirmation of the metastereotype” to verify positive metastereotypes and invalidate negative metastereotypes (Klein & Azzi, 2001, p. 281). Together, self-verification theory and psychological reactance theory provide evidence that in STEM women’s metastereotypes will be related to impression management behaviors, such that STEM women will engage in impression management techniques that confirm desirable metastereotypes and disconfirm negative

metastereotypes. In the section below, I propose and provide evidence for the specific relationships between the content of each metastereotype (i.e., warmth, competence) and the impression management techniques used to combat or endorse the metastereotype.

Impression Management Behaviors

Impression management (IM) refers to an individual's specific actions intended to elicit and maintain favorable impressions from others (Rosenfeld, Giacalone, & Riordan, 1995; Schnedier, 1981). Although various types of IM strategies have been investigated (Kumar & Beyerlein, 1991; Wayne & Ferris, 1990), several studies (Bolino & Turnley, 1999; Bolino & Turnley, 2001; Bolino & Turnely, 2003a; Bolino & Turnley, 2003b) have measured individuals' use of IM with the Jones and Pittman (1982) taxonomy because it is appropriate for organizational settings, it is derived from IM theory, and it is comprehensive (Bolino & Turnley, 1999). According to Jones and Pittman (1982), there are five separate IM tactics: (1) exemplification, in which individuals go above and beyond the job requirements to be viewed by others as committed; (2) ingratiation, in which individuals perform favors or engage in flattery to be viewed by others as *likeable*; (3) self-promotion, in which individuals make others aware of their accomplishments to be viewed by others as *competent*; (4) intimidation, in which individuals behave forcefully or aggressively to be viewed by others as powerful; and (5) supplication in which individuals pretend to be unknowledgeable or weak to be viewed by others as needy. I contend that, in an effort to disprove undesirable metastereotypes, STEM women will strategically engage in specific IM behaviors that directly map onto the metastereotype dimensions of warmth and competence: ingratiation and self-promotion.

Impression management strategies and competence metastereotypes. First, to combat perceptions that others view STEM women as less competent than their male-counterparts, women may engage in self-promotion IM behaviors. Self-promotion occurs when individuals make others aware of their accomplishments in an effort to be viewed by others as competent (Jones & Pittman, 1982). Since self-promotion is meant to increase others' perceptions of competence, this IM behavior may be a tactic used to react against low competence metastereotypes. Given the above reasoning, I hypothesize that *there will be a negative relationship between competence metastereotypes and self-promotion, such that perceptions that others view STEM women as low in competence will correspond to higher levels of self-promotion (Hypothesis 4).*

In addition to engaging in behaviors that may help to counteract low competence metastereotypes, I anticipate that STEM women will also downplay behaviors that perpetuate these metastereotypes. Specifically, although the “attributional goal is that of increased liking,” (Gordon, 1996, p. 54), ingratiation may not necessarily enhance competence. Indeed, scholars have postulated that there is an inherent risk associated with ingratiation, especially to the extent that the ingratiation has relatively less power than the recipient, as the behavior is seen as more obvious (Gordon, 1996; Jones, 1964; Liden & Mitchell, 1988). Taken a step further, I expect that STEM women who hold low competence metastereotypes will anticipate this risk, and thus avoid engaging in ingratiation. Formally, I hypothesize that *there will be a positive relationship between competence metastereotypes and ingratiation, such that perceptions that others view*

STEM women as low on competence will correspond to lower levels of ingratiation (Hypothesis 5).

Impression management strategies and warmth metastereotypes. In addition to combating metastereotypes of low competence, STEM women may also have to counteract metastereotypes regarding their low warmth. I propose that women will react to low warmth metastereotypes by engaging in ingratiation, which reflects behaviors meant to increase others liking or attraction toward the target (Jones & Pittman, 1984; Pandey & Bohra, 1984). Specifically, I hypothesize that *there will be a negative relationship between warmth metastereotypes and ingratiation, such that STEM women will engage in higher levels of ingratiation when they think that others stereotype them as lacking warmth (Hypothesis 6).*

The combination of competence and warmth metastereotypes. In addition to the influence that competence and warmth metastereotypes *individually* have on impression management behaviors, I also examine how varying levels of *both* metastereotypes influence impression management behaviors. I anticipate that possessing a metastereotype that is high on either the warmth or competence dimension will help to offset the need to engage in compensatory behaviors in response to a low metastereotype. Specifically, with regard to the positive relationship between the competence metastereotype and ingratiation (see hypothesis 5), I posit that STEM women who perceive that others view them as highly warm will feel less inclined to avoid ingratiation in response to low competence metastereotypes. Further, in the case of the anticipated negative relationship between the warmth metastereotype and ingratiation (see hypothesis

6), I expect that having a high competence metastereotype may help to offset the need to engage in ingratiation in response to low warmth metastereotypes. That is, I hypothesize that *competence metastereotypes will moderate the negative relationship between warmth metastereotypes and ingratiation, such that when the competence metastereotype is high, the negative relationship between warmth metastereotypes and ingratiation will be weaker (Hypothesis 7)*. Similarly, I hypothesize that *warmth metastereotypes will moderate the negative relationship between competence metastereotypes and self-promotion, such that when the warmth metastereotype is high the negative relationship between competence metastereotypes and self-promotion will be weaker (Hypothesis 8)*.

Impression management strategies and metastereotype consciousness. The effect of metastereotypes must be understood in light of individual differences in chronic awareness and concern about others' beliefs. Indeed, metastereotype consciousness plays an important role in determining the behavioral implications of metastereotypes. Specifically, metastereotype research suggests that when individuals are prompted to be cognizant of how they are stereotyped by outgroup members (i.e., metastereotype activation, Voruaer et al., 2000), they become more anxious of their self-presentation to outgroups (Klein & Azzi, 2001). This increased metastereotype awareness or consciousness may motivate STEM women to, according to stereotype reactance theory (Kray et al., 2001), engage in impression management behaviors. Indeed, a recent study found that when individuals were concerned about low warmth metastereotypes as a consequence of metastereotype activation, they were more likely to engage in behaviors to communicate warmth (van Leeuwen & Tauber, 2012). More generally, when STEM

women are highly conscious of how others stereotype them, I contend that they will be more likely to engage in behaviors to counteract negative metastereotypes. Formally, I hypothesize that *metastereotype consciousness will moderate the negative relationship between competence metastereotypes and self-promotion, such that the relationship between competence metastereotypes and self-promotion will be stronger when metastereotype consciousness is high (Hypothesis 9)*. In addition, I posit that *metastereotype consciousness will moderate the negative relationship between warmth metastereotypes and ingratiation, such that the relationship between metastereotype content and ingratiation will be stronger when metastereotype consciousness is high (Hypothesis 10)*.

Impression management strategies and the referent outgroup. Further, when women possess less perceived power than their referent outgroup (i.e., when the referent outgroup is superiors), I expect that they will be more likely to engage in behaviors to counteract negative metastereotypes. Indeed, Kaplan and colleagues (Kaplan, Santuzzi, & Ruscher, 2009) propose that “asymmetric outcome-dependence” (p. 603)-- when actual or perceived power is unequal between two groups-- may contribute to a heightened awareness of how a more powerful group stereotypes less powerful groups. This increased metastereotype awareness or consciousness may motivate STEM women to, according to stereotype reactance theory, engage in impression management behaviors. Formally, I hypothesize that *the referent outgroup will moderate the negative relationship between competence metastereotypes and self-promotion, such that the relationship between metastereotype content and behavioral strategies will be strongest*

when the referent outgroup is supervisors, less strong when the referent outgroup is peers, and least strong when the referent outgroup is subordinates (Hypothesis 11).

Further, I predict that *the referent outgroup will moderate the positive relationship between competence metastereotypes and ingratiation, such that the relationship between metastereotype content and ingratiation will be strongest when the referent outgroup is supervisors, less strong when the referent outgroup is peers, and least strong when the referent outgroup is subordinates (Hypothesis 12).* In addition, I posit that *the referent outgroup will moderate the negative relationship between warmth metastereotypes and ingratiation, such that the relationship between metastereotype content and ingratiation will be strongest when the referent outgroup is supervisors, less strong when the referent outgroup is peers, and least strong when the referent outgroup is subordinates (Hypothesis 13).*

Supervisor Responses to Impression Management-The Backlash Effect

I draw from two bodies of literature to formulate predictions of how supervisors will respond to STEM women's use of impression management. First, impression management research suggests that individuals who engage in ingratiation and self-promotion will generally receive higher evaluations than those who do not (Bolino & Turnley, 2003b; Orpen, 1996; Proost, De Witte, Schreurs, & Derous, 2010). Although this literature paints a promising picture for the use of impression management, impression management scholars due caution that these behaviors, especially self-promotion, can be risky. Specifically, depending on how the observer attributes an actor's use of self-promotion, the behaviors can be perceived as manipulative or indicative of

true competence. Scholars have also theorized that actors be perceived as less calculating and may elicit more positive evaluations if self-promotion is combined with ingratiation (Jones & Pittman, 1982; Wayne & Ferris, 1990).

The second body of literature focuses on the unanticipated negative effect (i.e., the backlash effect) women experience for engaging in self-promotion. I seek to tie the impression management and backlash literatures together by examining not only a condition under which self-promotion is viewed unfavorably (i.e., for women in STEM), but also by testing the role of ingratiation in mitigating the backlash effect.

The underlying premise of the backlash effect is that although women may engage in impression management techniques to improve others' appraisal of them, behaviors that reflect the masculine nature of STEM may come at an unanticipated cost. Specifically, STEM women find themselves in a dilemma in which to be viewed as competent, they must possess qualities that align with their male-dominated positions. By demonstrating these masculine characteristics or behaviors, however, they are violating their gender roles and, thus, may have to deal with repercussions (i.e., *backlash*, Rudman, 1998) in the form of being viewed as less likeable or hireable. Indeed, research has demonstrated that women who adopt masculine tendencies often face repercussions for violating prescriptive gender norms (Heilman, 2001; Heilman et al., 2004; Heilman & Okimoto, 2007; Liberman, 2007; Phelan, Moss-Racusin, & Rudman 2008). In essence, women in counter-stereotypic contexts often face the challenge of balancing competing gender and occupational roles. The backlash effect provides evidence of the glass ceiling,

or the invisible barricade that impedes women's advancement in the organizational hierarchy (Maume, 1999).

The backlash effect occurs when women who engage in masculine or agentic behaviors may be viewed as competent at the expense of being judged as less likeable or less hireable in comparison to their male counterparts (Rudman, 1998). Societal norms and gender schemas perpetuate the backlash effect. Specifically, career-driven women are often accused of not fulfilling gender prescriptions (Fels, 2004) and are often referred to as a "dragon lady," "battleaxe," or "iron maiden" (Kanter, 1977), whereas women who forgo their professional careers to concentrate on their personal and family life also experience scrutiny from others (Shapiro, Ingols, Blake-Beard, 2008). Evidence of the backlash effect is further corroborated by research linking IM behaviors to evaluations from others.

First, Proost and colleagues (2010) found that both self-promotion and ingratiation were positively related to interviewer ratings, and the relationship was slightly stronger for self-promotion. These findings were, however, general and rater gender differences were not examined. Focusing on how women are viewed for engaging in self-promotion, Rudman's (1998) seminal study on the backlash effect demonstrated that although self-promotion resulted in high competence ratings for women, this IM tactic also led to reductions in social attraction and hireability. This backlash may be particularly likely to occur for women in male-dominated fields, such as STEM, as these behaviors are assertive and antithetical to female gender prescriptions (Bolino & Turnley, 2003a). In light of these findings, I hypothesize that although *self-*

promotion will be positively related to supervisor competence ratings (Hypothesis 14), self-promotion will also be negatively related to supervisor likeability ratings (Hypothesis 15). Using the same logic, I expect women to receive a similar penalty for demonstrating too much warmth with ingratiating behaviors. Specifically, I hypothesize that while *ingratiation will be positively related to supervisor likeability ratings (Hypothesis 16)*, reflecting the other side of the double-edged sword, *ingratiation will be negatively related to competence ratings (Hypothesis 17).*

Mitigating the Backlash Effect

Despite these findings, a recent call (Scott & Brown, 2006) to examine conditions that attenuate the backlash effect has prompted scholars to identify these circumstances. One solution to overcoming women's double bind may be found in the extent to which women engage in a combination of masculine *and* feminine behaviors. Heilman and Okimoto (2007) explored this issue by examining the degree to which likeability ratings of female managers were improved by indications of the manager's communal characteristics (e.g., motherhood). The authors contend that women are most likely penalized due to their deficiency in feminine qualities rather than their engagement in masculine behaviors. This process occurs because the nature of the backlash is in the form reduced interpersonal liking, which reflects the female communal gender prescription. Therefore, when women engage in masculine behaviors, they are perceived to possess characteristics that are antithetical to the stereotypical woman.

Nevertheless, masculine behaviors are not inherently inappropriate for women, but the perceived lack of femininity engenders disapproval. In line with this reasoning,

Heilman and Okimoto found that competent women were perceived as more interpersonally likeable when they were also viewed as communal. Heilman and Okimoto's (2007) findings were later echoed in a study conducted by Shaughnessy and her colleagues (Shaughnessy, Treadway, Breland, Williams, & Brouer, 2011). Specifically, the authors found that women who engage in behaviors that are congruent with gender stereotypes while at the same time behaving counter-stereotypically are able to offset a negative backlash effect. As a whole, this research suggests that women's communal behavior may help them to strike a balance between gaining competence without the risk of losing warmth. Extrapolating this literature to the current study I expect that engaging in combinations of behaviors that demonstrate competence (i.e. self-promotion) and warmth (i.e., ingratiation) will help to mitigate the backlash effect, and therefore strike a balance on the competence and warmth continuum. Formally, I hypothesize that *self-promotion will moderate the relationship between ingratiation and competence, such that when levels of self-promotion are high, the negative relationship between ingratiation and supervisor perceptions of competence will become weaker (Hypothesis 18)*. Finally, I anticipate that *ingratiation will moderate the relationship between self-promotion and likeability, such that when levels of ingratiation are high, the negative relationship between self-promotion and supervisor perceptions of likeability will become weaker (Hypothesis 19)*.

METHOD

Participants and Procedure

Participants were recruited from a pool of approximately 3000 women who had applied to participate in conferences for junior faculty in STEM disciplines from 2006 to 2010. To ensure that the current contact information was complete and accurate, an Internet search was conducted on each individual to validate and update her email address. From this effort, 1,291 email addresses were identified. Of the individuals contacted, 37 opted out of the survey and 111 had invalid email addresses. A total of 150 completed the online survey, resulting in a response rate of 12.7%. The final sample consisted of women currently working in science, technology, engineering, and mathematics (STEM) fields. The majority of women were employed in academe as junior, tenure track faculty members (92.5%); sample disciplines include organic chemistry, robotics, mechanical engineering, and mathematical biology. The sample also consisted of women in non-tenure track academic positions (e.g., research scientist, 4.7%), industry (.02%), and post-doctoral positions (.01%). The mean age of participants was 35.14 (SD= 6.15). In addition the majority of participants were White (66.2%), followed by Asian American (15.5%), African American and Hispanic Americans (7.4% each), and individuals who identified as being of mixed ethnicities (1.4%).

To obtain supervisor data, these STEM women were asked to provide the contact information for their supervisor to send them a short survey about their subordinate's behaviors. In all, email addresses were provided for 80 supervisors, 4% opted out, and 54% responded (N=43).

Using an Internet survey tool, respondents were asked to complete a battery of surveys that assess STEM women's metastereotypes and the behavioral responses to these metastereotypes. The email attached to the survey explained the full purposes of the study, which are to examine the experiences of Women in STEM (see Appendix A). Using a between-subjects design (referent outgroup: subordinates, peers, supervisors), these questions were framed based on three referent outgroups resulting in three separate questionnaires. The survey took approximately 30 minutes to complete, and each participant was compensated with a \$50 online gift card when both they and their supervisor complete the survey. Upon receiving the supervisor contact information from the STEM women, supervisors were asked to complete a short survey, which took approximately 5 minutes, on their ratings and perceptions of their subordinate.

Measures

Metastereotype content. To assess the nature of metastereotypes held by women in STEM (i.e., how they think others stereotype women in STEM), I adapted 6 items, which reflect competence ($\alpha = .79$) and warmth ($\alpha = .73$), from Fiske et al.'s (2002) Stereotype Content Model (see Appendix A).

Metastereotype consciousness. In order to assess the extent to which women in STEM are self-conscious about how others stereotype them, I adapted 5 items from

Pinel's (1999) Stigma Consciousness Scale to reflect stereotypes toward women in STEM. A sample item includes "When interacting with men in STEM who are my (subordinates, peers, supervisors), I feel like they interpret all my behaviors in terms of the fact that I am a woman in STEM" (see Appendix A, $\alpha = .76$). These items were assessed with a 5-point Likert scale (1=strongly disagree, 5=strongly agree).

Referent outgroup. Both the metastereotype content and consciousness scales were adapted to reflect how these measures vary as a function of the referent out-group. Specifically, I used a between subjects design to measure the metastereotype content and consciousness that women in STEM have with reference to their subordinates, peers, and supervisors. For example, participants in the subordinate condition completed the metastereotype content scale using the following directions: "For each of the traits below, please think of the stereotypes that MOST male subordinates/students hold regarding women in your profession. According to THEIR stereotypes of women in your profession, please indicate the extent to which each of the following traits is characteristic of women in your profession." A participant in that same condition responded to the metastereotype consciousness scale with reference to their subordinates. A sample item includes, "Most of my male subordinates do not judge women in STEM on the basis of their gender" (see Appendix A).

Impression management behavior. Impression management tactics refer to an actor's specific behaviors intended to elicit a favorable response from others (Bolino & Turnley, 1999). Focusing just on the self-promotion ($\alpha = .81$) and ingratiation ($\alpha = .77$) IM tactics, I adapted 6 items from Bolino and Turnley's (1999) Impression Management

in Organizations scale based on the Jones and Pittman's (1964) taxonomy. A sample self-promotion IM item is "Please respond to the following statements by thinking about how often, in the last 6 months, you have behaved this way while at work... Make people aware of your talents or qualifications." A sample ingratiation item is "Compliment your colleagues so they will see you as likable" (see Appendix A). These items were assessed with a 5-point Likert scale (1=never behaved this way, 5=often behave this way).

Supervisor perceptions. In order to test for the potential backlash effect, supervisors were asked to rate the extent to which they perceive the STEM woman in question to be likeable and competent. Adapted from Heilman and Okimoto's (2007) likeability measure, the scale contains three items. A sample item is "How much do you like this individual?" ($\alpha = .84$). The competence scale consists of 3 items that have been adapted from Fiske and colleagues' measure ($\alpha = .73$; see Appendix A). These items were assessed with a 7-point Likert scale (1=extremely uncharacteristic, 7=extremely characteristic). A sample item is "How competent is this individual?"

Impression management behavior. Impression management behaviors were also measured from the supervisor's perspective using the adapted Bolino and Turnley (1999) measure described above (self-promotion $\alpha = .91$, ingratiation $\alpha = .91$).

Factor analyses. Exploratory factor analyses (EFA) were conducted to identify, validate, and compute composite scores for the Metastereotype Content and Consciousness measures, which have not been previously validated. Initial eigenvalues from the results of the EFA for metastereotype content (warmth and competence) indicated that the first two factors explained 69.69% of the variance. The two-factor

solution was preferred because the eigenvalues leveled off on the scree plot after two factors and only the first two factors contained eigenvalues greater than 1. In addition, the two-factor solution supports and aligns with the expected warmth and competence factors.

An EFA was also conducted on the metastereotype consciousness scale using oblimin rotation. Given that the initial eigenvalues indicated that the first factor explained 51.24% of the variance, the eigenvalues leveled off after the first factor, and that previous theoretical research (e.g., Pinel, 1999) suggest metastereotype consciousness is only comprised of one factor, the one factor solution was preferred and no items were deleted from the scale.

RESULTS

Preliminary Analyses

Descriptives. Table 1 reports means, standard deviations, correlations, and reliabilities for each of the scales (see Appendix B for further detail).

Hypothesis Testing

Collinearity statistics were computed for each hypothesized relationship. These results are not presented unless multicollinearity is found to exist. Tables 2 and 3 provide summaries of the regression analyses described below.

Relationships between the referent outgroup and metastereotype content and metastereotype consciousness. To test hypotheses 1, 2, and, 3, separate regression analyses were conducted to examine the effects of the referent outgroup on the competence metastereotype, the warmth metastereotype, and metastereotype consciousness, respectively. None of the analyses were significant, thus failing to provide support for hypotheses.

Relationship between metastereotype content and impression management. To test the relationships between metastereotype content and impression management behaviors, four separate hierarchical regressions were conducted in which the hypothesized metastereotype content variables (i.e., metastereotype competence and/or warmth) were entered into the first step of the equations along with metastereotype

consciousness and the referent outgroup. The moderating effects of metastereotype consciousness and the referent outgroup were entered in the second step of the equations. Only the findings from the second step of the regression equations relevant to the hypotheses are presented in the results section, but the complete findings are presented in Tables 2b and 2c. I describe the relationships between metastereotype content and impression management behaviors and then discuss how these relationships are moderated by metastereotype consciousness and the referent outgroup.

Self-promotion. To assess whether competence metastereotypes negatively predict self-promotion (hypothesis 4), a multiple regression analysis was conducted. The overall model was significant ($R^2 = .14$, $F(5,129) = 2.34$, $p < .05$); however, the relationship between the competence metastereotype and self-promotion was not significant, thus failing to provide support for hypothesis 4 (see Table 2b).

Ingratiation. To test the hypotheses that competence metastereotypes are positively related to ingratiation (hypothesis 5), warmth metastereotypes are negatively related to ingratiation (hypothesis 6), and that there is an interaction effect between competence and warmth metastereotypes on ingratiation (hypothesis 7), a hierarchical regression was performed. The overall model was significant ($R^2 = .20$, $F(10,122) = 2.23$, $p < .05$) as were the following effects: warmth metastereotype, referent outgroup comparing subordinates to peers, competence metastereotype by warmth metastereotype interaction (see Table 2c). To elaborate, these findings failed to provide support for hypothesis 5 as the relationship between the competence metastereotype and ingratiation was not significant. In addition, hypothesis 6 was not supported because although the

effect was significant ($\beta = .30, t = 2.29, p < .05$), it was in the opposite direction of the hypothesis. Next, although not hypothesized, a significant relationship was found between the referent outgroup and ingratiation ($\beta = .19, t = 2.00, p < .05$). The plot of this effect reveals that STEM women engage in higher levels of ingratiation with their subordinates, followed by supervisors, and then peers (see Figure 2). Finally, a significant interaction between competence and warmth was found ($\beta = -.31, t = -3.00, p < .01$). The first plot does not support hypothesis 7 as the plot illustrates that when the competence metastereotype is low, the relationship between the warmth metastereotype and ingratiation is positive, but when the competence metastereotype is high, there is no relationship between warmth and ingratiation (Figure 3).

Moderators of the relationship between metastereotype content and impression management.

Metastereotype consciousness.

Self-promotion. Neither the interaction between metastereotypes competence and metastereotype warmth (hypothesis 8) nor metastereotype consciousness (hypothesis 9) significantly predicted self-promotion (see Table 2b).

Ingratiation. The interaction between the warmth metastereotype and metastereotype consciousness was significant (hypothesis 10, $\beta = -.41, t = 2.29, p < .05$, see Table 2c). A plot of the interaction reveals that when metastereotype consciousness is low the relationship between the warmth metastereotype and ingratiation is positive, but when metastereotype consciousness is high, the relationship between the warmth metastereotype and ingratiation is negative (see Figure 4). Although the relationship

between the warmth metastereotype and ingratiation is weaker when metastereotype consciousness is high, the direction of the relationship is negative rather than positive, suggesting that when women are highly conscious of metastereotypes, they are more likely to engage in ingratiation when they think others view them as low on warmth. This finding is in alignment with hypothesis 8 that when metastereotype consciousness is high, STEM women are more likely to engage in behaviors to counteract low warmth metastereotypes.

Referent outgroup.

Self-promotion. Although the overall model was significant ($R^2 = .13$ $F(2,134) = 5.87, p < .01$), none of the main effects or interaction terms were significant. The regression weight coefficients revealed that the interaction between the referent outgroup (supervisors vs. peers) and metastereotype competence was approaching significance ($\beta = -.22, t = -1.87, p = .06$). Therefore, a second hierarchical regression analysis was conducted in which only the main effects and interaction between referent outgroup and metastereotype competence were examined (see Table 2c). The overall model was significant ($R^2 = .13$ $F(2,134) = 5.87, p < .01$) as was the interaction between competence and the referent outgroup ($\beta = -.26, t = -2.54, p < .05$). A plot of the interaction indicates that when the referent outgroup is supervisors there is a negative relationship between competence and self-promotion; however, this relationship is positive when the referent outgroup is peers or subordinates (see Figure 5). This finding provides partial support for hypothesis 11 in that STEM women are more likely to engage in impression management

to counteract low competence metastereotypes, but only when supervisors are the referent outgroup.

Ingratiation. The interactions between the referent outgroup (peers vs. supervisors) with metastereotype competence (hypothesis 12) and metastereotype warmth (hypothesis 13) and were both significant ($\beta = .30, t = 2.29, p < .05, \beta = -.26, t = 2.29, p < .05$, respectively, see Table 2c). A graph of the interaction between metastereotype competence and the referent outgroup reveals that when the referent outgroup is supervisors, the relationship between metastereotype competence and ingratiation is positive, but when the referent outgroup is peers and subordinates, the relationship between metastereotype competence and ingratiation is negative (see Figure 6). This pattern of results provides partial support for hypothesis 12. Specifically, STEM women are most likely to avoid behaviors that may emphasize low competence metastereotypes when supervisors are the referent outgroup; however, when peers or subordinates are the referent outgroup, STEM women are more likely to engage in high levels of ingratiation in response to low metastereotype competence.

Next, a graph of the interaction between metastereotype warmth and the referent outgroup reveals that when supervisors are the referent outgroup, there is a negative relationship between metastereotype warmth and ingratiation, but a positive relationship when peers are the referent outgroup. Further, there is no relationship between the warmth metastereotype and ingratiation when subordinates are the referent outgroup (see Figure 7). These findings provide some support for hypothesis 13 as STEM women are

more likely to engage in ingratiation to counteract low warmth perceptions when supervisors are the referent outgroup.

Metastereotype consciousness and the referent outgroup. Given that the above findings provide evidence that metastereotype consciousness and the referent outgroup are moderators of the relationship between metastereotype content and impression management behaviors, the interaction between metastereotype consciousness and the referent outgroup on impression management behaviors as well as the three-way interaction between metastereotype content, metastereotype consciousness, and the referent outgroup were examined as exploratory hypotheses. Only the significant effects are reported below.

Ingratiation. There was a significant three-way interaction between the warmth metastereotype, metastereotype consciousness, and the referent outgroup ($\beta = .29$, $t = 2.18$, $p < .05$). The three-way interaction is plotted in two graphs to separately examine the interaction between the warmth metastereotype and the referent outgroup for levels of low metastereotype consciousness (one standard deviation below the mean) and high metastereotype consciousness (one standard deviation above the mean, Figures 8 and 9, respectively). When metastereotype consciousness is low, there is a positive relationship between warmth metastereotypes and ingratiation for peers and a negative relationship for subordinates and supervisors. When metastereotype consciousness is high, however, there is a positive relationship between warmth metastereotypes and ingratiation for subordinates and a negative relationship for peers and supervisors.

Relationship between impression management and supervisor ratings.¹ To test the relationships between impression management behaviors and supervisor ratings of competence and likeability, two hierarchical regressions were conducted in which the supervisor ratings of impression management behaviors (i.e., self-promotion, ingratiation) were entered into the first step of the equations. The hypothesized interactions between these impression management behaviors were entered in the second step of the equations.

Supervisor competence ratings. With supervisor ratings of competence as the dependent variable, the overall model was not significant ($R^2 = .63$, $F(6,16) = 2.59$, $p = .06$). Indeed, the correlation between these interaction effects was very high ($r = .91$, $p < .01$).

The overall model for the hierarchical regression was significant ($R^2 = .64$, $F(6,16) = 8.58$, $p < .01$, see Table 3). Contrary to hypothesis 14 self-promotion was negatively related to supervisor ratings of competence ($\beta = -.34$, $t = 2.18$, $p < .05$). In addition, hypothesis 17 was not supported as ingratiation was positively related to supervisor ratings of competence ($\beta = .31$, $t = 2.18$, $p < .05$).

Supervisor likeability ratings. Next, the overall model when supervisor likeability ratings was the dependent variable was not significant ($R^2 = .46$, $F(6,16) = 1.06$, $p = .43$). The overall model was significant ($R^2 = .55$, $F(3,30) = 5.34$, $p < .01$). In support of hypotheses 15 and 16, respectively, self-promotion was negatively related ($\beta = -.34$, $t = 2.18$, $p < .05$) and ingratiation was positively ($\beta = .53$, $t = 2.18$, $p < .01$) related to supervisor likeability ratings.

Moderators of the relationship between impression management and supervisor ratings.

Supervisor competence ratings. The results provided evidence that self-promotion (hypothesis 18, $\beta = .57$, $t = 2.18$, $p < .01$) moderated the relationship between ingratiation and supervisor competence ratings. An examination of the plot of the interaction between self-promotion and ingratiation (see Figure 10) indicates that when self-promotion is low, the relationship between ingratiation and supervisor perceptions of competence is negative, but when self-promotion is high, the relationship between ingratiation and supervisor perceptions of competence is negative, thus providing support for hypothesis 18 that engaging in high levels of self-promotion can help to offset the negative relationship between ingratiation and supervisor ratings of competence.

Supervisor likeability ratings. The only significant interaction effect on supervisor likeability ratings is between self-promotion and ingratiation (hypothesis 19, $\beta = .56$, $t = 2.18$, $p < .01$). A plot of the significant interaction effect between self-promotion and ingratiation illustrates that when ingratiation is low, there is a negative relationship between self-promotion and supervisor likeability ratings, but this relationship becomes null when ingratiation is high (see Figure 11). This finding supports hypothesis 19 in that engaging in high levels of ingratiation may help to offset the negative influence that engaging in high levels of self-promotion has on supervisor likeability ratings.

Exploratory Analyses

Several post-hoc analyses were conducted to assess the extent to which the results were influenced by factors other than theoretical processes specified. First, I examined whether there were substantive differences between participants who had a matched supervisor response and participants whose supervisors did not complete the survey. Six independent sample t-tests were conducted to compare differences between the two groups of participants (supervisor completed survey vs. supervisor did not complete survey) on the participant (non-supervisor) variables in the study (referent outgroup, metastereotype competence, metastereotype warmth, metastereotype consciousness, self-promotion, and ingratiation). The results of these analyses indicate that there were no significant differences in scores on the participant variables for STEM women whose supervisors completed the survey and STEM women whose supervisors did not (see Table 4).

Second, I assessed the role of STEM women's self-rated competence in relation to other study variables. Self-rated competence is considered because it is possible that STEM women's *own* perceptions of their competence and not their perceptions of how their supervisors perceive them are driving their behaviors and supervisor perceptions. To this end, I examined the correlations between self-rated competence and the study variables. Self-rated competence was measured as a control variable using Fiske et al.'s aforementioned (2002) scale. A sample item is "Please indicate the extent to which each of the following traits is characteristic of you: Competent" (1= extremely uncharacteristic, 7= extremely characteristic; $\alpha = .82$). Self-rated competence was positively correlated with metastereotypes competence ($r = .21, p < .05$), self-promotion

($r = .18, p < .05$), and supervisor ratings of self-promotion ($r = .39, p < .05$), and it was negatively related to metastereotype consciousness ($r = -.18, p < .05$), ingratiation ($r = -.27, p < .01$).

DISCUSSION

The goal of the current research was to examine the linkages between STEM women's cognitions and behaviors as well as the supervisor reactions elicited from these behaviors. In general, the findings suggest that metastereotypes, metastereotype consciousness, and the referent outgroup play a role in the expression of impression management behaviors. Further, the results provide evidence that some impression management behaviors may have a negative influence on supervisor evaluations. Finally, the results suggest that combinations of impression management behaviors may help to offset negative supervisor evaluations. An elaboration of the findings and their implications for theory and practice are discussed below.

Implications for Antecedents of Impression Management Behaviors

Metastereotypes. The first major pattern of results demonstrates that certain types of metastereotypes are related to impression management behaviors in unanticipated ways. Specifically, the findings suggest that STEM women tended to engage in behaviors (i.e., ingratiation) that were consistent with rather than counteractive to their warmth metastereotypes. Competence metastereotypes were, however, unrelated to impression management behaviors. These unexpected findings are explained in the sections below in which I highlight the moderating effects of metastereotype consciousness and the referent outgroup on impression management.

Metastereotype consciousness. First, the results suggest that impression management behaviors are influenced by the extent to which STEM women are conscious of how they are stereotyped by others. In alignment with original predictions, STEM women who were more conscious of how others stereotyped them were more likely to engage in behaviors to counteract the low warmth metastereotype (i.e., ingratiation), while women who were not highly conscious of metastereotypes were more likely to engage in behaviors that align with their metastereotype. This means that warmth metastereotypes are positively related to ingratiation only when STEM women are not self-conscious of metastereotypes.

These results may be explained by the metastereotype activation literature, which suggests that when metastereotypes are activated, or individuals are thinking about how the outgroup views the ingroup (Vorauer et al., 2000), they become more concerned with how they present themselves to others (Klein & Azzi, 2001; van Leeuwen & Tauber, 2012). Applying this research to the current study, metastereotype activation is conceptually similar to metastereotype consciousness in that they both reflect an awareness of metastereotypes. Further, when STEM women were highly conscious of metastereotypes, they were more likely to worry about how others viewed them, and therefore, they were more likely to behave in a reactionary manner against negative metastereotypes (e.g., Kray et al., 2001). Although metastereotype consciousness clarified the unanticipated relationship between warmth metastereotypes and impression management, it did not account for the null relationship between competence metastereotypes and these behaviors.

The referent outgroup. A second moderator, the referent outgroup, helps to elucidate the relationship between both warmth and competence metastereotypes and their relationship with impression management. The results paint varying pictures depending on whether the referent outgroup is supervisor, peers, or subordinates. When the referent outgroup was supervisors, STEM women were more likely to engage in behaviors to offset less desirable metastereotypes. Specifically, when STEM women perceived that they were viewed as low on competence by their supervisors, they were more likely to engage in self-promotion and less likely to engage in ingratiation. Further, to counteract perceptions that supervisors stereotype them as cold, STEM women also demonstrated a tendency to engage in ingratiation. These findings are in alignment with earlier predictions that STEM women will combat stereotypes that male supervisors perceive them as low on competence and warmth. These results are also congruent with recent research on compensatory behaviors to counteract interpersonal discrimination (Singletary & Hebl, 2009). Specifically, providing counterstereotypical individuating information (i.e., women using self-promotion or ingratiation) may be used not only as a buffer to negative metastereotypes, but also as a proactive strategy to reduce potential discrimination.

In contrast, when peers were the referent outgroup, STEM women demonstrated a tendency to engage in behaviors that were consistent with the metastereotype. Specifically, perceptions of high competence corresponded with high levels of self-promotion. At the same time, however, the results suggested that STEM women also engaged in behaviors (i.e., ingratiation) that may exacerbate peers' perceptions of low

competence. Together, contrary to the hypothesized predictions, these findings imply that STEM women do not engage in behaviors to compensate for undesirable metastereotypes when peers are the outgroup. These results may reflect that STEM women are less concerned with managing how their peers view them in comparison to their supervisors. Specifically, given that supervisor perceptions, and ultimately evaluations, are more likely to have a significant impact on an individual's "resources (e.g., budget) and rewards (e.g., salary increases and promotions)" (Ashford & Tsui, 1991) than peer perceptions, STEM women may put less effort in trying to alter the opinions of their peers.

In comparison to the supervisors and peers, when subordinates were the referent outgroup, the findings illustrated a more ambiguous pattern of results. Specifically, STEM women engaged in behaviors that were consistent, counteractive, and unrelated to the metastereotype. In the case of competence metastereotypes, STEM women were more likely to engage in behaviors that were congruent (i.e., self-promotion) with how they think subordinates stereotyped them. Unexpectedly, as was the case when peers were the referent outgroup, low competence metastereotypes corresponded to high levels of ingratiation. As a whole, engaging in behaviors that demonstrate warmth (i.e., ingratiation) toward subordinates seemed to be important--STEM women exhibited these behaviors in response to low warmth *and* low competence. These findings are consistent with social role theory of sex differences in which communal characteristics are ascribed to women (Eagly, Wood, & Diekmann, 2000), and as an effort to appease subordinates and avoid negative reactions to being agentic, women employ more interpersonally oriented

and democratic leadership styles (Eagly & Johnson, 1990; Eagly & Johannesen-Schmidt, 2001).

Metastereotype consciousness, the referent outgroup, and metastereotypes. In addition to the separate moderating effects of metastereotype consciousness and the referent outgroup, there was also evidence of a three-way interaction, revealing that warmth metastereotypes, metastereotype consciousness and the referent outgroup interacted to have an influence on ingratiation. Specifically, these findings shed light on the conditions under which STEM women engaged in impression management that was either consistent or incongruous with warmth metastereotypes. First, regardless of metastereotype consciousness level, the results suggest that STEM women strive to engage in behaviors to offset perceived negative stereotypes from supervisors. Indeed, these results provide further corroboration for the above findings that STEM women engage in compensatory behaviors to counteract negative metastereotypes from supervisors. The finding that STEM women engage in compensatory behaviors toward supervisors regardless of metastereotype consciousness level extends these results. This finding may be explained by drawing from recent implicit social cognition literature (Gawronski & Bodenhausen, 2006; Strack & Deutsch, 2004) and evidence that implicit in-group stereotypes as well as explicit in-group stereotypes influence behaviors (Nosek & Smyth, 2011). Specifically, although STEM women may not be highly self-conscious of how their supervisors stereotype them, they may still hold implicit metastereotypes (i.e., metastereotypes that they are unconscious or not readily aware of), and in turn, implicit low warmth metastereotypes may result in reliance on ingratiation.

These findings also provide further elaboration on the relationship between metastereotype content and impression management when the referent outgroup is peers. Specifically, it was originally concluded that, contrary to earlier predictions, STEM women engage in behaviors toward peers that are consistent with the metastereotype as they may not be motivated to manage potentially negative impressions from peers. In alignment with the original hypotheses, however, there is evidence that STEM women do engage in behaviors toward peers to thwart negative metastereotypes, but only when they are highly conscious of these metastereotypes. Again, these findings provide further corroboration that metastereotype activation (or consciousness) engenders distress about self-presentation, and thus results in engagement in warmth demonstrating behaviors to reduce low warmth metastereotypes (e.g., van Leeuwen & Tauber, 2012).

In comparison to the peer referent outgroup, when subordinates were the referent outgroup an opposite pattern of results emerged. Specifically, when metastereotype consciousness was low, STEM women reported engaging in behaviors (i.e., high ingratiation) to offset *low* warmth metastereotypes; however, under levels of high metastereotype consciousness, STEM women were more likely to exhibit impression management that was consistent (i.e., high ingratiation) with *high* metastereotypes.

Implications for Antecedents of Supervisor Perceptions

Beyond STEM women's own perceptions and reports, it is also critical to consider how others view STEM women. The results revealed that supervisor perceptions of their subordinates are in some cases negatively influenced by STEM women's impression management behaviors. Specifically, when supervisors perceived that their

subordinates engaged in self-promotion, the subordinates were also perceived as less competent and less likeable, thus providing support for the backlash effect, or the negative consequences faced by women who violate their gender roles by engaging in counter-stereotypic behaviors (Rudman, 1998). Other behaviors that aligned to gender roles were positively associated with supervisor perceptions. For instance, ingratiation was positively related to likeability. Unexpectedly, ingratiation was positively related to supervisor ratings of competence. This relationship is not, however, unprecedented, as ingratiation has been described as a “power-enhancing and dependence-reducing strateg[y]” (Kumar & Beyerlein, 1991) and linked to positive supervisor performance evaluations (Kipnis & Schmidt, 1988; Pandey & Kakkar, 1982; Watt, 1993). To extend the literature on gender and impression management, I also examined conditions that may reduce the backlash effect.

Mitigating the backlash effect. In addition to the aforementioned main effects, I explored the extent to which engaging in combinations of impression management behaviors would influence supervisor ratings. First, the combination of high ingratiation with high self-promotion was positively linked to supervisor competence perceptions; however, high-levels of self-promotion were related to lower competence ratings when ingratiation was low, suggesting that high levels of ingratiation are necessary to positively influence supervisor impressions of competence. Finally, the interaction between self-promotion and ingratiation did provide evidence that STEM women can engage in behaviors to attenuate the backlash effect. Specifically, the negative influence of high levels of self-promotion on likeability was buffered when women engaged in high

levels of ingratiation. This finding is consistent with previous research that the backlash effect may be mitigated (Heilman & Okimoto, 2007; Shaughnessy et al. 2011) when women engage in competence- and warmth-demonstrating behaviors simultaneously. As a whole, this research sheds light on STEM women's experience at work by specifically highlighting the influence of metastereotypes on impression management; underscoring the key moderating role of metastereotype consciousness and the referent outgroup in the relationship between metastereotypes and behaviors; examining supervisor reactions to impression management behaviors; and exploring circumstances that may attenuate negative supervisor perceptions.

Theoretical Implications

The findings from the current research have theoretical implications for several diverging literatures relating to (a) the experiences of STEM women, (b) the role of metastereotypes and impression management in an academic context, (c) the metastereotype literature, (d) the impression management literature, and (e) the backlash effect. First, the results of the current study contribute to the women in STEM literature that is largely missing from organizational science. Specifically, despite the growing demand for employees in STEM (Bardsley, 2008), organizational scholars (e.g., Blake-Beard et al., 2011) are just beginning to make inroads in examining individuals, especially women, in this burgeoning field (Kerr et al., 2012). This presents a critical gap in the field as STEM occupations present women with a unique challenge in which women are the minority in nearly every echelon of the organization. These findings also have implications for women who work in counterstereotypical industries.

Second, this study is unique in that the vast majority of participants were employed in academic professions. Given the unique relationship that academics have with their department chair (i.e., their supervisors) and their graduate students (i.e., their graduate students), this research provides a novel examination of the processes through which metastereotypes may influence behavior, and ultimately supervisor evaluations. Future research should also examine non-academic populations to further understand the extent to which the findings of the current study are unique to academe or translate to other settings.

Third, the present research has theoretical implications for the metastereotype literature by examining the critical moderating role of metastereotype consciousness and the referent outgroup. Indeed, the current study underscores the importance of metastereotype consciousness in predicting the extent to which individuals will engage in behaviors to counter negative metastereotypes. Specifically, metastereotypes tended to have the greatest impact on impression management behaviors when STEM women were self-conscious of them. Further, the current study provides an extension of Pinel's (1999) stigma consciousness work by demonstrating that rather than foregoing the opportunity to invalidate negative stereotypes, individuals who possess high metastereotype consciousness are likely to react against negative metastereotypes to positively influence others' perceptions (Kray et al., 2001).

The current study also contributes to the metastereotype literature by further investigating the metastereotype referent outgroup. Although the role of the referent outgroup has been discussed (Vorauer et al., 1998) and the influence of power (Lamers et

al., 2008) has been examined in the context of metastereotyping, this study provides the first attempt to overlay both concepts by specifically investigating the role of referent outgroups with varying levels of power. The current study suggests that individuals may respond differently to metastereotypes depending on the referent outgroup. Most importantly, the results suggest that STEM women are most likely to engage in behaviors to counter negative metastereotypes when supervisors are the referent outgroup.

Fourth, the findings from this research have implications for the impression management literature. Consistent with research on the relationship between impression management and evaluations (Orpen, 1996; Proost et al., 2010), STEM women's use of ingratiation was successful for both supervisor competence and likeability ratings. The impression management literature is contradicted and extended by the findings that self-promotion was negatively related to supervisor competence and likeability evaluations and the combination of these behaviors helped to offset the negative effects of self-promotion.

The expansion of the impression management literature may also include the merging of this literature with the backlash effect literature. Consistent with the literature that self-enhancing behaviors are inconsistent with female gender roles (see Guadagno & Cialdini, 2007) and that engaging in such behaviors will likely result in a backlash effect, such as lower supervisor ratings of likability (Rudman, 1998; Rudman & Fairchild, 2004; Rudman et al., 2012), supervisor ratings of self-promotion resulted in backlash in the form of lower likeability ratings. A major extension upon this theory is that behaviors that demonstrating warmth (i.e., ingratiation) may help to offset the backlash effect. The

process through which backlash reduction occurs should be investigated in future research.

Practical Implications

In addition to the theoretical implications of the current study, these findings also present practical value. First, STEM institutions should be cognizant that women often represent the numerical minority in their place of work (National Science Board, 2008) and that this context may trigger various metastereotypes as well as reactions in the form of impression management.

An additional finding of practical significance is that STEM women engage in behaviors to reduce negative metastereotypes when supervisors are the referent outgroup, but supervisor perceptions of these behaviors may not always result in favorable ratings. Specifically, STEM women demonstrated a tendency to engage in self-promotion in response to anticipated low competence perceptions from their supervisors. In turn, supervisor perceptions of these behaviors had the unanticipated effect of exhibiting a negative relationship with supervisor ratings of likeability and competence. Fortunately, the current study also illustrated that low likeability and competence ratings in response to self-promotion may be mitigated by high levels of ingratiation. The practical implications of these findings are two-fold. First, the results suggest that STEM women may find a balance between demonstrating behaviors that are congruent with their occupational role as well as their gender role. At the same time, however, STEM women have the delicate task of managing their impressions with different outgroups in an effort to balance perceptions of competence and warmth. Second, to put the onus on

supervisors, institutions may offer supervisor evaluation training that provides edification on stereotypes and the potential for biased ratings.

Limitations

Despite the merits of the current study, it is not without limitations. First, there was minimal variance on several key variables, and perhaps most importantly, the supervisor sample size was relatively small, especially for analyzing interaction effects, suggesting that the current sample may not be representative of the possible range of responses. For instance, STEM women and their supervisors had a tendency to use low ratings on all of the impression management behaviors. Further, supervisors rated their subordinate extremely positively on likeability and competence. As such, the results may be magnified or altered with a more variable sample.

In addition, given that all data were collected through surveys without any consistent time lag in between responses, causality cannot be inferred. Exploratory analyses were conducted to assess alternative causal explanations for the findings. Specifically, the extent to which self-rated competence was driving the other variables was examined. The results indicated that self-rated competence does share some variance with metastereotype competence, but that these variables are unique, indicating that STEM women's perceptions of how others' view them are not necessarily the same as how they view themselves. Further, although self-rated competence was related to supervisor perceptions of self-promotion, it was not related to supervisor competence or likeability ratings. Given these relationships, although it is not possible to rule out other alternative explanations, it is reasonable to deduce that supervisor evaluations were not

influenced by self-rated competence. Although a true experiment would be necessary to make causal inferences, this research provides the groundwork for conducting a laboratory or experimental field study in which impression management behaviors and their effect on supervisor evaluations may be observed.

Further, the current study only examined metastereotypes as a function of male referent outgroups. I set this boundary condition because in terms of women's gender identity, other women most likely constitute their ingroup. Specifically, metaperception research suggests that when interaction partners are ingroup members, individuals expect that their self-stereotypes will be consonant with how others' stereotype them. Conversely, people expect outgroup members' stereotypes about them to diverge from their self-stereotypes (Robinson, Keltner, Ward, & Ross, 1995). Therefore, I expect that the STEM women's metastereotype content for men will reveal more unique information than their metastereotype content for women.

A second study parameter related to gender is that the experiences of STEM women were not compared to their male counterparts. Given that the impression management and backlash literatures offer different consequences for engaging in self-promotion and ingratiation, I expect that there would be meaningful differences between a male and female STEM sample. Specifically, I would anticipate that the pattern of results for the male sample would be in greater alignment with the impression management literature than the backlash literature. Future research should examine how the relationships between metastereotypes, behaviors, and evaluations differ among male and female samples.

A third stipulation related to limiting the sample to STEM women is that the pattern of the results may apply to a broader population than women in STEM. Specifically, people in general may expect their supervisors to perceive them as warm, but less competent and their subordinates to view them as competent, but cold. While the relationship between metastereotype content and impression management may be generalizable to other samples, the results of the current study provide evidence that the findings on the relationship between impression management and supervisors ratings are more specific to women in male-dominated fields. Specifically, given that previous impression management research demonstrates the self-promotion is generally beneficial to evaluations (Bolino & Turnley, 2003b; Orpen, 1996; Proost et al., 2010), the current study findings that self-promotion was negatively related to supervisor evaluations suggest that the current sample is distinct from the general population. Future research should be conducted to validate this supposition by examining not only STEM women's male counterparts, but also their male and female counterparts and non-STEM related fields.

In addition to the potential limitations of the method, it is also important to address alternative explanations to the findings of the current study. First, one possible reason that the results varied depending on the referent outgroup is that STEM women may have a greater tendency to interact with their subordinates and peers than their supervisors. As such, STEM women may be more able, and therefore more likely, to counteract undesirable metastereotypes with IM behaviors when engaging with their supervisors who they interact less frequently with than their peers or subordinates.

Although data was not collected to assess the validity of this supposition, I still maintain that at least a portion of the variance to explain the moderating effect of the referent outgroup on the relationship between metastereotype content and IM behavior is that STEM women are more motivated to present a positive impression on supervisors than subordinates or peers. Indeed, as aforementioned, individuals with less relative power are motivated to engaging in metastereotyping (Vorauer et al., 2000) and are therefore more likely to engage in impression management behaviors to counter the undesirable metastereotypes (Kray et al., 2001).

CONCLUSION

The present study examined STEM women's metastereotypes as predictors of impression management behaviors, and the impact of these behaviors on supervisor perceptions. In addition to these relationships, the referent outgroup (subordinates, peers, and supervisors) as well as metastereotype consciousness were examined as moderators. Several important findings emerged. First, results indicate that the relationship between metastereotypes and impression management behaviors is dependent on the referent outgroup. Second, analyses suggest that metastereotype consciousness influences the relationship between both metastereotypes and referent outgroup on impression management. Finally, the findings indicate that impression management may result in a backlash effect in the form of negative supervisor likeability perceptions; however, this backlash may be mitigated when STEM women engage in impression management that conveys warmth (i.e., ingratiation). Results of the current study shed light not only on the experiences of STEM women, but also contribute to the extant literature on the implications of self and other perceptions. It is important to equip targets, actors, and organizations with an understanding of the implications of metastereotypes for STEM women. Attention to these issues may help to guide the development of strategies and interventions to attract and retain gifted STEM women.

Table 1. Means, Standard deviations, and Correlations among Study Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10
1. Referent Outgroup	--	--										
2. CM	3.50	.79	-.06	.79								
3. WM	3.63	.78	.02	-.02	.73							
4. MC	3.01	.90	-.11	-.36**	-.20*	.76						
5. Self-promotion	3.08	.93	-.14	.15	.02	.07	.81					
6. Ingratiation	2.89	1.01	-.08	-.02	.04	-.04	.28**	.77				
7. SR: Self-Promotion	3.23	1.19	-.11	-.07	.25	-.04	.02	.25	.91			
8. SR: Ingratiation	2.62	1.23	-.15	.25	.02	-.09	.19	.24	.36*	.91		
9. SR: Likeability	5.89	1.58	.11	.08	-.09	-.17	.15	.16	-.13	.41**	.84	
10. SR: Competence	5.85	1.56	.19	.14	-.02	-.19	.21	.17	-.09	.36*	.86**	.73

Note. * $p < .05$. ** $p < .01$. Coefficient alphas are listed on the diagonal in parentheses. CM= Competence Metastereotype. WM= Warmth Metastereotype. MC= Metastereotype Consciousness. SR=Supervisor Rating. **Bold** indicates reliability of the scale (along the diagonal). Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

Table 2a. Summary of Regression Analyses of Relationships among Subordinate Variables

Independent Variable	Dependent Variable								
	Competence Metastereotype			Warmth Metastereotype			Metastereotype Consciousness		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Referent Outgroup									
Subordinate s vs. Peers	.04	.16	.03	-.06	.15	-.04	.07	.18	.03
Supervisors vs. Peers	-.09	.16	-.05	-.02	.16	-.01	-.20	.19	-.10
R^2			.00			.00			.01
F for Δ in R^2			.31			.08			.96

Note: * $p < .05$. ** $p < .01$. Referent Outgroup was represented as two dummy variables with peers serving as the reference group. In the case of moderated regression, the independent variables and moderators were centered at their means.

Table 2b. Summary of Hierarchical Regression Analysis for Variables Predicting Self-Promotion

Independent Variable	Dependent Variable					
	Self-Promotion					
	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
Competence Metastereotype	.22	.11	.19*	.30	.15	.26
Warmth Metastereotype	.07	.10	.06	.09	.10	.07
Referent Outgroup Subordinates vs. Peers	.32	.18	.16	.33	.18	.17
Supervisors vs. Peers	.05	.20	.02	-.01	.19	.00
Metastereotype Consciousness	.15	.10	.14	.11	.10	.10
Competence Metastereotype x Referent Outgroup Subordinates vs. Peers			--	.20	.23	.10
Supervisors vs. Peers			--	-.59	.24	-.26*
Competence Metastereotype x Warmth Metastereotype				-.10	.11	-.07
R^2			.07			.14
F for Δ in R^2			1.89			3.78**

Note: * $p < .05$. ** $p < .01$. Referent Outgroup was represented as two dummy variables with peers serving as the reference group. In the case of moderated regression, the independent variables and moderators were centered at their means.

Table 2c. Summary of Hierarchical Regression Analysis for Variables Predicting Ingratiation

Independent Variable	Dependent Variable					
	Ingratiation					
	Model 1			Model 2		
	<i>B</i>	<i>SE B</i>	β	<i>B</i>	<i>SE B</i>	β
CM	-.05	.12	-.04	-.21	.18	-.17
WM	.04	.11	.03	.38	.16	.30*
MC	-.06	.11	-.05	-.11	.16	-.10
RO						
Dummy 1	.31	.20	.14	.40	.20	.19*
Dummy 2	.05	.21	.02	.21	.21	.10
CM x WM	-.23	.12	-.20*	-.44	.15	-.31**
CM x RO						
Dummy 1		--		-.13	.27	-.06
Dummy 2		--		.73	.28	.30*
WM x RO						
Dummy 1		--		-.44	.27	-.19
Dummy 2		--		-.63	.29	-.26*
CM x MC		--		.15	.13	.12
WM x MC		--		-.55	.25	-.41*
MC x RO						
Dummy 1		--		.02	.26	.01
Dummy 2		--		.15	.25	.08
MW x MC x RO						
Dummy 1		--		.79	.36	.29*
Dummy 2		--		.44	.31	.25
R^2			.06			.20
F for Δ in R^2			1.36			2.23*

Note: * $p < .05$. ** $p < .01$. Referent Outgroup was represented as two dummy variables with peers serving as the reference group. CM=Competence Metastereotype. WM= Warmth Metastereotype. MC= Metastereotype Consciousness. RO= Referent Outgroup. Dummy 1= Subordinates v. Peers. Dummy 2= Supervisors vs. Peers. In the case of moderated regression, the independent variables and moderators were centered at their means.

Table 3. Summary of Hierarchical Regression Analysis for Variables Predicting Supervisor Competence and Likeability Perceptions

	Dependent Variable											
	Competence- Supervisor IM						Likeability- Supervisor IM					
	Model 1			Model 2			Model 1			Model 2		
	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β	<i>B</i>	<i>SE</i>	β
IV												
	<i>B</i>			<i>B</i>			<i>B</i>			<i>B</i>		
SP	-.61	.23	-.46*	-.49	.18	-.37*	-.54	.24	-.40*	-.46	.21	-.34*
IN	.42	.23	.32	.39	.18	.30*	.70	.24	.52**	.71	.20	.53*
												*
SP		--		.60	.14	.57*		--		.60	.16	.56**
x						*						
IN												
R^2			.33			.64			.31			.55
F			4.08**			8.58 **			3.75*			5.34**
for												
Δ												
in												
R^2												

Note: Referent Outgroup was represented as two dummy variables with peers serving as the reference group. In the case of moderated regression, the independent variables and moderators were centered at their means. IV = Independent Variable. SP= Self-Promotion. IN = Ingratiation. Competence-Subordinate IM refers to the regression of supervisor competence ratings on subordinate self-ratings of impression management behaviors. Competence-Supervisor IM refers to the regression of supervisor competence ratings supervisor ratings of subordinate's impression management behaviors. * $p < .05$. ** $p < .01$.

Table 4. Summary of Independent Sample T-tests Comparing STEM Women in Supervisor Response vs. Non-response Condition

Participant Variable	Supervisor Completed Survey	Mean	<i>t</i>
Referent	Yes	1.79	-1.21
Outgroup	No	1.98	
Metastereotype	Yes	3.47	-.22
Competence	No	3.51	
Metastereotype	Yes	3.77	1.01
Warmth	No	3.60	
Metastereotype	Yes	3.12	.78
Consciousness	No	2.97	
Self-Promotion	Yes	3.11	.34
	No	3.04	
Ingratiation	Yes	2.94	.23
	No	2.89	

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

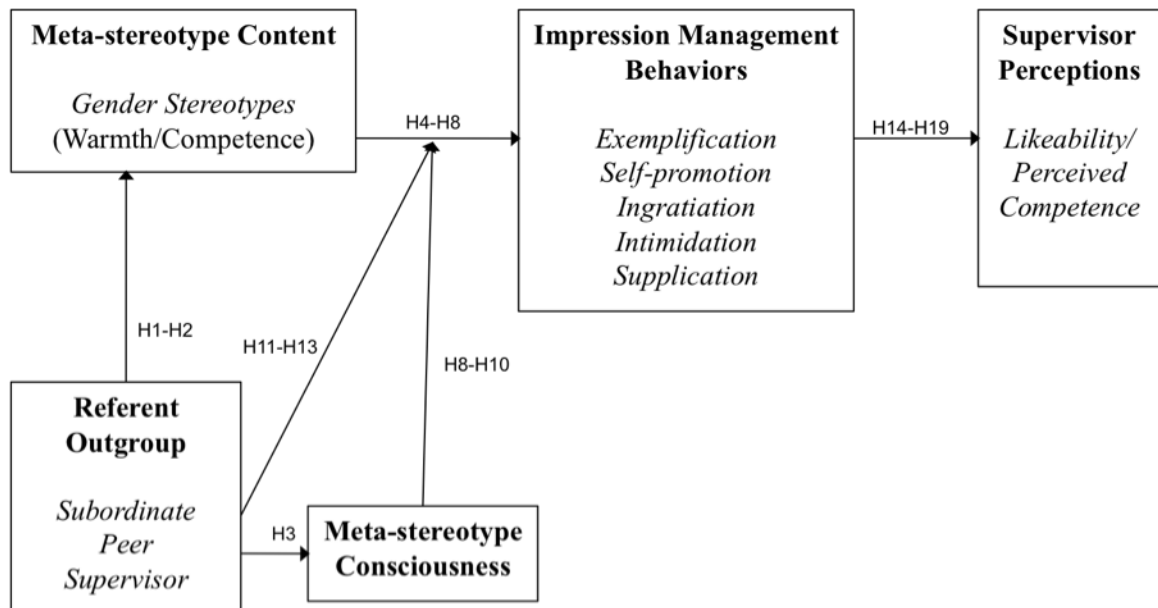


Figure 1. Hypothesized Model

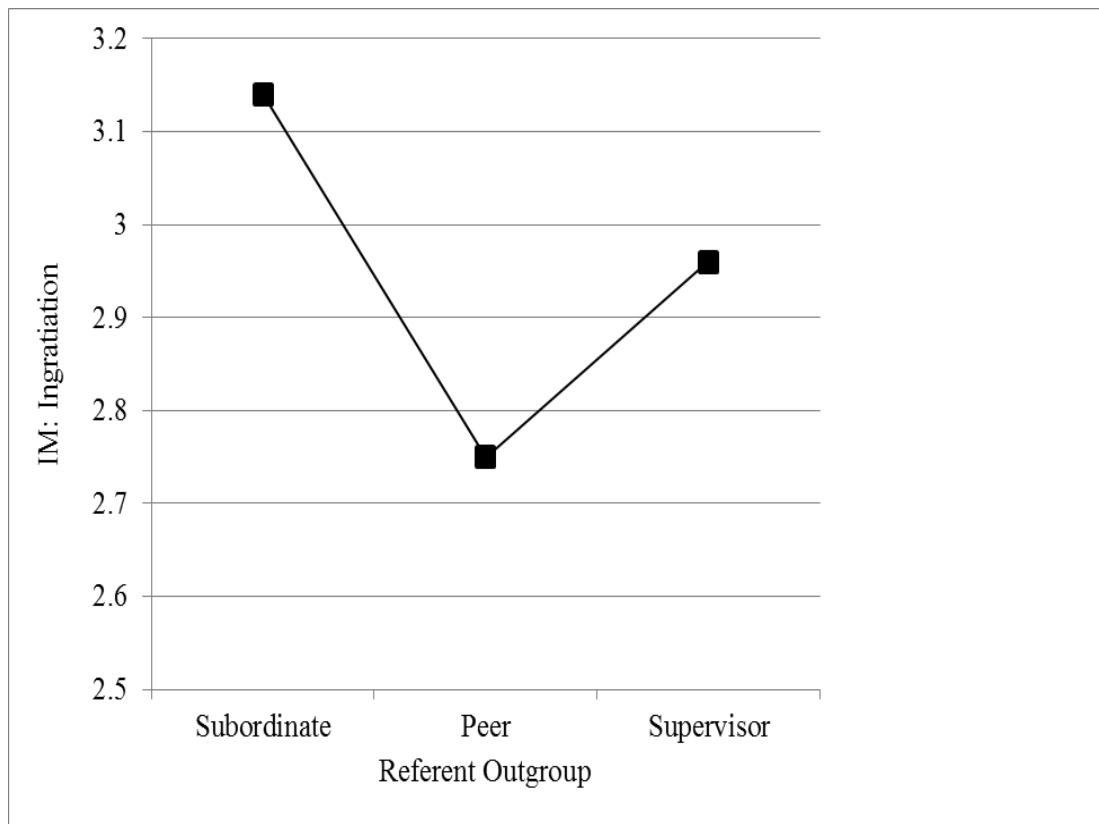


Figure 2. Graph of the relationship between the referent outgroup and STEM women's ratings of ingratiation

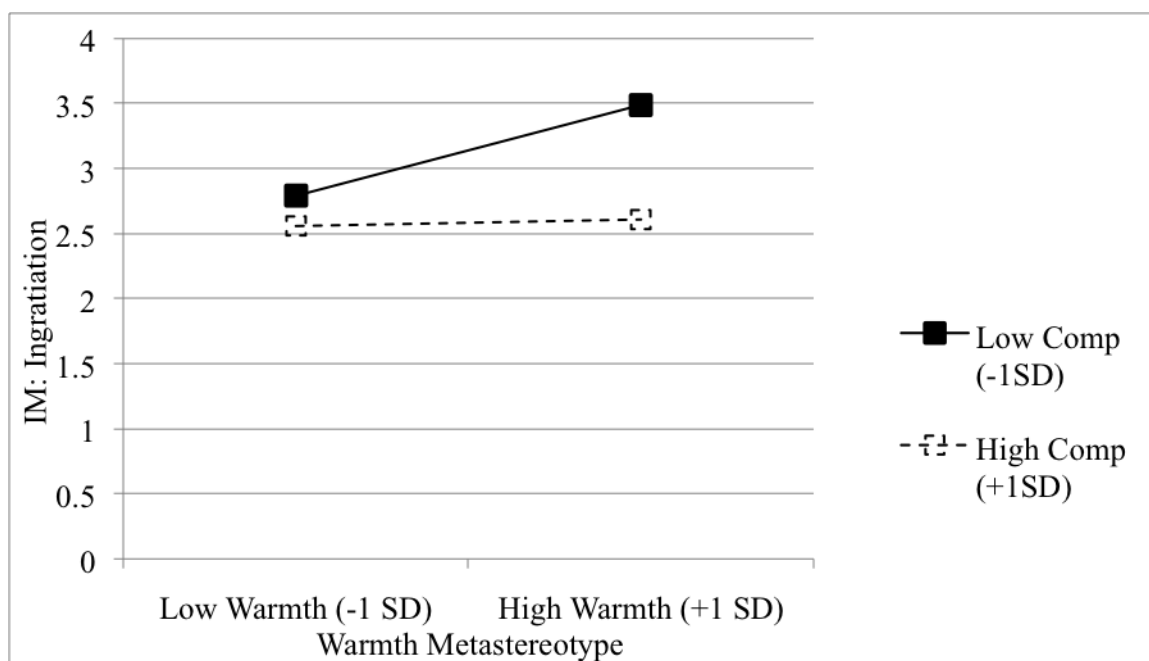


Figure 3. Graph of the interaction between warmth metastereotypes and competence metastereotypes on STEM women's ratings of ingratiation.

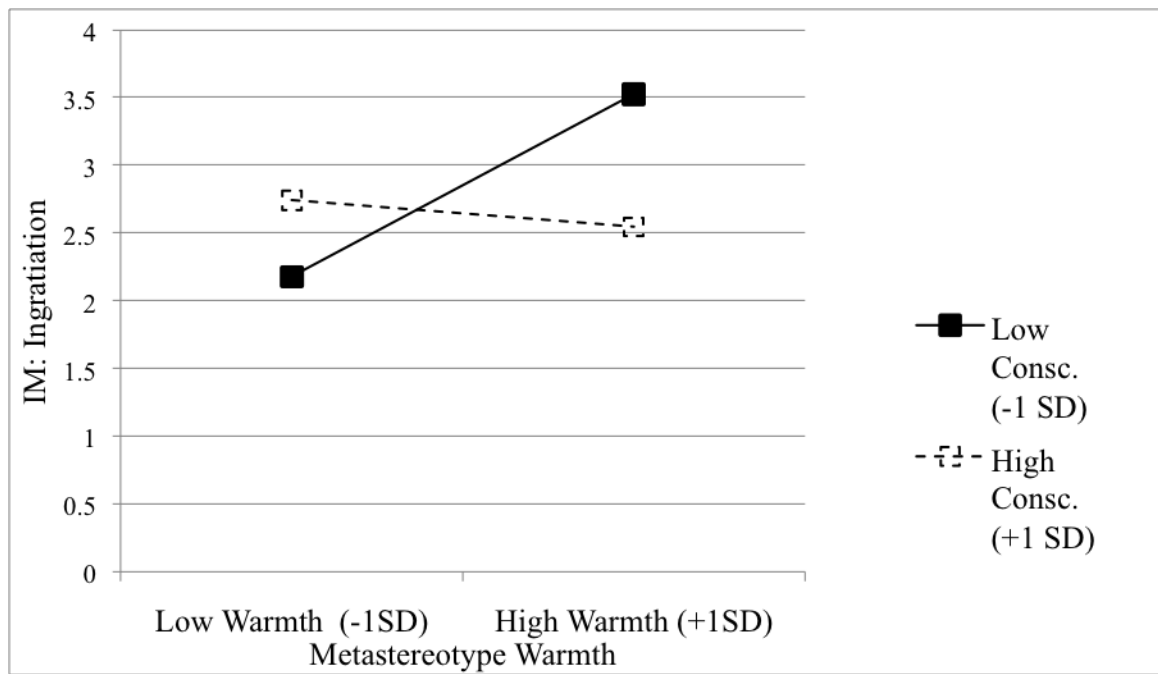


Figure 4. Graph of the Interaction between warmth metastereotype and metastereotype consciousness on STEM women's ratings of ingratiation.

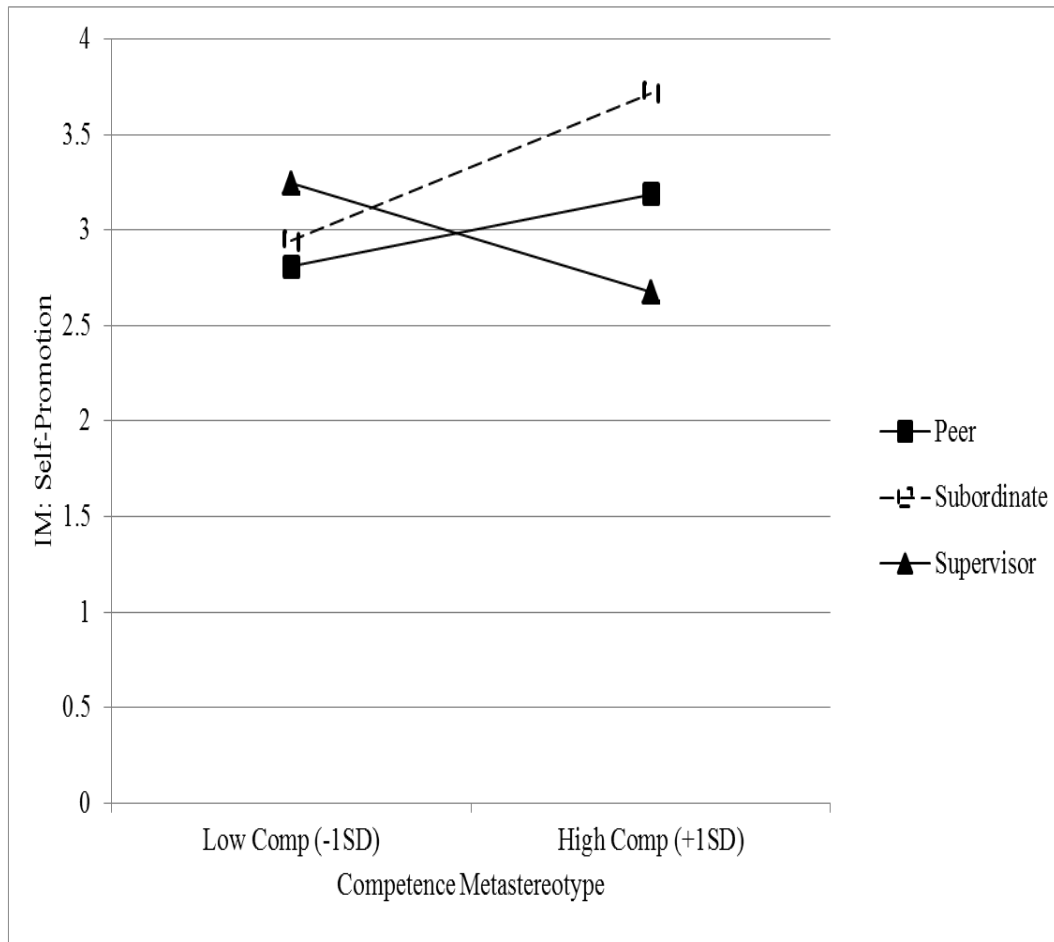


Figure 5. Graph of the interaction between competence metastereotypes and the referent outgroup on STEM women's ratings of self-promotion. Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

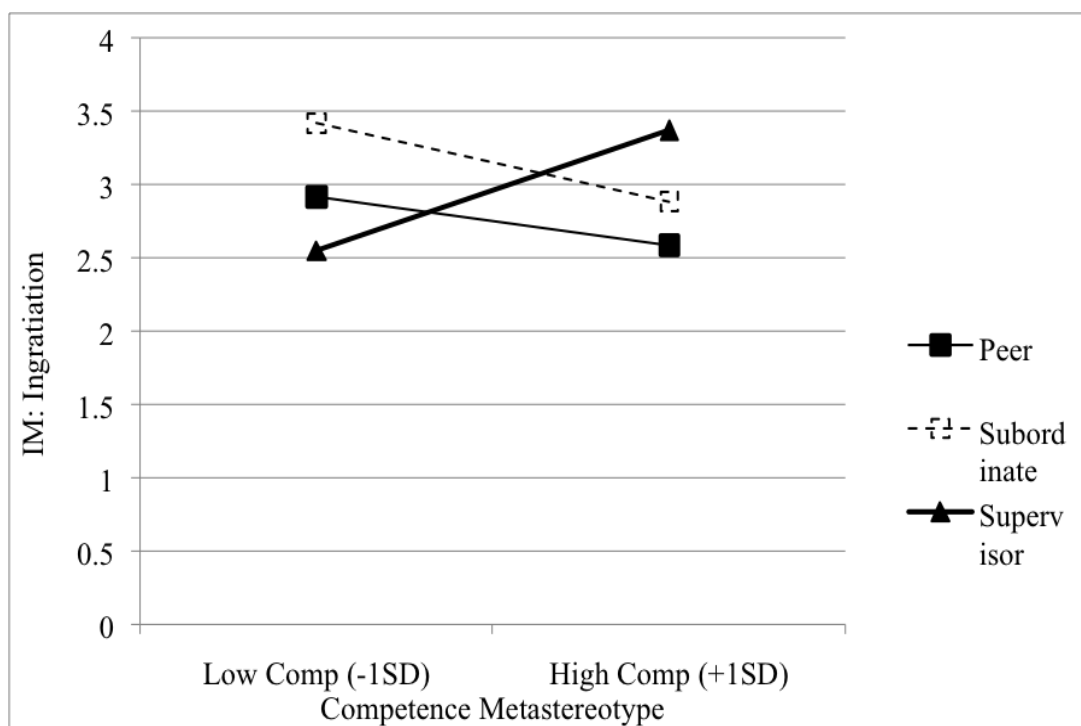


Figure 6. Graph of the interaction between the competence metastereotypes and the referent outgroup on STEM women's ratings of ingratiation. Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

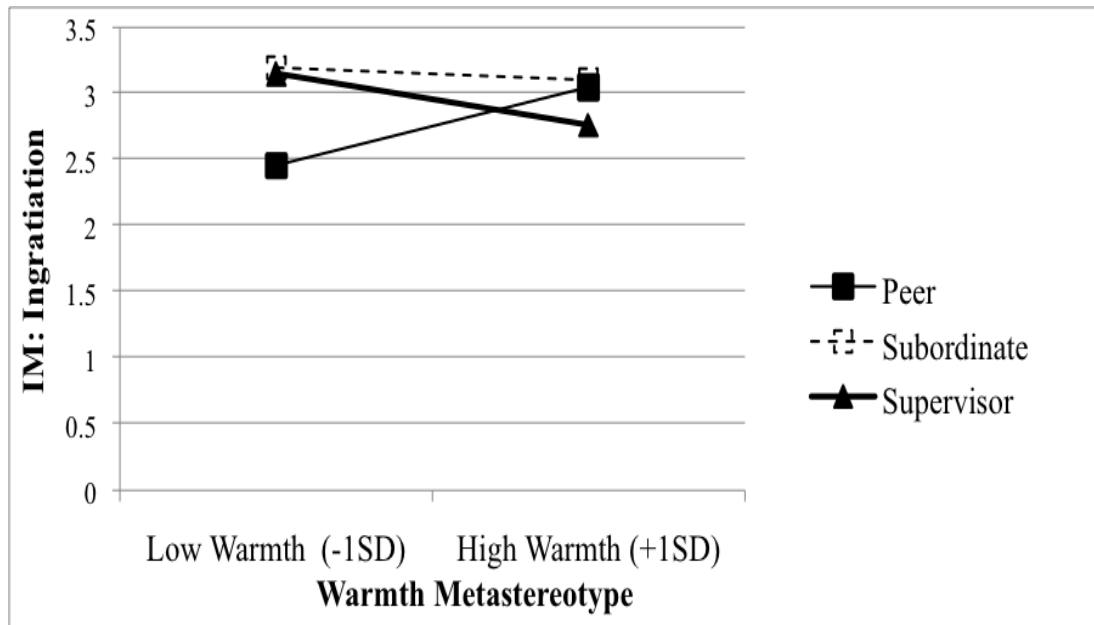


Figure 7. Graph of the interaction between warmth metastereotypes and the referent outgroup on STEM women's ratings of ingratiation. Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

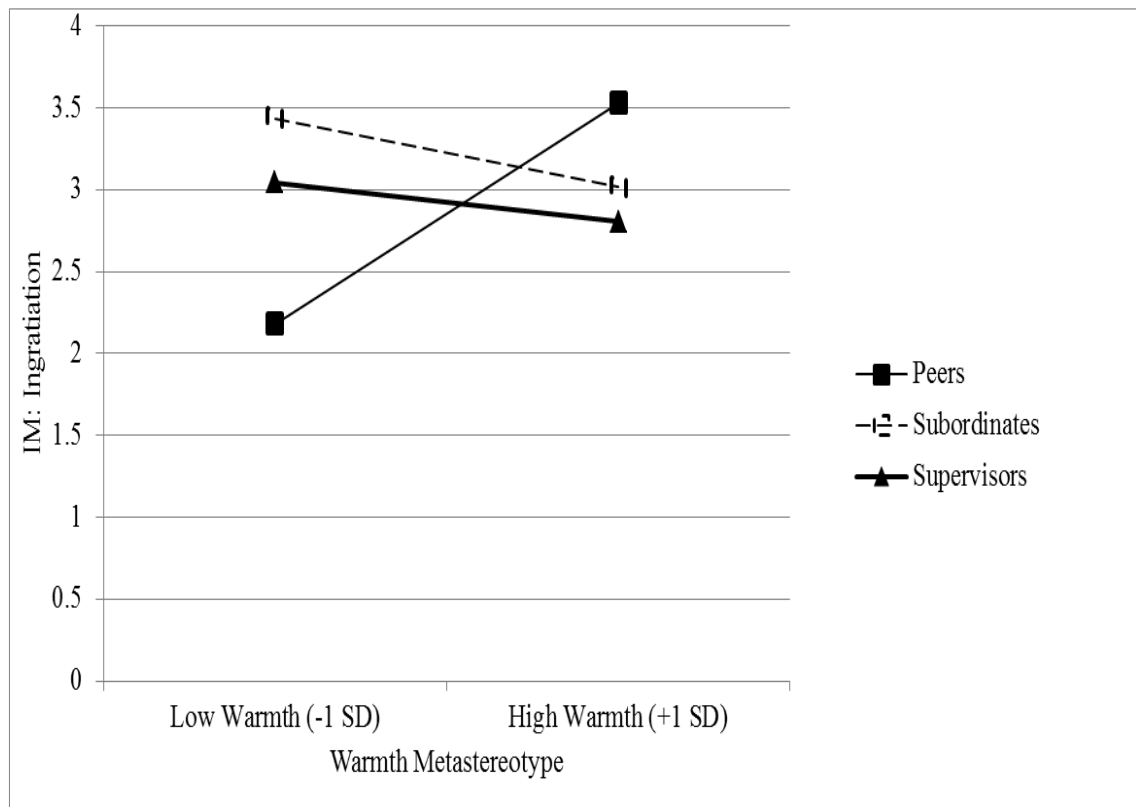


Figure 8. Graph of the three-way interaction between warmth metastereotypes, metastereotype consciousness, and the referent outgroup on STEM women's ratings of ingratiation-low metastereotype consciousness (-1 SD). Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

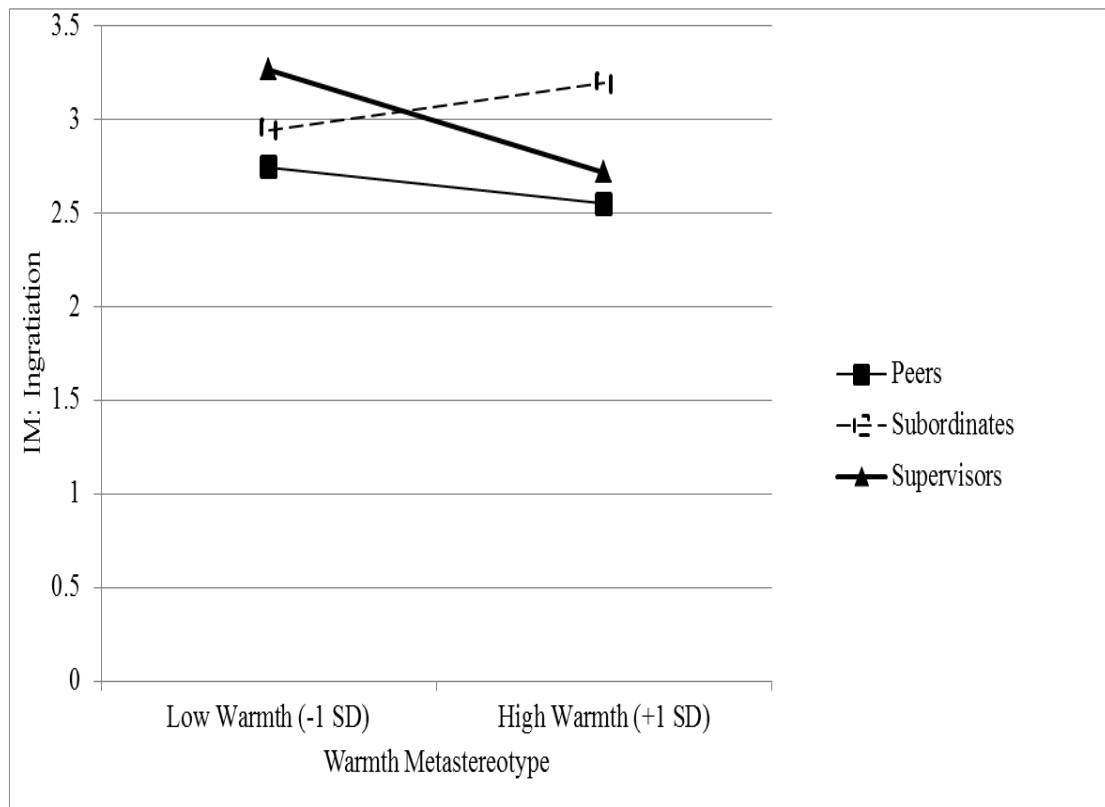


Figure 9. Graph of the three-way interaction between warmth metastereotypes, metastereotype consciousness, and the referent outgroup on STEM women's ratings of Ingratiation-high metastereotype consciousness (+1 SD). Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

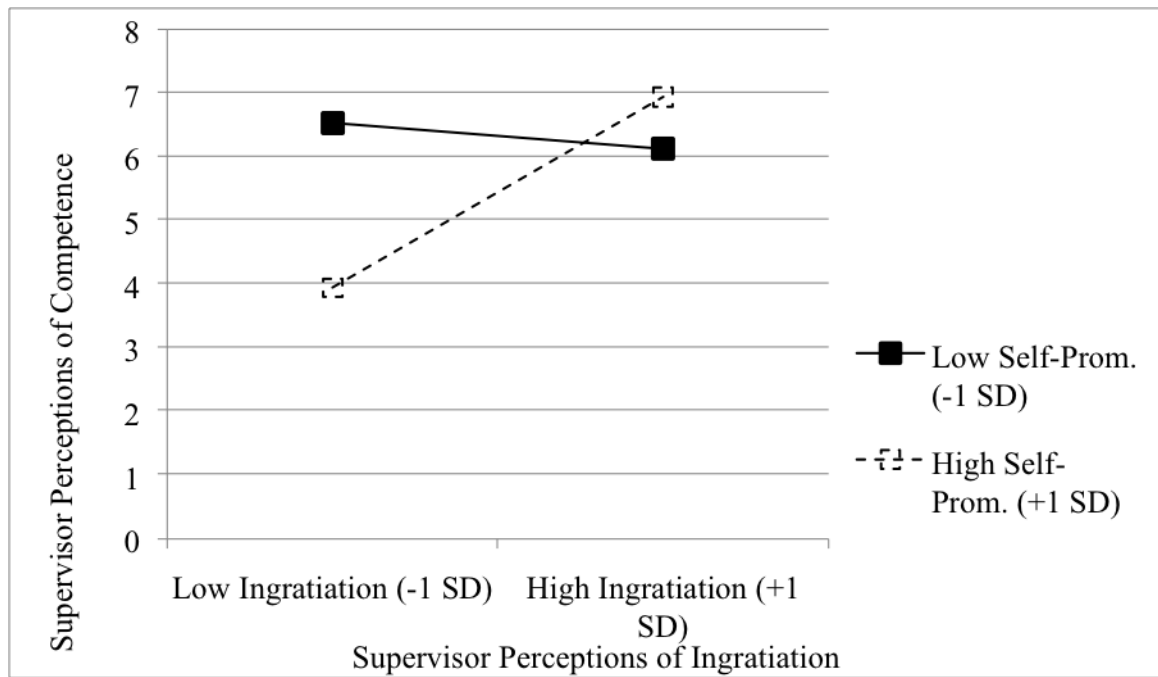


Figure 10. Graph of the interaction between supervisor ratings of self-promotion and supervisor ratings of ingratiation on supervisor ratings of competence. Referent Outgroup was represented as two dummy variables with peers serving as the reference group.

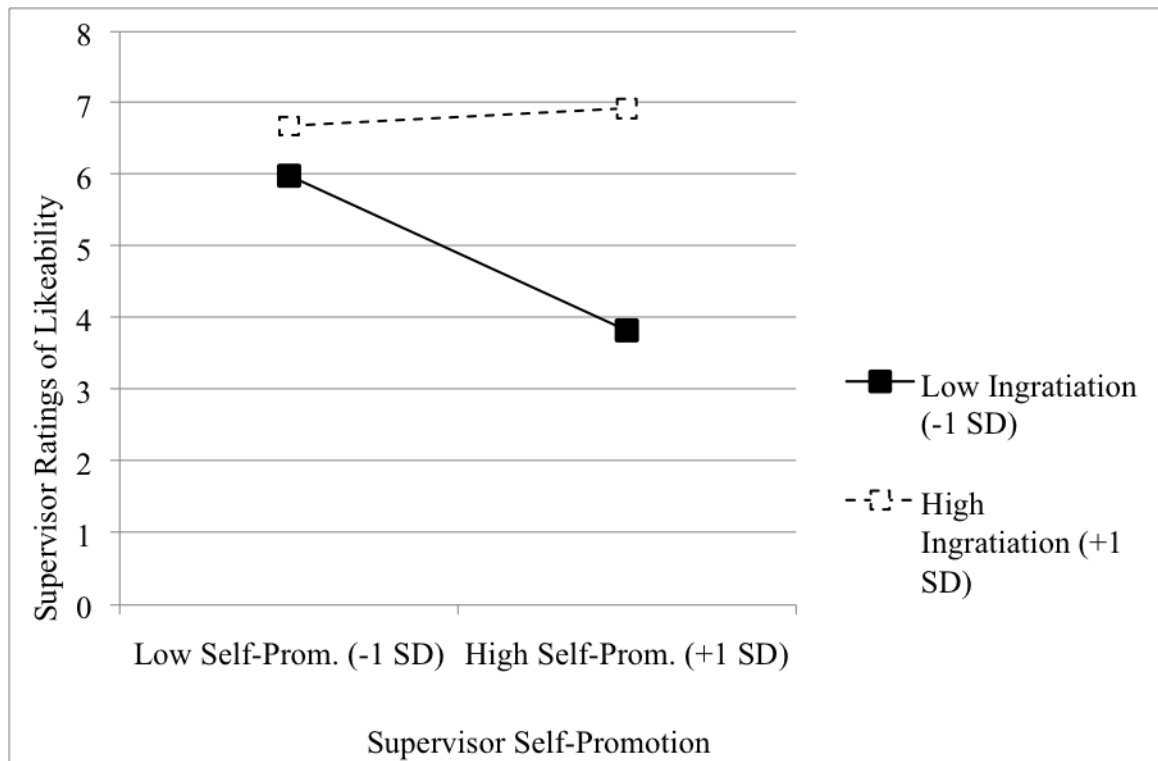


Figure 11. Graph of the interaction between self-promotion and ingratiation on supervisor ratings of likeability. Referent outgroup was represented as two dummy variables with peers serving as the reference group.

APPENDIX A: SURVEY MEASURES

Meta-stereotype Content (Cheryan et al., 2011; Fiske et al., 2002).

Directions: In this section, we would like you to think about how MOST male 1) subordinates/students 2) colleagues/peers 3) superiors/supervisors (between subjects design) view WOMEN IN YOUR PROFESSION. We are not interested in your personal beliefs, but in how you think women in YOUR profession are viewed by male 1) subordinates/students 2) colleagues/peers 3) superiors/supervisors (between subjects design).

For example, if you believe MOST male 1) subordinates/students 2) colleagues/peers 3) superiors/supervisors (between subjects design) think that the trait is “extremely uncharacteristic” of women in your profession, indicate a "1"; if you believe MOST male 1) subordinates/students 2) colleagues/peers 3) superiors/supervisors (between subjects design) think that the trait is “extremely characteristic” of women in your profession please indicate a "7" next to the trait.

For each of the traits below, please think of the stereotypes that MOST male 1) subordinates/students 2) colleagues/peers 3) superiors/supervisors (between subjects design) hold regarding women in your profession. According to THEIR stereotypes of women in your profession, please indicate the extent to which each of the following traits is characteristic of women in your profession.

Competence

1. Intelligent
2. Competitive
3. Independent

Warmth

1. Warm
2. Tolerant
3. Family-oriented

Meta-stereotype Consciousness (adapted from Stigma Consciousness Scale; Pinel, 1999).

Directions: Please read each of the following statements carefully and rate how much you agree with each statement (1= strongly disagree to 5= strongly agree). Although some of these items may appear very similar, they are all a little bit different, so please respond to every statement carefully. Rate how much you agree with each statement by circling the appropriate number. Remember, there are NO “right” or “wrong” answers.

1. Stereotypes about women in STEM have not affected me personally. (R)
2. When interacting with men in STEM who are my (subordinates, peers, supervisors), I feel like they interpret all my behaviors in terms of the fact that I am a woman in STEM.
3. Most of my male (subordinates, peers, supervisors) do not judge women in STEM on the basis of their gender. (R)
4. My being a woman in STEM does not influence how male (subordinates, peers, supervisors) in STEM act with me. (R)
5. I almost never think about the fact that I am a woman in STEM when I interact with male (subordinates, peers, supervisors) in STEM (R).

Impression Management (Bolino and Turnley, 1999).

Directions: Please respond to the following statements by thinking about how often, in the last 6 months, you have behaved this way while at work. Indicate your responses on the scale provided: (1) *never behave this way*, (2) *very rarely behave this way*, (3) *occasionally behave this way*, (4) *sometimes behave this way*, and (5) *often behave this way*.

Self-Promotion

1. Make people aware of your talents or qualifications.
2. Let others know that you are valuable to the organization.
3. Make people aware of your accomplishments.

Ingratiation

1. Compliment your colleagues so they will see you as likable.
2. Praise your colleagues for their accomplishments so they will consider you a nice person.
3. Do personal favors for your colleagues to show them that you are friend.

Supervisor Ratings (Fiske et al., 2002; Heilman & Okimoto, 2007).

Directions: In this section, please indicate the extent to which each of the following traits is characteristic of the individual in question (1=very much to 5=not at all).

Likeability

1. How much do you like this individual?

2. How friendly is this individual?
3. How agreeable is this individual?

Competence

1. How competent is this individual?
2. How confident is this individual?
3. How capable is this individual?

APPENDIX B: DESCRIPTIVE STATISTICS

On average, the participants in the STEM women sample scored in the low to medium range on most measures with the exception of self-rated competence in which the average was moderately high, suggesting that while STEM women report using lesser amounts of impression management, they perceive themselves to be relatively high on competences. The supervisor sample rated STEM women in the low to medium range on average for all of the impression management measures and the interpersonal hostility scale; however, in general, STEM women were rated highly by their supervisors on competence and likeability. The descriptive statistics in the supervisor sample suggest that STEM women are also not perceived to be engaging in high levels of impression management nor are they viewed as interpersonally hostile by supervisors; however, supervisors do view STEM women as competent and likeable.

In addition, the correlations between study variables revealed several key findings. With regard to the covariates, the proportion of women in the department was

positively related to warmth metastereotypes ($r = .18, p < .05$) and STEM women's engagement in ingratiation ($r = .17, p < .05$), suggesting that STEM women in departments with a greater proportion of women are more likely to perceive that others view them as high and warmth and to engage in ingratiation. In addition to the proportion of women in the department, self-rated competence was also measured as a covariate. The results of the correlation analysis reveal that self-rated competence was positively correlated with competence meta-stereotypes ($r = .22, p < .05$), ingratiation ($r = .27, p < .01$), self-promotion ($r = .19, p < .05$), and supervisor perceptions of self-promotion ($r = .42, p < .01$), indicating that women who view themselves as competent are more likely to think that others view them as competent, engage in ingratiation and self-promotion, and be perceived by their supervisors as engaging in self-promotion. Self-rated competence was also negatively correlated with metastereotype consciousness ($r = -.19, p < .05$) and exemplification ($r = -.26, p < .01$), suggesting that those who view themselves as competent are less likely to be conscious of meta-stereotypes and less likely to engage in exemplification.

In addition to being associated with covariates, the primary independent variables, warmth and competence meta-stereotypes,

were also negatively correlated with meta-stereotype consciousness ($r = -.21, p < .05$; $r = -.35, p < .01$; respectively), suggesting that STEM women who think that others view them as high on competence or warmth are less conscious of how others stereotype them. In addition, competence meta-stereotypes were positively related to exemplification ($r = .17, p < .05$).

Related to the second half of the conceptual model, there are several significant correlations between impression management behaviors and supervisor perceptions. First, exemplification is positively related to supervisor likeability perceptions ($r = .51, p < .01$), suggesting that the use of exemplification is likely to result in positive likeability perceptions from supervisors. Further, supervisor perceptions of intimidation are positively related to interpersonal hostility perceptions ($r = .51, p < .01$). In addition to these relationships, there are several significant correlations among impression management and supervisor perception variables in Table 1. Additional information about the interrelatedness among scale items is provided in the following section.

APPENDIX C: DISSERTATION PROPOSAL LITERATURE REVIEW

Women have made strides in the traditionally male-dominated fields of science, technology, engineering, and mathematics (STEM); some estimates suggest that women

have been awarded approximately 50% of all undergraduate degrees in engineering and science (Drummond, 2010). Despite this improvement, women comprise less than one-third of STEM faculty positions (National Science Board, 2008). In addition, while research has demonstrated that STEM men and women demonstrate equal levels of career commitment, women are more likely to turnover than their male counterparts. Moreover, these findings have also indicated that women's attrition is related to dissatisfaction with research support, advancement opportunities, and service obligations (Walters & McNeely, 2010; Xu, 2008). Indeed, research has demonstrated that STEM women tend to be promoted at a slower rate than men (Lane, 1999; Valian, 1999). This incongruity speaks to the challenge of women's retention and advancement in STEM (Drury, Siy, & Cheryan, 2011).

While some research suggests that women's persistence in STEM is limited by discrimination (Blackwell, Snyder, & Mavriliplis, 2009; Reskin, 2003), unwelcoming organizational climates (Cech, Rubino, Silbey, & Seron, 2011), and family responsibilities (Charyton, Elliot, Rahman, Woodard, & DeDios, 2011), a growing literature has suggested that stereotypes are to blame for the underrepresentation of women in the STEM professoriate (Ceci, Williams, & Barnett, 2009; Cheryan, Siy, Vichayapai, Drury, & Kim; Eccles, 2011; Dasgupta, 2011b; Diekman, Clark, Johnston, Brown, & Steinberg, 2011; Shapiro & Williams, 2012). Specifically, these stereotypes not only color others' perceptions of the target, but they also influence the target's perceptions of how she is stereotyped by the out-group, which may influence her actions and, in turn, other's appraisals (Torres & Charles, 2004).

I propose a novel process through which stereotypes influence STEM women's behaviors, which may ultimately result in poor evaluations from outgroup members (see Figure 1). First, I describe the specific nature of stereotypes toward STEM women by examining both gender and STEM stereotypes. I also highlight several stereotype theories that have been explored with reference to the experiences of women in general and more specifically toward women in STEM. Second, I discuss meta-stereotypes, which emerge from beliefs regarding how one's in-group is stereotyped by out-group members. I describe research showing that the specific content of meta-stereotypes differs depending on the referent out-group (Vorauer, Main, & O'Connell, 1998) and propose that women in STEM may have different perceptions about how various male out-groups, such as subordinates, peers, and supervisors, stereotype STEM women.

Third, I investigate the behavioral responses to STEM women's meta-stereotypes. Specifically, I anticipate that STEM women will be motivated to refute negative meta-stereotypes (Hopkins et al., 2007) and emphasize positive meta-stereotypes by engaging in impression management (IM, Bolino & Turnley, 1999) behaviors. Last, the use of IM strategies; however, may result in an unanticipated "backlash effect" (Rudman, 1998, p. 629), in which engaging in strategies to enhance perceptions of competence may result in higher competence evaluations at the expense of being seen as unlikeable. In essence, women in stereotypically masculine occupations, such as STEM, may be caught in a double bind (Camden & Witt, 1983, p. 260) in which they are penalized if they are too competent, warm, or nerdy yet also penalized if they do not possess these characteristics. Taken together, the current model explores a mechanism through which STEM women

form perceptions about how they are stereotyped by others; these meta-stereotypes motivate STEM women to engage in behavioral strategies to counteract undesirable meta-stereotypes; and ultimately, others may react negatively to these behavioral tactics.

Theory and Research on Gender and STEM Stereotypes

To understand the nature of STEM women's meta-stereotypes, it is important to first understand stereotypes toward STEM women. While several decades of research have been devoted to research and theory on gender stereotypes (see Heilman, 2001 for a review), the literature on the intersection of gender and STEM has only recently been explored (e.g., Blackwell et al., 2009; Carrigan, Quinn, & Riskin, 2011; Cheryan et al., 2011; Dasgupta, 2011a; Diekmann et al., 2011; Shapiro & Williams, 2012). In the following paragraphs, I delineate extant theoretical gender stereotype paradigms followed by describing the content of gender stereotypes.

Gender Stereotype Theories

To investigate the underrepresentation of women in STEM careers, I focus on four gender theories that discuss gender rules, lack of fit, social roles, and status. As described by *gender rules theory*, in addition to being descriptive (i.e., conceptions of attributes that women *do* possess), stereotypes are also prescriptive (i.e., beliefs about characteristics that women *should* possess, Burgess & Borgida, 1999; Eagly & Karau, 2002). For instance, competence attributes are prescriptive for men, while warmth attributes are prescriptive for women (Burgess & Borgida, 1999; Eagly, 1987; Prentice & Carranza, 2002; Williams & Best, 1990). In addition to descriptive and prescriptive gender rules, there are also proscriptive gender rules, which dictate the behaviors in

which men and women *should not* engage. Accordingly, demonstrating competence characteristics is proscribed for women, while demonstrating warmth characteristics is proscribed for men (Prentice & Carranza, 2002).

Gender rules theory is particularly informative in explaining why women have difficulty breaking the glass ceiling, or an invisible obstruction preventing women from moving up the organizational hierarchy, or perhaps from gaining entry into male-dominated professions (Maume, 1999). Specifically, senior management level positions primarily overlap with masculine gender stereotypes. Attributes assigned to upper level management and executive jobs often reflect achievement-orientation, forcefulness, and emotional toughness, which are consistent with stereotypically male characteristics and how men should behave, but inconsistent with female-gender stereotypes. It should be noted that there are some industries that may align more with the female sex-type (e.g., nursing); however, in general, characteristics of management positions in the upper echelons of organizations are masculine (Heilman, 2001). In addition, as will be described below, stereotypes pertaining to individuals in STEM professions also tend to reflect masculine qualities. Taken together, gender rules theory provides information about characteristics that women and men do possess, should possess, and should not possess. As such, attributes that are associated with STEM are proscribed, or unacceptable, for women.

Consistent with gender rules theory, *social role theory* (Diekmann & Eagly, 2000; Eagly, 1987; Eagly, Wood, & Diekmann, 2000) also draws from descriptive and injunctive (i.e., proscriptive) stereotypes to explain why women are viewed as unsuited for STEM

professions. Specifically, social role theory posits that descriptive stereotypes arise from the perceived relationship between the occupational roles that men and women typically hold and the personal characteristics that are perceived to be required for these occupations (Eagly, 1987; Eagly et al., 2000).

Reinforcing the contention that executive level positions correspond more closely to male stereotypes than female stereotypes, gender rules theory and social role theory have received substantial empirical support. For instance, research has demonstrated that characteristics of successful managers are primarily in line with masculine stereotypes (Duehr & Bono, 2006; Heilman, Block, Martell, & Simon, 1989; Powell & Butterfield, 1989; Schein, 2001). Further, masculine characteristics are viewed as essential to executive or leader achievement (Koenig, Eagly, Mitchell, & Ristikari, 2011; Martell, Parker, Emrich, & Crawford, 1998). Extrapolating these findings to the current study of STEM women, it seems that the characteristics associated with predominantly male occupations, such as those in STEM fields, are likely to be agentic or competence-related attributes. Specifically, since men comprise the majority of occupations in STEM, there is an expectation that the requisite attributes for STEM careers will reflect masculine characteristics. It follows that these presumptions give rise to the stereotype that individuals in STEM possess masculine qualities. Indeed, scholars have found that STEM occupations are associated with masculinity (Cheryan, Plaut, Davies, & Steele, 2009; Heyman & Legare, 2004; Schott & Selwyn, 2000). These stereotypes have serious implications as they may preclude women from occupations in STEM areas. In the following section, I describe these stereotypes.

Gender Stereotypes

Gender stereotypes, which refer to “socially shared beliefs about what qualities can be assigned to individuals based on their membership in the female or male half of the human race” (Lips, 2008, p.2), are often described in terms of Powell and Butterfield’s (1979) agency–communion paradigm (Bakan, 1966; Eagly, 1987). Specifically, women are expected to possess communal attributes (e.g., kind, nurturing, caring, understanding, Burgess & Borgida, 1999; Eagly, 1987; Prentice & Carranza, 2002; Williams & Best, 1990), while men are expected to have agentic attributes (e.g., dominant, competitive, or achievement oriented, Dodge, Gilroy, & Fenzel, 1995; Eagly & Karau, 2002; Glick, Zion, & Nelson, 1988). These communal and agentic stereotypes correspond with Fiske and her colleagues’ (Fiske, Cuddy & Glick, 2007; Fiske, Cuddy, Glick, & Xu, 2002) universal dimensions of warmth and competence, respectively, with women being stereotyped as high on warmth (i.e., communion) and low on competence (i.e., agency). It is important to note that masculine and feminine gender stereotypes are the antithesis of each other, suggesting that one gender is perceived to possess the qualities that the other gender is lacking and vice versa (Heilman, 2001). Further, these gender stereotypes are widespread and generally impervious to change (Dodge, et al., 1995; Leuptow, Garovich, & Leuptow, 1995)

Despite their resistance to change, gender stereotypes may be malleable to contextual and social cues. Specifically, researchers propose that gender stereotypes are recalibrated when taking into account the social roles that men and women hold (Diekmann & Eagly, 2000). It follows that stereotypes toward women who work in

traditionally masculine occupations may differ from women who work in traditionally feminine occupations. For instance, research indicates that stereotypes toward traditional women are more positive than stereotypes toward nontraditional women (Haddock & Zanna, 1994). Further, women who display feminine attributes often receive more positive evaluations than women who display masculine attributes (Heilman & Okimoto, 2007; Rajecki, De Graaf-Kaser, & Rasmussen, 1992). In comparison to women in general, unconventional women may be stereotyped as highly competent, yet cold (Fiske et al., 2002). To further comprehend the stereotypes toward women in male-dominated STEM careers, I examine the stereotype content and theoretical models underlying these STEM stereotypes.

STEM Stereotypes and Theory

In addition to gender stereotypes, women in STEM may experience another layer of stereotypes from being associated with the STEM field itself. Individuals involved in STEM fields are often characterized as technology-obsessed, socially awkward, nerdy, and masculine (Cheryan et al., 2009; Schott & Selwyn, 2000). For instance, in one study, objects such as Star Trek posters, comic books, and technical magazines, were identified as typical possessions of a stereotypical computer scientist (Cheryan et al., 2009). Relative to gender stereotypes, considerably less research has been devoted to STEM stereotypes; rather, scholars more frequently address theoretical mechanisms to understand the experience of STEM women.

Two theories that have been used to explore women's underrepresentation or lack of progression in STEM disciplines are stereotype threat theory (Akcinar, Priyanka, &

Walton, 2011; Cheryan et al., 2009; Logel et al., 2009; Shapiro & Williams, 2012), and the stereotype inoculation model (Dasgupta, 2011a). Although both theories may be applied to other instances in which stereotypes hinder an individual's acceptance in a particular role, these theories have received considerable attention by scholars who explore women in STEM. Below, I articulate the tenets of each theory and describe extant research that corroborates the theory. In the section that follows the current one, I propose a novel theoretical process that delineates how stereotypes inhibit women's progression in STEM fields.

Stereotype threat theory. The first theory that has been described in conjunction with the underrepresentation of women in STEM is stereotype threat theory. Stereotype threat reflects a concern that women or racial minorities may have about others viewing them in light of a negative stereotype (Steele, Spencer, & Aronson, 2002). This anxiety may, in turn, interfere with and compromise performance in areas in which the target fears he or she may be negatively stereotyped (Beilock, 2008; Beilock, Rydell, & McConnell, 2007; Schmader, Johns, & Forbes, 2008). Drawing from stereotype threat theory, Shapiro and Williams (2012) sought to elucidate how gender-biased attitudes about math and science weaken women's preference for and performance in STEM careers. Specifically, they postulated that contextual cues in academic environments, such as being the token woman in a science department (Inzlicht & Ben-Zeev, 2000; Sekaquaptewa & Thompson, 2003) or exposure to individuals who stereotype women negatively (Logel et al., 2009), enhance the salience of negative stereotypes about women in STEM. Indeed, Cheryan and her colleagues (2009) found that women's interest in

computer science was influenced by environmental cues, which reflected STEM stereotypes and emphasized the masculine aspect of this stereotype, such that women were less interested in computer science when presented with a stereotypical computer science environment. An additional study indicates that sexist male behaviors (e.g., assertive actions, flirtation) may trigger stereotype threat, leading to poorer scores on an engineering test (Logel et al., 2009). Taken together, the stereotype threat literature indicates that women's slow advancement in comparison to their male counterparts in STEM fields may be due to individuals or situations that cue negative stereotypes about women.

Stereotype inoculation model. In line with the stereotype threat researchers who explore interventions to improve women's experience and progression in STEM fields, Nilanjana Dasgupta (2011a) proposed the stereotype inoculation model (SIM), which suggests that exposure to high achieving ingroup members (e.g., successful women in STEM fields) may operate as a "social vaccine...and inoculate" (p. 231) ingroup members against stereotypes that undermine their competence in STEM fields. More specifically, Dasgupta contends that women who are exposed to successful ingroup members are protected from negative stereotypes through two primary psychological mechanisms: increased sense of belonging and self-efficacy. In turn, these psychological mechanisms help to reinforce women's positive self-concept.

With regard to STEM women's sense of belonging, the contextual cues that signal masculinity in STEM settings prompt women to feel that they do not belong in STEM environments. As described by stereotype threat theory, these contextual cues may

include the number of women in the department or workplace. The SIM extends this research by specifying that exposure to *successful* peers helps to inoculate STEM women against negative stereotypes. As such, to the extent that women identify with high-achieving STEM women, the presence of successful ingroup peers will conceivably increase their sense of belonging in STEM occupations. In addition, contact with peers who excel in STEM fields may also result in increased self-efficacy. Indeed, the social comparison literature suggests that the presence of high performing ingroup members improves self-efficacy and, thus, performance; however, women exposed to unsuccessful peers may suffer decreases in self-efficacy and performance (Blanton, Crocker, & Miller, 2000; Brewer & Weber, 1994).

In sum, stereotype threat theory and the SIM suggest that situational cues in STEM environments prompt women to be aware of negative stereotypes about them. In addition, stereotype threat researchers also explore factors or interventions that may reduce the negative effects of stereotype threat on performance. One proposed option is to exchange stereotypical STEM environmental cues (e.g., proportion of women; masculine posters, artwork, and objects) with gender-neutral symbols, which has been shown to enhance women's interest in STEM (e.g., Cheryan et al., 2009; Cheryan et al., 2011; Murphy, Steele, & Gross, 2007; Pronin, Steele, & Ross, 2004; Steele et al., 2002). As another alternative, Akcinar & Walton (2011, as cited by Akcinar et al., 2011) found that seemingly negligible, yet positive actions (e.g., a handshake) from men may increase women's test taking performance despite being presented with a stereotype threat inducing situation. Further, the major tenet of the SIM is that the negative effects of

stereotypes on women in STEM may be alleviated or avoided by exposure to successful peers (Dasgupta, 2011a). In line with the stereotype threat theory and the SIM, I concur that environmental cues channel negative stereotypes about women in STEM. In contrast, however, I propose an unprecedented examination of the actions women in STEM, themselves, may take to overcome obstacles engendered by negative stereotypes. First, while the aforementioned theories propose that certain interventions (e.g., gender neutral environment and exposure to successful ingroup peers) may help to alleviate the challenges faced by women in STEM, I expect that women will engage in behavior to protect themselves against stereotypes. Second, I posit that rather than behaving in line with these gender stereotypes as proposed by stereotype threat theory (Schmader, Johns & Forbes, 2008), STEM women are likely to engage in behaviors that counteract these negative perceptions. The current study goes beyond stereotype threat and the SIM by proposing a theoretical mechanism that investigates the behaviors in which women may engage, on their own accord, to counteract negative stereotypes. Specifically, in the next sections I elaborate on how women perceive the stereotypes that others have toward their ingroup and how these meta-stereotypes influence behavioral responses.

STEM Women's Meta-stereotypes

Stereotyped individuals may view themselves through a “double consciousness,” which involves both self-perceptions (i.e. self-stereotypes) and other-perceptions (Torres & Charles, 2004, p.116). Integrating these lenses of perception, Vorauer and colleagues (1998) introduced the term meta-stereotype, which combines the concept of stereotypes, which are “exaggerated beliefs” about the characteristics of another group (Allport, 1954,

p. 187), and meta-perceptions, which reflect individuals' views about how they are perceived by others (Kenny & DePaulo, 1993; Vorauer & Claude, 1998; Vorauer & Miller, 1997; Vorauer & Ross, 1998). Meta-stereotypes are formally defined as “a person's beliefs regarding the stereotype that out-group members hold about his or her own group” (Vorauer et al., 1998, p. 917). Although meta-stereotype research originally focused on the meta-stereotypes of majority or dominant social groups (Vorauer et al., 1998; Vorauer, Hunter, Main, & Roy, 2000), since then the meta-stereotypes of socially disadvantaged groups have been examined (Judd, Park, Yzerbyt, Gordijn & Muller, 2005; Klein, Pohl & Ndagijimana, 2007; Yzerbyt, Provost & Corneille, 2005). Meta-stereotypes differ from self-stereotypes due to their relational component (Vorauer et al., 1998). Specifically, meta-stereotypes may differ depending on the referent outgroup. For example, the meta-stereotype that the Dutch have of the French (i.e., when French people are the outgroup) may be different than the meta-stereotype that the Dutch have of the Germans (i.e., when German people are the outgroup, Vorauer et al., 1998; 2000).

Like self-stereotypes, however, meta-stereotypes may be positive, negative or neutral (Anseel, 2011). Despite the variety of valences that meta-stereotypes may hold, the majority of meta-stereotype research has focused on negative meta-stereotypes (Owuamalam & Zagefka, 2011; Vorauer et al., 1998). For instance, in their seminal study, Vorauer and colleagues (1998) found that negative meta-stereotypes were related to negative emotions and decreased self-esteem. Corroborating these original findings, Owuamalam and Zagefka (2011) found that the activation of a negative meta-stereotype led to reduced self-esteem and prompted individuals to deemphasize their association

with their ingroup. The implications of negative *and* positive meta-stereotypes have been examined by Klein and Azzi (2001), who found that, as an effort to ward off the negative repercussions of meta-stereotypes, individuals emphasize the positive aspects of the meta-stereotype while downplaying the negative components. The behavioral implications of STEM women's meta-stereotypes will be further elaborated in the later sections of the paper. In the current section, I delineate two integral components of STEM women's meta-stereotypes: meta-stereotype content and meta-stereotype consciousness. In so doing, I also highlight the importance of the referent outgroup.

Meta-stereotype Content

The content of meta-stereotypes often reflects the specific nature of the stereotypes that others have of certain groups. Specifically, scholars have proposed that people are often aware of the stereotypes that others hold about their ingroup (Klein & Azzi, 2001; Tajfel, 1981). Indeed, Sigleman and Touch (1997) found that meta-stereotypes are closely related to actual stereotypes.

Therefore, drawing from the aforementioned research on gender and STEM stereotypes, I expect that the content of STEM women's meta-stereotypes will vary along dimensions of competence (Dodge et al., 1995; Eagly & Karau, 2002; Glick et al., 1988), warmth (Burgess & Borgida, 1999; Eagly, 1987; Prentice & Carranza, 2002; Williams & Best, 1990), and STEM qualities (Cheryan et al., 2009; Schott & Selwyn, 2000).

As explicated by Vorauer and colleagues (1998), however, an individual's meta-stereotype may differ depending on the outgroup in question. For STEM women, their meta-stereotype content may vary according to whether they are thinking about their

male subordinates, peers, or supervisors. STEM women may also hold different perceptions about how their female subordinates, peers, or supervisors view them. Despite this possibility, I focus exclusively on STEM women's meta-stereotype content when men are the referent outgroup. I set this boundary condition because in terms of women's gender identity, other women most likely constitute their ingroup. Specifically, meta-perception research suggests that when interaction partners are ingroup members, individuals expect that their self-stereotypes will be consonant with how others' stereotype them. Conversely, people expect outgroup members' stereotypes about them to diverge from their self-stereotypes (Robinson, Keltner, Ward, & Ross, 1995). Therefore, I expect that the STEM women's meta-stereotype content for men will reveal more unique information than their meta-stereotype content for women. In the next section, I examine STEM women's meta-stereotype content for each referent outgroup, and I expect that underlying many of the differences in meta-stereotype content is the power relationship between the target and the referent outgroup.

Referent outgroup. Although power may elicit several different meanings (Fiol, O'Connor, & Aguinis, 2001; French & Raven, 1959, 1960; Gelfand, Erez, & Aycan, 2007; Ravlin & Thomas, 2005), in the current study, power reflects a person's capacity or perceived capacity to have authority over others (Fiol et al., 2001). This conception of power is often referred to as social power (Van Dijke & Poppe, 2006). Recently, scholars have explored the role of power (or lack thereof) in meta-stereotyping (Lamers, Gordign, & Otten, 2008). Specifically, powerless individuals are often motivated to avert threats and prevent losses (Keltner, Gruenfeld, & Anderson, 2003). In order to be successful at

this task, the powerless must be able to predict threats and losses. As such, the powerless are likely to estimate how powerful outgroup members perceive or stereotype them. In other words, the powerless are likely to engage in meta-stereotyping (Vorauer et al., 2000).

It is important to note that powerless individuals have a propensity to think about both positive and negative meta-stereotypes (Lamers et al., 2008). Indeed, drawing from stereotype literature, people think about both positive and negative stereotypes to serve two separate goals (Van den Bos & Stapel, 2009): self-enhancement (Fein & Spencer, 1997; Schwinghammer, Stapel, & Blanton, 2006) and comprehension (Macrae & Bodenhausen, 2000; Strack & Deutsch, 2004), respectively. These goals help to improve one's self worth and facilitate understanding of other groups, and thus both are used equally. This stereotype research is corroborated by Lamers and colleagues (2008) findings, suggesting that powerless individuals are likely to experience meta-stereotype activation regardless of the valence of the meta-stereotype. The researchers propose that the activation of both positive and negative meta-stereotypes serves a similar function to activation of stereotypes. Specifically, while positive meta-stereotypes help to bolster self-esteem, negative meta-stereotypes provide information about the referent out-group in question.

Power in the context of gender stereotypes has also received considerable attention. Specifically, research has indicated that although stereotypes towards women have changed over time (Diekmann & Eagly, 2000), the power distribution generally remains in favor of men (Carli, 1999, 2001; Diekmann, Goodfriend, & Goodwin, 2004;

Kanter, 1977; Ragins & Sundstrom, 1989; Sagrestano, 1992). This research suggests that while gender stereotypes are shifting, women still have less power in comparison to their male counterparts. Indeed, scholars have proposed that stereotypes concerning men's agency and competence and women's deficiency in these qualities are at the root of gender differences in power (Ragins & Sundstrom, 1989). Therefore, all else being equal, STEM women may hold the meta-stereotype that their male peers or supervisors perceive them as less powerful and, therefore, less competent. With regard to their subordinates, however, STEM women's meta-stereotypes may reflect high power or competence. Specifically, women may gain power through other means, such as their occupational roles (e.g., women in the military, Wood & Eagly, 2002). It follows that given the power afforded by their stereotypically masculine occupation, STEM women may expect their subordinates to view them as highly competent and powerful. Therefore, I hypothesize *that the competence meta-stereotype of STEM women will vary as a function of the male referent outgroup. Specifically, meta-stereotype content ratings on competence will be highest when the referent outgroup is subordinates, lower when the referent outgroup is peers, and lowest when the referent outgroup is superiors (Hypothesis 1).*

With regard to the communal/warmth stereotype dimension, research described above suggests that women must often sacrifice warmth as the cost of competence (Heilman & Okimoto, 2007; Heilman, Wallen, Fuchs, & Tamkins, 2004); therefore, women may believe that those who view them as powerful or competent may also view them as less warm. As such, I expect *that the warmth meta-stereotype of STEM women to vary as a function of the male referent outgroup. Specifically, meta-stereotype content*

ratings on warmth will be highest when the referent outgroup is superiors, lower when the referent outgroup is peers, and lowest when the referent outgroup is subordinates (Hypothesis 2).

Finally, I expect that STEM stereotypes will correspond to STEM women's meta-stereotypes. Specifically, given that STEM stereotypes are field specific, other individuals within the STEM field (e.g., subordinates, peers, and superiors) may actually shift to the ingroup as men in STEM occupations may also possess the meta-stereotype that others see them as "nerdy". Drawing from social categorization theory, when superordinate categories (e.g., STEM field) are salient, former outgroup members often provide more favorable evaluations (Gaertner, Mann, Dovidio, Murrell and Pomare, 1990). Further, self-categorization theory suggests that individuals categorize themselves differently depending on the ingroup in a given situation (Turner, Hogg, Oakes, Reicher and Wetherell, 1987). Following this logic, if STEM men do form the new ingroup, women's STEM meta-stereotypes may not differ depending on the referent outgroup. Formally, I hypothesize *that STEM women's STEM meta-stereotypes will not vary as a function of the male referent outgroup. (Hypothesis 3).*

Meta-stereotype Consciousness

A second component of STEM women's meta-stereotypes is meta-stereotype consciousness, which is defined as the extent to which individuals are persistently self-conscious about how others stereotype them (Pinel, 1999; Ryan, 2010). Underscoring once again the importance of the referent outgroup, I expect that meta-stereotype consciousness will vary depending on whether the referent outgroup consists of male

subordinates, peers, or supervisors. Specifically, I expect STEM women to experience greater meta-stereotype consciousness when they perceive the referent outgroup as having more power than them. Previous research demonstrates that powerless individuals strive to avert threats to their ingroup (Keltner, Gruenfeld, & Anderson, 2003). In an effort to ward off external threats, powerless people will try to anticipate how powerful outgroup members perceive or stereotype their ingroup. In other words, STEM women will be more conscious of meta-stereotypes when the referent outgroup is more powerful (i.e., when the referent outgroup is male peers or supervisors).

A second reason that STEM women may be more conscious of meta-stereotypes when the referent outgroup is powerful comes from research suggesting that powerless individuals are more likely to engage in perspective taking (Galinsky, Magee, Inesi, & Gruenfeld, 2006) and that meta-stereotyping involves perspective taking (Vorauer et al., 2000). Indeed, a recent study demonstrated that power is negatively associated with meta-stereotype activation and that this relationship is mediated by perspective taking (Lamers et al., 2008). Extending this research, I contend that powerlessness elicits not only the emergence of dormant meta-stereotypes, but it also engenders the more chronic, persistent consciousness of these meta-stereotypes. Specifically, I hypothesize that *STEM women's meta-stereotype consciousness will vary as a function of the male referent outgroup. Specifically, STEM women will be most conscious of meta-stereotypes when the referent outgroup is superiors, less conscious when the referent outgroup is peers, and least conscious when the referent outgroup is subordinates (Hypothesis 4).*

Behavioral Responses to Meta-stereotypes

Meta-stereotype content and consciousness have serious implications as these cognitions may influence the actions of STEM women. Indeed, previous research has demonstrated that meta-stereotypes can influence behavior (Klein & Azzi, 2001; Kamans, Gordijn, Oldenhuis, & Otten, 2009; Sigleman & Touch, 1997). In the following sections, I delineate several impression management tactics as a behavioral response to STEM women's meta-stereotypes. In addition, I describe theoretical processes to explain why STEM women would engage in these strategies.

Theoretical Mechanisms

Previous research has demonstrated that meta-stereotypes can influence behavior (Klein & Azzi, 2001; Kamans et al., 2009; Sigleman & Touch, 1997). Specifically, negative meta-stereotypes may influence actions toward the outgroup (Frey & Tropp, 2006; Shelton & Richeson, 2006). One explanation for how meta-stereotypes relate to behaviors is provided by self-verification theory, which has explored how individuals understand and manage others' views of them (Goffman, 1959; Kenny, 1994; Schlenker, 1980; Swann, 1987). Specifically, individuals desire to be viewed in a way that is consistent with their self-concept, that is, they aspire to be viewed positively (Swann, 1987). In addition, the self-presentation (Baumeister, 1982) and impression management (Schlenker, 1980) literatures demonstrate that people will engage in behavioral strategies to maintain their positive self-image. Therefore, as an effort to preserve a positive self-concept, I predict that STEM women will employ impression management techniques to elicit favorable perceptions and confirm positive meta-stereotypes from others.

In contrast to self-verification theory, stereotype reactance theory specifies the process through which people react against negative stereotypes (Kray, Thompson, & Galinsky, 2001). Stereotype reactance theory is an extension of psychological reactance theory (Brehm, 1966), which suggests that people respond to threats to freedom by defending their freedom more assertively. In turn, stereotype reactance theory postulates that negative stereotypes lead targets to “react by engaging in behaviors that are counter to those prescribed by the stereotype” (Kray et al., 2001, p. 949). Indeed, researchers have found that individuals are motivated to refute “mean” stereotypes (Hopkins et al., 2007, p. 779). Further, meta-stereotype researchers contend that targets will engage in a “selective-confirmation of the meta-stereotype” to verify positive meta-stereotypes and invalidate negative meta-stereotypes (Klein & Azzi, 2001, p. 281). Together, self-verification theory and psychological reactance theory provide evidence that in general the content of STEM women’s meta-stereotypes will be related to impression management behaviors, such that STEM women will engage in impression management techniques that confirm desirable meta-stereotypes and disconfirm negative meta-stereotypes. In the section below, I propose and provide evidence for the specific relationships between the content of each meta-stereotype (i.e., warmth, competence, and STEM stereotypes) and the impression management techniques used to combat or endorse the meta-stereotype.

Impression Management Behaviors

Impression management (IM) refers to an individual’s specific actions intended to elicit and maintain favorable impressions from others (Rosenfeld, Giacalone, & Riordan,

1995; Schnedier, 1981). Although various types of IM strategies have been investigated (Kumar & Beyerlein, 1991; Wayne & Ferris, 1990), several studies (Bolino & Turnley, 1999; Bolino & Turnley, 2001; Bolino & Turnley, 2003a; Bolino & Turnley, 2003b) have measured individuals' use of IM with the Jones and Pittman (1982) taxonomy because it is appropriate for organizational settings, it is derived from IM theory, and it is comprehensive (Bolino & Turnley, 1999). According to Jones and Pittman (1982), there are five separate IM tactics: (1) exemplification, in which individuals go above and beyond the job requirements to be viewed by others as committed; (2) ingratiation, in which individuals perform favors or engage in flattery to be viewed by others as likeable; (3) self-promotion, in which individuals make others aware of their accomplishments to be viewed by others as competent; (4) intimidation, in which individuals behave forcefully or aggressively to be viewed by others as powerful; and (5) supplication in which individuals pretend to be unknowledgeable or weak to be viewed by others as needy. I contend that, in an effort to promote desirable meta-stereotypes and disprove undesirable meta-stereotypes, STEM women will strategically engage in specific IM behaviors.

Impression management strategies and competence. First, to combat perceptions that others (i.e., male supervisors) view STEM women as less competent than their male-counterparts, women may engage in exemplification or self-promotion IM behaviors. An example of exemplification, which reflects “the self-presentation of moral character” (Gilbert & Jones, 1986, p. 594), may occur when a person stays late at work so that others' perceive that he/she is a dedicated worker (Nagy, Kacmar, & Harris, 2011).

Indeed, exemplification has been found to be effective (Kacmar & Carlson, 1999; Turnley & Bolino, 1999). As an example, qualitative research has demonstrated that CEOs use exemplification to enhance their competence (Pollach & Kerbler, 2011).

A second IM behavior that STEM women may engage in to combat low competence meta-stereotypes is self-promotion. Self-promotion occurs when individuals make others aware of their accomplishments in an effort to be viewed by others as competent (Jones & Pittman, 1982). Since self-promotion is meant to increase others' perceptions of competence, this IM behavior may be a tactic used to react against low competence meta-stereotypes. Examining both exemplification and self-promotion IM behaviors, I hypothesize that *there will be a negative relationship between competence and (a) exemplification and (b) self-promotion, such that perceptions that others view STEM women as lower on competence will correspond to higher levels of exemplification and self-promotion (Hypothesis 5).*

Impression management strategies and warmth and STEM meta-stereotypes.

In addition to combating meta-stereotypes of low competence, STEM women may also have to counteract meta-stereotypes regarding their low warmth. I propose that women react to low warmth meta-stereotypes by engaging in ingratiation, which reflects behaviors meant to increase others liking or attraction toward the target (Jones & Pittman, 1984; Pandey & Bohra, 1984). Similarly, this IM tactic may also serve to counteract undesirable STEM meta-stereotypes, which again reflect masculinity, nerdiness, and social awkwardness. Specifically, I hypothesize that *there will be a negative relationship between warmth STEM meta-stereotypes and ingratiation, such that STEM women will*

engage in higher levels of ingratiation when they think that others stereotype them as lacking warmth or possessing STEM meta-stereotypes (Hypothesis 6).

One somewhat counterintuitive meta-stereotype that STEM women may try to counteract is that they are *too* warm. Specifically, these women may fear that men, especially superiors, view them as overly nice or a pushover. Indeed, given that women are expected to be less assertive and aggressive than men (Eagly, 1987; Eagly & Steffen, 1986; Hyde, 1984), it has been recommended that women “play like a man” by engaging in these atypical behaviors (Wentling, 1995, as cited in Bolino & Turnley, 2003a). In line with this argument, I anticipate that women in predominantly male occupations, will engage in intimidation, which refers to forceful or aggressive behaviors used to be viewed by others as powerful, to the extent that they hold the meta-stereotype that they others view them as too warm. Specifically, I hypothesize that *there will be a positive relationship between warmth-meta-stereotypes and intimidation (Hypothesis 7).*

Impression management strategies and meta-stereotype consciousness. Thus far, I have discussed all of the aspects of the theoretical model (see Figure 1) aside from the mediated moderation (Preacher, Rucker, & Hayes, 2007) of the referent-outgroup on the relationship between meta-stereotype content and behavioral responses. As described in the meta-stereotype consciousness section, due to feeling relatively less powerful, women in male-dominated roles will be most conscious of meta-stereotypes when the referent outgroup is male superiors. Indeed, Kaplan and colleagues (Kaplan, Santuzzi, & Ruscher, 2009) propose that “asymmetric outcome-dependence” (p. 603), or when actual or perceived power is unequal between two groups, may contribute to a heightened

awareness of how a more powerful group stereotypes less powerful groups. This increased meta-stereotype awareness or consciousness may motivate STEM women to, according to stereotype reactance theory, engage in impression management behaviors. In other words, when women are more chronically aware of meta-stereotypes (i.e., when the referent outgroup is superiors), they are more likely to engage in behaviors to counteract negative meta-stereotypes. Formally, I hypothesize that *the referent out-group will moderate the relationship between meta-stereotype content and behavioral strategies, such that the relationship between meta-stereotype content and behavioral strategies will be stronger when the referent outgroup has more power (i.e., peers or supervisors, Hypothesis 8)*. Further, given the previous hypotheses that meta-stereotype consciousness will be heightened when the referent outgroup is superiors followed by peers (see Hypothesis 4), I contend that greater meta-stereotype consciousness will motivate STEM women to engage in IM behaviors to counteract negative meta-stereotypes. *Specifically, to the extent that meta-stereotype consciousness increases, the relationship between meta-stereotype content and behavioral strategies increases (Hypothesis 9)*.

The Backlash Effect

Although women may engage in impression management techniques to improve others' appraisal of them, behaviors that reflect the masculine nature of STEM may come at an unanticipated cost. Specifically, STEM women find themselves in a dilemma in which to be viewed as competent, they must possess qualities that align with their male-dominated positions. By demonstrating these masculine characteristics or behaviors,

however, they are violating their gender roles and, thus, may have to deal with repercussions (i.e., *backlash*, Rudman, 1999) in the form of being viewed as less likeable or hireable. Indeed, research has demonstrated that women who adopt masculine tendencies often face repercussions for violating prescriptive gender norms (Heilman, 2001; Heilman et al., 2004; Heilman & Okimoto, 2007; Liberman, 2007; Phelan, Moss-Racusin, & Rudman 2008). In essence, women in counter-stereotypic contexts often face the challenge of balancing competing gender and occupational roles. The backlash effect provides evidence of the glass ceiling, or the invisible barricade that impedes women's advancement in the organizational hierarchy (Maume, 1999). In the current section, in addition to further describing the backlash effect, which depicts the experience of women in counter-stereotypic positions and more specifically, STEM, I provide theoretical mechanisms that may account for negative reactions toward non-traditional women. In so doing, I highlight extant research that typifies these organizational occurrences.

Theoretical Mechanisms

The *lack of fit model* (Heilman, 1983) suggests that presumptions concerning the extent to which an individual will achieve success in a certain position or occupation influences evaluations of that person. Specifically, expectations are based on the anticipated fit between the characteristics of the person and the prerequisites of the position. To the extent that expectations of fit are positive, success of the individual will be anticipated; however an ill fit between the presumed characteristics of the individual and the requirements of the job will result in anticipated failure and ultimately expectations of failure.

As is evident from the tenets of gender rules theory, the qualities that are perceived to be essential to performing well in a male sex-typed role are not consistent with female gender stereotypes. The inconsistency between stereotypical female characteristics and traditional male positions or occupations likely results in a perceived lack of fit and, thus poor evaluations. Further, to the extent that the position or occupation is masculine, women will elicit greater perceptions of ill fit and negative evaluations. Essentially, presumptions that women will fail in male-dominated jobs trigger bias toward women.

The lack of fit model has also received empirical support. For instance, the literature has consistently found evidence of gender bias in personnel selection procedures (see Davison & Burke, 2000 and Olian, Schwab, & Haberfeld, 1988, for reviews). Specifically, men are more likely to be viewed as hireable and successful than women, despite having equivalent resumes or other applicant credentials. The implications of stereotyping and lack of fit may exceed personnel decisions by producing a proclivity toward negative judgments of women.

Despite the insight on gender stereotyping and occupational fit provided by the aforementioned theories, these theories do not explore the consequences for women in male-dominated positions when their competence is undeniable. To fill this gap, a fourth gender stereotype theory, the *status incongruity hypothesis* (Rudman, Moss-Racusin, Phelan, & Nauts, 2012), has recently been proposed to take a broader approach to examining gender stereotypes by identifying why women in counter-stereotypic roles

may experience a backlash effect (i.e., reduced likeability at the cost of increased competence, Rudman, 1998).

Specifically, women who have achieved success by, for example, obtaining a position in a male-dominated occupation are perceived to possess the requisite characteristics to successfully perform the job. In essence, women who have demonstrated their competence are likely to experience a reduction in the perceived lack of fit originating from descriptive gender stereotypes. Despite successfully abating descriptive gender norms, women who are successful in male-dominated occupations have, in effect, violated prescriptive gender stereotypes. In other words, although competent women have achieved a positive fit between others' perceptions of them and the requirements of the job, they have also acquired a negative fit between others' perceptions of them and what women should be like (Heilman, 2001). Drawing from research in social psychology, it may be surmised that competent women's counter-stereotypic behaviors will engender negative evaluations (Cialdini & Trost, 1998).

Consistent with the social psychology literature, the status incongruity hypothesis suggests that women who possess power or strive to obtain power through their occupational role become status incongruent. Further, women who engage in masculine behaviors are thought to pose a threat to the gender status quo, which should engender backlash effects. Indeed, a number of studies have found evidence of women experiencing disfavor for engaging in behaviors that are proscribed by gender norms. For example, when women and men fail to exhibit feminine and masculine characteristics, respectively, they are perceived to have poorer mental health and are judged less

positively than individuals who do ascribe to their gender stereotypes (Costrich, Feinstein, Kidder, Marecek, & Pascale, 1975). Further, research has found that descriptions of traditional women are viewed more positively than descriptions of nontraditional women (Haddock & Zanna, 1994). In addition, more recent findings have demonstrated that women experience backlash effects (Phelan & Rudman, 1998; Rudman, 1998; Rudman & Glick, 1999, 2001) or penalties (Heilman & Okimoto, 2007; Heilman et al., 2004; Parks-Stamm, Heilman, & Hearn, 2008) in the form of being viewed as less likeable for exhibiting stereotypically male behaviors or being in a stereotypically male position.

The Backlash Effect

The backlash effect occurs when women who engage in masculine or agentic behaviors may be viewed as competent at the expense of being judged as less likeable or less hireable in comparison to their male counterparts (Rudman, 1998). Societal norms and gender schemas perpetuate the backlash effect. Specifically, career-driven women are often accused of not fulfilling gender prescriptions (Fels, 2004) and are often referred to as a “dragon lady,” “battleaxe,” or “iron maiden” (Kanter, 1977), whereas women who forgo their professional careers to concentrate on their personal and family life also experience scrutiny from others (Shapiro, Ingols, Blake-Beard, 2008). Evidence of the backlash effect is further corroborated by both legal and empirical findings.

Indeed, the landmark *Price Waterhouse v. Hopkins* (1989) case demonstrated an instance in which a woman was not given an executive partnership because although she possessed desirable masculine attributes (e.g., aggressiveness, independence) necessary

for the job, she lacked femininity in her dress and mannerisms (Evans, 2011; Lovoy, 2001). In addition, empirical research has found that the backlash effect has far reaching consequences, which may bias negotiations (Bowles, Babcock, & Lai, 2007), personnel decisions (Phelan et al., 2008), and leader effectiveness ratings (Heilman, Block, Martell, 1995; Heilman et al., 2004; Rudman & Glick, 1991, 2001). Indeed, within the context of executive leadership, gender stereotypes that fuel the double bind may be partially to blame for underrepresentation of female CEOs in Fortune 500 companies (Evans, 2011). For example, the mere process of applying for a higher-ranking position elicits perceptions that women are abrasive, overbearing, and devious and, ultimately, reduces the likelihood that they will be nominated for a promotion (Heilman et al., 2004). More recently, one study demonstrated that women who worked in the building trade, which is predominately comprised of men, received negative reactions for using profanities in their everyday work language and for *not* swearing at work. Those women who did swear were perceived as transgressing proscriptive gender rules, while women who used profane language were evaluated negatively for not conforming to the norms of the job (Denissen, 2010). Taken together, this evidence demonstrates that the backlash effect may have particularly pernicious consequences. Specifically, poor interpersonal evaluations may interfere with women's promotion and rewards (Rudman & Phelan, 2008). Indeed, the literature on supervisor liking indicates that positive interpersonal attitudes towards subordinates are linked to promotions (Thacker & Wayne, 1995; Treadway, Ferris, Duke, Adams, & Thatcher, 2007) and positive performance appraisals (Kolodinsky, Treadway, & Ferris, 2007; Wayne & Ferris, 1990; Wayne & Liden, 1995).

Evidence of the backlash effect is also evidenced by research linking IM behaviors to evaluations from others. First, Rudman's (1998) seminal study on the backlash effect demonstrated that although self-promotion resulted in high competence ratings for women, this IM tactic also led to reductions in social attraction and hireability. In addition, Bolino and Turnley (2001) found that while intimidation was linked to positive performance evaluations for male employees, the same behavior was negatively associated with performance evaluations for female employees. With regard to exemplification, there are no studies to date that explore the consequences of exemplification as a function of gender (Guadagno & Cialdini, 2007). One study, however, demonstrated that exemplification has the potential to backfire in which the actor is viewed as a hypocrite rather than the moral and ethical character they are trying to demonstrate (Gilbert & Jones, 1986). This backfire or backlash may be particularly likely to occur for women in male-dominated fields, such as STEM, as these behaviors are assertive and antithetical to female gender prescriptions (Bolino & Turnley, 2003a). In light of these findings, I hypothesize that *STEM women who engage in high levels of intimidation, self-promotion and exemplification will receive lower likeability ratings than STEM women who do not engage in these behaviors (Hypothesis 10)*.

Despite these findings, a recent call (Scott & Brown, 2006) to examine conditions that attenuate the backlash effect has prompted scholars to identify these circumstances. One solution to overcoming women's double bind may be found in the extent to which women engage in a combination of masculine *and* feminine behaviors. Heilman and Okimoto (2007) explored this issue by examining the degree to which likeability ratings

of female managers were improved by indications of the manager's communal characteristics (e.g., motherhood). The authors contend that women are most likely penalized due to their deficiency in feminine qualities rather than their engagement in masculine behaviors. This process occurs because the nature of the backlash is in the form reduced interpersonal liking, which reflects the female communal gender prescription. Therefore, when women engage in masculine behaviors, they are perceived to possess characteristics that are antithetical to the stereotypical woman. As such, masculine behaviors are not inherently inappropriate for women, but the perceived lack of femininity engenders disapproval. In line with this reasoning, Heilman and Okimoto found that competent women were perceived as more interpersonally likeable when they were also viewed as communal. Heilman and Okimoto's (2007) findings were later echoed in a study conducted by Shaughnessy and her colleagues (Shaughnessy, Treadway, Breland, Williams, & Brouer, 2011). Specifically, the authors found that women who engage in behaviors that are congruent with gender stereotypes while at the same time behaving counter-stereotypically are able to offset a negative backlash effect. As a whole, this research suggests that women's communal behavior may help them to strike a balance between gaining competence without the risk of losing warmth.

In addition, research on gender and impression management also provides evidence that successful women can also be perceived as warm. For example, researchers found that women who are high on self-monitoring (O'Neill & O'Reilly, 2011) or political skill (Shaughnessy et al., 2011) are also able to mitigate potential backlash effects. Self-monitoring reflects the ability to correctly gauge social situations and

determine the best reactions to these situations (Snyder & Gangestad, 1986); whereas, political skill refers to the propensity to accurately comprehend other individuals and use this information for personal or individual gain (Ferris et al., 2005). These constructs are similar in that they both involve the understanding of individuals or situations and how to respond to these stimuli. Further, self-monitoring and political skill are conceptually comparable to IM. Specifically, as previously defined, IM reflects behaviors designed to prompt and perpetuate desirable impressions from others. For instance, research has demonstrated that to the extent that individuals are high self-monitors (Turnley & Bolino, 2001) or possess political skill (Treadway et al., 2007), they will be more likely to express IM behaviors that will elicit favorable responses from others. Indeed, women who were high self-monitors were awarded more promotions, demonstrating evidence of a reduced backlash effect (O'Neill & O'Reilly, 2011). Further, politically skilled women who engaged in ingratiation, or the tactic of providing assistance and praise (Kipnis, Schmidt, & Wilkinson, 1980; Liden & Mitchell, 1988; Yukl, Falbe, & Yoon, 1993) were perceived as more likeable than those who did not (Shaughnessy et al., 2011). Taken together, I expect that feminine IM behaviors may help to counteract the backlash effect. Specifically, I hypothesize that *STEM women who engage in high levels of ingratiation will receive higher likeability ratings than STEM women who do not engage in these behaviors (Hypothesis 11).*

REFERENCES

- Akcinar, E. N., Carr, P. B., & Walton, G. M. (2011). Interactions with men and whites matter too. *Psychological Inquiry*, 22(4), 247-251.
- Allport, G. W. (1954). *The nature of prejudice*. Reading, MA: Addison-Wesley.
- Anderson, J. C., & Gerbing, D. W. (1988). Structural equation modeling in practice: A review and recommended two-step approach. *Psychological Bulletin*, 103, 411-423.
- Anseel, F. (2011). A closer look at the mechanisms of perceived job discrimination: 'How I think you think about us'. *International Journal of Selection and Assessment*, 19, 245-250.
- Ashford, S. J., & Tsui, A. S. (1991). Self-regulation for managerial effectiveness: The role of active feedback seeking. *Academy of Management Journal*, 34(2), 251-280.
- Bakan, D. (1966). *The duality of human existence*. Chicago: Rand McNally.
- Baumeister, R. F. (1982). A self-presentational view of social phenomena. *Psychological Bulletin*, 91(1), 3-26.
- Beilock, S. L. (2008). Math performance in stressful situations. *Current Directions in Psychological Science*, 17, 339-343.
- Beilock, S. L., Rydell, R. J., & McConnell, A. R. (2007). Stereotype threat and working memory: Mechanisms, alleviation, and spillover. *Journal of Experimental Psychology: General*, 136, 256-276.
- Bentler, P. M. (1983). Some contributions to efficient statistics in structural models: Specification and estimation of moment structures. *Psychometrika*, 48, 493-517.
- Bentler, P. M. (1978). The interdependence of theory, methodology, and empirical data: Causal modeling as an approach to construct validation. In D. B. Kandel (Ed.), *Longitudinal drug research* (pp.267- 302). New York:Wiley.

- Beutel, A., & Nelson, D. (2005). The gender and race-ethnicity of faculty in top science and engineering research departments. *Journal of Women and Minorities in Science and Engineering*, 11, 389 - 402.
- Blackwell, L. V., Snyder, L. A., & Mavriplis, C. (2009). Diverse faculty in STEM fields: Attitudes, performance, and fair treatment. *Journal of Diversity in Higher Education*, 2, 195-205.
- Blanton, H., Crocker, J., & Miller, D. T. (2000). The effects of in-group versus out-group social comparison on self-esteem in the context of a negative stereotype. *Journal of Experimental Social Psychology*, 36(5), 519-530.
- Bolino, M. C., & Turnley, W. H. (2001). Gender and the use of supplication and intimidation in organizations. *Academy of Management Proceedings & Membership Directory*, 2001, pA1.
- Bolino, M. C., & Turnley, W. H. (1999). Measuring impression management in organizations: A scale development based on the Jones and Pittman taxonomy. *Organizational Research Methods*, 2, 187–206.
- Bolino, M. C., Turnley, & William, H. (2003a). Counternormative impression management, likeability, and performance ratings: the use of intimidation in an organizational setting. *Journal of Organizational Behavior*, 24, 237-250.
- Bolino, M. C., & Turnley, W. H. (2003b). More than one way to make an impression: Exploring profiles of impression management, *Journal of Management*, 29, 141-160.
- Bowles, H. R., Babcock, L., & Lai, L. (2007). Social incentives for gender differences in the propensity to initiate negotiations: Sometimes it does hurt to ask. *Organizational Behavior and Human Decision Processes*, 103, 84–103.
- Brehm, J. W. (1966). *A theory of psychological reactance*. Oxford, England: Academic Press.
- Brewer, M. B., & Weber, J. G. (1994). Self-evaluation effects of interpersonal versus intergroup social comparison. *Journal of Personality and Social Psychology*, 66(2), 268-275.
- Browne, M. W. (1984). Asymptotically distribution-free methods for the analysis of covariance structures. *British Journal of Mathematical and Statistical Psychology*, 37, 62-83.

- Burgess, D., & Borgida, E. (1999). Who women are, who women should be: Descriptive and prescriptive gender stereotyping in sex discrimination. *Psychology, Public Policy, and Law*, 5, 665-692.
- Camden, C. T., & Witt, J. (1983). Manager communicative style and productivity: A study of female and male managers. *International Journal of Women's Studies*, 6, 258-269.
- Campbell, D. T. (1960). Recommendations for AP A test standards regarding construct, trait, or discriminant validity. *American Psychologist*, 15, 546-553.
- Carli, L. L. (1999). Gender, interpersonal power, and social influence. *Journal of Social Issues*, 55, 81-99.
- Carli, L. L. (2001). Gender and social influence. *Journal of Social Issues*, 57, 725-741.
- Carrigan, C., Quinn, K., & Riskin, E. A. (2011). The gendered division of labor among STEM faculty and the effects of critical mass. *Journal of Diversity in Higher Education*, 4, 131-146.
- Cech, E., Rubineau, B., Silbey, S., & Seron, C. (2011). Professional role confidence and gendered persistence in engineering. *American Sociological Review*, 76, 641-666.
- Ceci, S., Williams, W., & Barnett, S. (2009). Women's underrepresentation in science: Sociocultural and biological considerations. *Psychological Bulletin*, 135, 218-261.
- Charyton, C., Elliott, J. O., Rahman, M. A., Woodard, J. L., & Dedios, S. (2011). Gender and science: Women nobel laureates. *The Journal of Creative Behavior*, 45, 203-214.
- Cheryan, S., Plaut, V. C., Davies, P. G., & Steele, C. M. (2009). Ambient belonging: How stereotypical cues impact gender participation in computer science. *Journal of Personality and Social Psychology*, 97, 1045-1060.
- Cheryan, S., Siy, J. O., Vichayapai, M., Drury, B. J., & Kim, S. (2011). Do female and male role models who embody STEM stereotypes hinder women's anticipated success in STEM? *Social Psychological and Personality Science*, 2, 656-664.
- Cialdini, R. B., & Trost, M. R. (1998). Social influence: Social norms, conformity and compliance. In D. T. Gilbert, S. T. Fiske, & G. Lindzey (Eds.), *The handbook of social psychology*, Vols. 1 and 2 (4th ed.) (pp. 151-192). New York: McGraw-Hill.

- Costrich, N., Feinstein, J., Kidder, L., Marecek, J., & Pascale, L. (1975). When stereotypes hurt: Three studies of penalties for sex-role reversals. *Journal of Experimental and Social Psychology*, 11, 520–530.
- Cronbach, L. J., & Meehl, P. E. (1955). Construct validity in psychological tests. *Psychological Bulletin*, 52, 281-302.
- Dasgupta, N. (2011a). Ingroup experts and peers as social vaccines who inoculate the self-concept: The stereotype inoculation model. *Psychological Inquiry*, 22, 231-246.
- Dasgupta, N. (2011b). With a little help from my colleagues: Strengthening the stereotype inoculation model with insights from fellow psychologists. *Psychological Inquiry*, 22, 299-303.
- Davison, H. K., & Burke, M. J. (2000). Sex discrimination in simulated employment contexts: A meta-analytic investigation. *Journal of Vocational Behavior*, 56, 225-248.
- Denissen, A. M. (2010). The right tools for the job: Constructing gender meanings and identities in the male-dominated building trades. *Human Relations*, 63, 1051-1069.
- Diekmann, A. B., Clark, E. K., Johnston, A. M., Brown, E. R., & Steinberg, M. (2011). Malleability in communal goals and beliefs influences attraction to stem careers: Evidence for a goal congruity perspective. *Journal of Personality and Social Psychology*, 101, 902-918.
- Diekmann, A. B., & Eagly, A. H. (2000). Stereotypes as dynamic constructs: Women and men of the past, present, and future. *Personality and Social Psychology Bulletin*, 26(10), 1171-1188.
- Diekmann, A. B., Goodfriend, W., & Goodwin, S. (2004). Dynamic stereotypes of power: Perceived change and stability in gender hierarchies. *Sex Roles*, 50, 201-215.
- Dodge, K. A., Gilroy, F. D., & Fenzel, L. M. (1995). Requisite management characteristics revisited: Two decades later. *Journal of Social Behavior & Personality*, 10, 253–264.
- Drummond, M. (2010). Beautiful minds: Science needs a woman's touch. *InventorsDigest.com*, May, 19-24.
- Drury, B. J., Siy, J. O., Cheryan, S. (2011). When do female role models benefit women? The importance of differentiating recruitment from retention in STEM.

Psychological Inquiry: An international journal for the advancement of psychological theory, 22, 265-269.

- Duehr, E. E., & Bono, J. E. (2006). Men, women, and managers: Are stereotypes finally changing? *Personnel Psychology*, 59(4), 2006, 815-846.
- Eagly, A. H. (1987). Reporting sex differences. *American Psychologist*, 42, 756-757.
- Eagly, A. H., & Johannesen-Schmidt, M. C. (2001). The leadership styles of women and men. *Journal of Social Issues*, 57(4), 781-797. doi:10.1111/0022-4537.00241
- Eagly, A. H., & Johnson, B. T. (1990). Gender and leadership style: A meta-analysis. *Psychological Bulletin*, 108(2), 233-256. doi:10.1037/0033-2909.108.2.233
- Eagly, A. H., & Karau, S. J. (2002). Role congruity theory of prejudice toward female leaders. *Psychological Review*, 109, 573-598.
- Eagly, A. H., & Steffen, V. J. (1986). Gender and aggressive behavior: A meta-analytic review of the social psychological literature. *Psychological Bulletin*, 100(3), 309-330.
- Eagly, A. H., Wood, W., & Diekmann, A. B. (2000). Social role theory of sex differences and similarities: A current appraisal. In T. Eckes & H. M. Trautner (Eds.), *The developmental social psychology of gender* (pp. 123-174). Mahwah, NJ: Lawrence Erlbaum Associates.
- Evans, D. (2011). Room at the top: Advancement and equity for women in the business world. *National Civic Review*, Summer, 62-64.
- Fein, S., & Spencer, S. J. (1997). Prejudice as self-image maintenance: Affirming the self through derogating others. *Journal of Personality and Social Psychology*, 73, 31-44.
- Fels, A. (2004). Do women lack ambition? *Harvard Business Review*, 82, 50.
- Ferris, G. R., Treadway, D. C., Kolodinsky, R. W., Hochwarter, W. A., Kacmar, C. J. & Douglas, C. (2005). Development and validation of the political skill inventory. *Journal of Management*, 31, 126-52.
- Fiol, C. M., O'Connor, E. J., & Aguinis, H. (2001). All for one and one for all? The development and transfer of power across organizational levels. *Academy of Management Review*, 26, 224-242.

- Fiske, S. T., Cuddy, A. J. C., & Glick, P. (2007). Universal dimensions of social cognition: Warmth and competence. *Trends in Cognitive Sciences*, 11, 77-83.
- Fiske, S. T., Cuddy, A. J. C., Glick, P., & Xu, J. (2002). A model of (often mixed) stereotype content: Competence and warmth respectively follow from perceived status and competition. *Journal of Personality and Social Psychology*, 82(6), 878-902.
- French, J. R. P., J., & Raven, B. (1959). The bases of social power. In D. Cartwright (Ed.), *Studies in social power* (pp. 150-167). Oxford, England: Univer. Michigan.
- French, J. R. P., J., & Raven, B. (1960). The basis of social power. In D. Cartwright & A.F. Zander (Ed.s), *Group Dynamics* (2nd ed.). Evanston, IL: Row & Peterson.
- Gaertner, S. L., Mann, J. A., Dovidio, J. F., Murrell, A. J., & Pomare, M. (1990). How does cooperation reduce intergroup bias? *Journal of Personality and Social Psychology*, 59, 692-704.
- Galinsky, A. D., Magee, J. C., Inesi, M. E., & Gruenfeld, D. H. (2006). Power and Perspectives Not Taken. *Psychological Science*, 17(12), 1068-1074.
- Gawronski, B., & Bodenhausen, G. V. (2006). Associative and propositional processes in evaluation: An integrative review of implicit and explicit attitude change. *Psychological Bulletin*, 132(5), 692-731. doi:10.1037/0033-2909.132.5.692
- Gelfand, M. J., Erez, M., & Aycan, Z. (2007). Cross-Cultural Organizational Behavior. *Annual Review of Psychology*, 58, 479-514.
- Gilbert, D. T., & Hixon, J. G. (1991). The trouble of thinking: Activation and application of stereotypic beliefs. *Journal of Personality and Social Psychology*, 60(4), 509-517.
- Glick, P., Zion, C., & Nelson, C. (1988). What mediates sex discrimination in hiring decisions? *Journal of Personality and Social Psychology*, 55(2), 178-186.
- Goffman, E. (1959). *The presentation of self in everyday life*. Garden City, NY: Doubleday/Anchor Books.
- Guadagno, R. E., & Cialdini, R. B. (2007). Gender differences in impression management in organizations: A qualitative review. *Sex Roles*, 56, 483-494.
- Haddock, G., & Zanna, M. P. (1994). Preferring "housewives" to "feminists": Categorization and the favorability of attitudes toward women. *Psychology of Women Quarterly*, 18(1), 25-52.

- Heilman, M. E. (2001). Description and prescription: How gender stereotypes prevent women's ascent up the organizational ladder. *Journal of Social Issues*, 57, 657-674.
- Heilman, M. E. (1983). Sex bias in work settings: The Lack of Fit model. *Research in Organizational Behavior*, 5, 269-298.
- Heilman, M. E., Block, C. J., & Martell, R. F. (1995). Sex stereotypes: Do they influence perceptions of managers? *Journal of Social Behavior & Personality*, 10, 237-252.
- Heilman, M. E., & Okimoto, T. G. (2007). Why are women penalized for success at male tasks?: The implied communality deficit. *Journal of Applied Psychology*, 92(1), 81-92.
- Heilman, M. E., & Okimoto, T. G. (2008). Motherhood: A potential source of bias in employment decisions. *Journal of Applied Psychology*, 93(1), 189-198.
- Heilman, M. E., Wallen, A. S., Fuchs, D., & Tamkins, M. M. (2004). Penalties for Success: Reactions to Women Who Succeed at Male Gender-Typed Tasks. *Journal of Applied Psychology*, 89(3), 416-427.
- Heyman, G. D., & Legare, C. H. (2004). Children's beliefs about gender differences in the academic and social domains. *Sex Roles*, 50(3-4), 227-236.
- Hopkins, N., Reicher, S., Harrison, K., Cassidy, C., Bull, R., & Levine, M. (2007). Helping to improve the group stereotype: On the strategic dimension of prosocial behavior. *Personality and Social Psychology Bulletin*, 33, 776-788.
- Hyde, J. S. (1984). How large are gender differences in aggression? A developmental meta-analysis. *Developmental Psychology*, 20, 722-736.
- 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.
- Jones, E. E., & Pittman, T. S. (1982). Toward a general theory of strategic self-presentation. In J. Suls (Ed.), *Psychological perspectives on the self*, 231-262. Hillsdale, NJ: Lawrence Erlbaum.
- Joreskog, K. G. (1978). Structural analysis of covariance and correlation matrices. *Psychometrika*, 43, 443-477.
- Judd, C. M., Park, B., Yzerbyt, V., Gordijn, E. H., & Muller, D. (2005). Attributions of

- intergroup bias and outgroup homogeneity to ingroup and outgroup others. *European Journal of Social Psychology*, 35, 677-704.
- Kacmar, K. M., & Carlson, D. S. (1999). Effectiveness of impression management tactics across human resource situations. *Journal of Applied Social Psychology*, 29(6), 1293-1315.
- Kacmar, K. M., Wayne, S. J., & Wright, P. M. (2009). Subordinate Reactions to the Use of Impression Management Tactics and Feedback by the Supervisor. *Journal of Managerial Issues*, 21, 498-517.
- Kamans, E., Gordijn, E. H., Oldenhuis, H., & Otten, S. (2009). What I think you see is what you get: Influence of prejudice on assimilation to negative meta-stereotypes among Dutch Moroccan teenagers. *European Journal of Social Psychology*, 39(5), 842-851.
- Kaplan, S. A., Santuzzi, A. M., & Ruscher, J. B. (2009). Elaborative metaperceptions in outcome-dependent situations: The diluted relationship between default self-perceptions and metaperceptions. *Social Cognition*, 27, 601-614.
- Kanter, R. (1977). *Men and women of the corporation*. New York: Basic Books.
- Keltner, D., Gruenfeld, D. H., & Anderson, C. (2003). Power, approach, and inhibition. *Psychological Review*, 110(2), 265-284.
- Kenny, D. A. (1994). *Interpersonal perception: A social relations analysis*. New York: Guilford Press.
- Kenny, D. A. & DePaulo, B. M. (1993). Do People Know How Others View Them? An Empirical and Theoretical Account. *Psychological Bulletin*, 114, 145-161.
- Kipnis, D., Schmidt, S. M., & Wilkinson, I. (1980). Intraorganizational influence tactics: Explorations in getting one's way. *Journal of Applied Psychology*, 65(4), 440-452.
- Klein, O., & Azzi, A. E. (2001). The strategic confirmation of meta-stereotypes: How group members attempt to tailor an out-group's representation of themselves. *British Journal of Social Psychology*, 40(2), 279-293.
- Klein, O., Pohl, S., & Ndagijimana, C. (2007). The influence of intergroup comparisons on Africans' intelligence test performance in a job selection context. *Journal of Psychology: Interdisciplinary and Applied*, 141, 453-467.

- Koenig, A. M., Eagly, A. H., Mitchell, A. A., & Ristikari, T. (2011). Are leader stereotypes masculine? A meta-analysis of three research paradigms. *Psychological Bulletin*, 137(4), 616-642.
- Kolodinsky, R. W., Treadway, D. C., & Ferris, G. R. (2007). Political skill and influence effectiveness: Testing portions of an expanded Ferris and Judge (1991) model. *Human Relations*, 60, 1747-1777.
- Kray, L. J., Galinsky, A. D., & Thompson, L. (2002). Reversing the gender gap in negotiations: An exploration of stereotype regeneration. *Organizational Behavior and Human Decision Processes*, 87(2), 386-409.
- Kumar, K., & Beyerlein, M. (1991). Construction and validation of an instrument for measuring ingratiation behaviors in organizational settings. *Journal of Applied Psychology*, 76, 619- 627.
- Lane, J. (1999). Why are there so few women in science? *Nature*. Retrieved from http://www.nature.com/nature/debates/women/women_frameset.html
- Lamers, J., Gordijn, E.H., & Otten, S. (2008). Looking through the eyes of the powerful. *Journal of Experimental Social Psychology*, 44, 1229-1238.
- Leuptow, L. B., Garovich, L., & Leuptow, M. B. (1995). The persistence of gender stereotypes in the face of changing sex roles: Evidence contrary to the sociocultural model. *Ethology and Sociobiology*, 16, 509-530.
- Liden, R. C., & Mitchell, T. R. (1988). Ingratiation behaviors in organizational settings. *The Academy of Management Review*, 13, 572-587.
- Lips, H. M. (2008). *Sex & gender: An introduction*. New York: McGraw-Hill.
- Lim, Y.-K. (2012). A longitudinal study of impression management strategies and leadership emergence: The moderating roles of gender and virtualness. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 72(11-B), 7009. (UMI No. AAI3464721)
- Logel, C., Walton, G. M., Spencer, S. J., Iserman, E. C., von Hippel, W., & Bell, A. E. (2009). Interacting with sexist men triggers social identity threat among female engineers. *Journal of Personality and Social Psychology*, 96, 1089-1103.
- Lovoy, L. (2001). A historical survey of the glass ceiling and the double bind faced by women in the workplace: Options for avoidance. *Law and Psychology Review*, 25.

- Macrae, C. N., & Bodenhausen, G. V. (2000). Social cognition: Thinking categorically about others. *Annual Review of Psychology*, 51, 93-120.
- Martell, R. F., Parker, C., Emrich, C. G., & Crawford, M. S. (1998). Sex stereotyping in the executive suite: "Much ado about something." *Journal of Social Behavior & Personality*, 13, 127-138.
- Maume, D. J. (1999). Glass ceilings and glass escalators: Occupational segregation and race and sex differences in managerial positions. *Work and Occupations*, 26, 483-509.
- Morrison, A. M., White, R. P., & Van Velsor, E. (1987). *Breaking the glass ceiling*. Reading, MA: Addison-Wesley.
- Murphy, M. C., Steele, C. M., & Gross, J. J. (2007). Signaling threat: How situational cues affect women in math, science, and engineering settings. *Psychological Science*, 18, 879-885.
- National Science Board. (2008). *Science and Engineering Indicators 2008*. Arlington, VA: National Science Foundation.
- Nagy, B., Kacmar, M., & Harris, K. (2011). Dispositional and situational factors as predictors of impression management behaviors. *Journal of Behavioral and Applied Management*, 12(3), 229-245.
- Olian, J. D., Schwab, D. P., & Haberfeld, Y. (1988). The impact of applicant gender compared to qualifications on hiring recommendations: A meta-analysis of experimental studies. *Organizational Behavior and Human Decision Processes*, 41, 180-195.
- O'Neill, O. A., & O'Reilly, C. A. III. (2011). Reducing the backlash effect: Self-monitoring and women's promotions. *Journal of Occupational and Organizational Psychology*, 84, 825-832.
- Orpen, C. (1996). The effects of ingratiation and self-promotion tactics on employee career success. *Social Behavior and Personality: An International Journal*, 24, 213-214.
- Owuamalam, C. K., & Zagefka, H. (2011). Downplaying a compromised social image: The effect of metastereotype valence on social identification. *European Journal of Social Psychology*, 41, 528-537.

- Pandey, J., & Bohra, K. A. (1984). Ingratiation as a function of organizational characteristics and supervisory styles. *International Review of Applied Psychology*, 33(3), 381-394.
- Pandey, J., & Kakkar, S. (1982). Supervisors' affect: Attraction and positive evaluation as a function of enhancement of others. *Psychological Reports*, 50(2), 479-486. doi:10.2466/pr0.1982.50.2.479
- Parks-Stamm, E. J., Heilman, M. E., & Hearn, K. A. (2008). Motivated to penalize: Women's strategic rejection of successful women. *Personality and Social Psychology Bulletin*, 34(2), 237-247.
- Phelan, J. E., & Rudman, L. A. (2010). Actors' reactions to ethnic deviance: The role of backlash in racial stereotype preservation. *Journal of Personality and Social Psychology*, 99, 265-281.
- Pinel, E. C. (1999). Stigma consciousness: The psychological legacy of social stereotypes. *Journal of Personality and Social Psychology*, 76, 114-128.
- Pollach, I., & Kerbler, E. (2011). Appearing competent: A study of impression management in U.S. and European CEO profiles. *Journal of Business Communication*, 48 (4), 355-372.
- Powell, G. N., & Butterfield, D. A. (1979). The "good manager": Masculine or androgynous? *Academy of Management Journal*, 22, 395-403.
- Preacher, K. J., Rucker, D. D., & Hayes, A. F. (2007). Addressing moderated mediation hypotheses: Theory, methods, and prescriptions. *Multivariate Behavioral Research*, 42, 185-227.
- Prentice, D. A., & Carranza, E. (2002). What women should be, shouldn't be, are allowed to be, and don't have to be: The contents of prescriptive gender stereotypes. *Psychology of Women Quarterly*, 26, 269-281.
- Pronin, E., Steele, C. M., & Ross, L. (2004). Identity bifurcation in response to stereotype threat: Women and mathematics. *Journal of Experimental Social Psychology*, 40(2), 152-168.
- Proost, K., Schreurs, B., De Witte, K., Deroos, E. (2010). Ingratiation and self-promotion in the selection interview: The effects of using single tactics or a combination of tactics on interviewer judgments. *Journal of Applied Social Psychology*, 40, 2155-2169.

- Ragins, B. R., & Sundstrom, E. (1989). Gender and power in organizations: A longitudinal perspective. *Psychological Bulletin*, 105, 51-88.
- Rajecki, D. W., de Graaf-Kaser, R., & Rasmussen, J. L. (1992). New impressions and more discrimination: Effects of individuation on gender-label stereotypes. *Sex Roles*, 27, 171-185.
- Ravlin, E. C., & Thomas, D. C. (2005). Status and Stratification Processes in Organizational Life. *Journal of Management*, 31(6), 966-987.
- Reskin, Barbara. (2003). Including Mechanisms in Our Models of Ascriptive Inequality. *American Sociological Review* 68, 1–21.
- Robinson, R. J., Keltner D., Ward, A., & Ross, L. (1995). Actual versus assumed differences in construal: "Naive realism" in intergroup perception and conflict. *Journal of Personality and Social Psychology*, 68, 404-417.
- Rosenbloom, J. L., Ash, R. A., Dupont, B., & Coder, L. (2008). Why are there so few women in information technology? Assessing the role of personality in career choices. *Journal of Economic Psychology*, 29, 543–554.
- Rosenfeld, P. R., Giacalone, R. A. & Riordan, C. A. (1995). *Impression management in organizations: Theory, measurement, and practice*. New York: Routledge.
- Rosser, S. V. (2004). *The science glass ceiling: Academic women scientists and the struggle to succeed*. New York, NY: Routledge.
- Rudman, L. (1998). Self-promotion as a risk factor for women: The costs and benefits of counterstereotypical impression management. *Journal of Personality and Social Psychology*, 74(3), 629-645.
- Rudman, L. A., & Glick, P. (1999). Feminized management and backlash toward agentic women: The hidden costs to women of a kinder, gentler image of middle managers. *Journal of Personality and Social Psychology*, 77(5), 1004-1010.
- Rudman, L. A., & Glick, P. (2001). Prescriptive gender stereotypes and backlash toward agentic women. *Journal of Social Issues*, 57(4), 743-762.
- Rudman, L. A., Moss-Racusin, C. A., Phelan, J. E., & Nauts, S. (2012). Status incongruity and backlash effects: Defending the gender hierarchy motivates prejudice against female leaders. *Journal of Experimental Social Psychology*, 48(1), 165-179.

- Rudman, L. A., & Phelan, J. E. (2008). Backlash effects for disconfirming gender stereotypes in organizations. In A. P. Brief, & B. M. Staw (Eds.), *Research in organizational behavior*, Vol. 4. (pp. 61–79) New York: Elsevier.
- Ryan, K. M. (2010). Exploring younger workers' metastereotypes in relation to impression management behavior at work. *Dissertation Abstracts International: Section B: The Sciences and Engineering*, 71(5-B), 3392.
- Sagrestano, L. M. (1992). The use of power and influence in a gendered world. *Psychology of Women Quarterly*, 16, 439-447.
- Schlenker, B. R. (1980). Impression management. Monterey, CA: Brooks/ Cole.
- Schneider, D. J. (1981). Tactical self-presentations: Toward a broader conception. In J. T. Tedeschi (Ed.), *Impression management theory and social psychological research* (pp. 23-40). New York, NY: Academic.
- Schmader, T., Johns, M., & Forbes, C. (2008). An integrated process model of stereotype threat effects on performance. *Psychological Review*, 115(2), 336-356.
- Schott, G., & Selwyn, N. (2000). Examining the "male, antisocial" stereotype of high computer users. *Journal of Educational Computing Research*, 23, 291-303.
- Schwinghammer, S. A., Stapel, D. A., & Blanton, H. (2006). Different selves have different effects: Self-activation and defensive social comparison. *Personality and Social Psychology Bulletin*, 32, 27–39.
- Scott, K. A., & Brown, D. J. (2006). Female first, leader second? Gender bias in the encoding of leadership behavior. *Organizational Behavior and Human Decision Processes*, 101, 230-242.
- Sekaquaptewa, D., & Thompson, M. (2003). Solo status, stereotype threat, and performance expectancies: Their effects on women's performance. *Journal of Experimental Social Psychology*, 39(1), 68-74.
- Shapiro, M., Ingols, C., & Blake-Beard, S. (2008). Confronting career double binds: Implications for women, organizations, and career practitioners. *Journal of Career Development*, 34, 309-333.
- Shapiro, J. R., & Williams, A. M. (2012). The role of stereotype threats in undermining girls' and women's performance and interest in STEM fields. *Sex Roles*, 66, 175-183.

- Shaughnessy, B. A., Treadway, D. C., Breland, J. A., Williams, L. V., & Brouer, R. L. (2011). Influence and promotability: The importance of female political skill. *Journal of Managerial Psychology*, 26, 584-603.
- Shelton, J. N., & Richeson, J. A. (2006). Ethnic minorities' racial attitudes and contact experiences with white people. *Cultural Diversity and Ethnic Minority Psychology*, 12, 149-164
- Sigleman, L., & Tuch, S. A. (1997). Metastereotypes: Blacks' perceptions of whites' stereotypes of blacks. *Public Opinion Quarterly Volume*, 61, 87-101.
- Singletary, S. L., & Hebl, M. R. (2009). Compensatory strategies for reducing interpersonal discrimination: The effectiveness of acknowledgments, increased positivity, and individuating information. *Journal of Applied Psychology*, 94(3), 797-805. doi:10.1037/a0014185
- Smith, C. A., Organ, D. W., & Near, J. P. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology*, 68(4), 653-663. doi:10.1037/0021-9010.68.4.653
- Snyder, M., & Gangestad, S. (1986). On the nature of self-monitoring: Matters of assessment, matters of validity. *Journal of Personality and Social Psychology*, 51, 125-139.
- Steele, C. M., Spencer, S. J., & Aronson, J. (2002). Contending with group image: The psychology of stereotype and social identity threat. In M. P. Zanna (Ed.), *Advances in experimental social psychology*, Vol. 34, pp. 379-440). San Diego, CA: Academic Press.
- Stout, J. G., Dasgupta, N., Hunsinger, M., & McManus, M. A. (2011). STEMing the tide: Using ingroup experts to inoculate women's self-concept in science, technology, engineering, and mathematics (STEM). *Journal of Personality and Social Psychology*, 100, 255-270.
- Strack, F., & Deutsch, R. (2004). Reflective and Impulsive Determinants of Social Behavior. *Personality and Social Psychology Review*, 8, 220-247.
- Swann, W. B., Jr. (1987). Identity negotiation: Where two roads meet. *Journal of Personality and Social Psychology*, 53, 1038-1051.
- Tajfel, H. (1981). *Human groups and social categories: Studies in social psychology*. Cambridge, England: Cambridge University Press.

- Thacker, R. A. & Wayne, S. J. (1995). An examination of the relationship between upward influence tactics and assessments of promotability. *Journal of Management* 21, 739–756.
- Torres, K.C., & Charles, C. Z. (2004). Metastereotypes and the black-white divide: A qualitative view of race on an elite college campus. *Du Bois Review*, 1, 115-149.
- Treadway, D. C., Ferris, G. R., Duke, A. B., Adams, G. L., & Thatcher, J. B. (2007). The moderating role of subordinate political skill on supervisors' impressions of subordinate ingratiation and ratings of subordinate interpersonal facilitation. *Journal of Applied Psychology*, 92, 848-855.
- Turnley, W. H., & Bolino, M. C. (2001). Achieving desired images while avoiding undesired images: Exploring the role of self-monitoring in impression management. *Journal of Applied Psychology*, 86: 351-360.
- Turner, J. C., Hogg, M. A., Oakes, P. J., Reicher, S. D., & Wetherell, M. S. (1987). *Rediscovering the social group: A self-categorization theory*. Cambridge, MA: Basil Blackwell.
- Valian, V. (1999). *Why so slow? The advancement of women*. Cambridge, MA: The MIT Press.
- Van den Bos, A., & Stapel, D. A. (2009). Why people stereotype affects how they stereotype: The differential influence of comprehension goals and self-enhancement goals on stereotyping. *Personality and Social Psychology Bulletin*, 35, 101-113.
- Van Dijke, M., & Poppe, M. (2006). Striving for personal power as a basis for social power dynamics. *European Journal of Social Psychology*, 36, 537-556.
- van Leeuwen, E., & Täuber, S. (2012). Outgroup helping as a tool to communicate ingroup warmth. *Personality and Social Psychology Bulletin*, 38(6), 772-783. doi:10.1177/0146167211436253
- Vorauer, J. D., & Claude, S. D. (1998). Perceived versus actual transparency of goals in negotiation. *Personality and Social Psychology Bulletin*, 24(4), 371-385.
- Vorauer, J. D., Hunter, A. J., Main, K. J., & Roy, S. A. (2000). Metastereotype activation: Evidence from indirect measures for specific evaluative concerns experienced by members of dominant groups in intergroup interaction. *Journal of Personality and Social Psychology*, 78, 690-707.
- Vorauer, J. D., Main, K. J., & O'Connell, G. B. (1998). How Do Individuals Expect to Be Viewed by Members of Lower Status Groups? Content and Implications of Meta-

- Stereotypes. *Journal of Personality & Social Psychology*, 75, 917-937.
- Vorauer, J. D., & Miller, D. T. (1997). Failure to recognize the effect of implicit social influence on the presentation of self. *Journal of Personality and Social Psychology*, 73(2), 281-295.
- Vorauer, J. D., & Ross, M. (1999). Self-awareness and feeling transparent: Failing to suppress one's self. *Journal of Experimental Social Psychology*, 35(5), 415-440.
- Walters, J., & McNeely, C.L. (2010). Recasting Title IX: Addressing gender equity in the science, technology, engineering, and mathematics professoriate. *Review of Policy Research*, 27, 317-322.
- Watt, J. D. (1993). The impact of frequency of ingratiation on the performance evaluation of bank personnel. *Journal of Psychology: Interdisciplinary and Applied*, 127(2), 171-177.
- Wayne, S. J., & Ferris, G. R. (1990). Influence tactics, affect, and exchange quality in supervisor-subordinate interactions: A laboratory experiment and field study. *Journal of Applied Psychology*, 75, 487-499.
- Wayne, S. J., & Liden, R. C. (1995). Effects of impression management on performance ratings: A longitudinal study. *Academy of Management Journal*, 38, 232-260.
- Williams, J. E., & Best, D. L. (1990). *Measuring sex stereotypes: A multinational study* (Rev. ed.). Newbury Park, CA: Sage.
- Wilson, R. (2004). Where the elite teach, it's still a man's world. *The Chronicle of Higher Education*, 51, A8.
- Wood, W., & Eagly, A. H. (2002). A cross-cultural analysis of the behavior of women and men: Implications for the origins of sex differences. *Psychological Bulletin*, 128(5), 699-727.
- Xu, Y. J. (2008). Gender disparity in STEM disciplines: A study of faculty attrition and turnover intentions. *Research in Higher Education*, 49, 607-624.
- Yaffe, T., & Kark, R. (2011). Leading by example: The case of leader OCB. *Journal of Applied Psychology*, 96(4), 806-826. doi:10.1037/a0022464
- Yukl, G., & Falbe, C. M. (1990). Influence Tactics and Objectives in Upward, Downward, and Lateral Influence Attempts. *Journal of Applied Psychology*, 75, 132-140.

- Yukl, G., Falbe, C. M., & Joo, Y. Y. (1993). Patterns of influence behavior for managers. *Group & Organization Management*, 18, 5-28.
- Yzerbyt, V., Provost, V., & Corneille, O. (2005). Not Competent but Warm... Really? Compensatory Stereotypes in the French-speaking World. *Group Processes & Intergroup Relations*, 8, 291-308.

FOOTNOTES

¹ The relationships between impression management behaviors and supervisor ratings of competence and likeability were assessed using self-ratings of impression management as well as supervisor ratings of impression management. There were no significant relationships between subordinate assessments of impression management and supervisor ratings. In other words, STEM women's perceptions of their own behaviors were inconsequential to supervisor ratings, whereas supervisors' perceptions significantly corresponded to their evaluations. As such, only the relationships between supervisor ratings of impression management and supervisor perceptions of competence and likeability are reported.

CURRICULUM VITAE

Veronica L. Gilrane graduated from Woodward Academy in College Park, GA in 2004. She received her Bachelor of Arts and Science from the University of Georgia in 2008. She has been employed as an instructor and adjunct professor at George Mason University, a consortium research fellow at the Army Research Institute, and a human capital consultant at PDRI. She received her MA. and Ph.D. from George Mason University in 2010 and 2013, respectively.

SELECTED MANUSCRIPTS

- King, E. B., Dawson, J. F., West, M., Gilrane, V., & Peddie, C. (2011). Why Organizational Community Diversity Matter: The Emergence of Incivility and Organizational Outcomes. *Academy of Management Journal*, 54, 1103-1118.
- Botsford Morgan, W., *Gilrane, V., *McClausland, T. C., & King, E. B. (2011). Social stigma faced by female leaders in the workplace. In M. Paludi (Ed.), *Women as Transformational Leaders: From Grassroots to Global Interests*.
- Gilrane, V. L., McCausland, T.C., Jones, K. J., & King, E. B. (2012). Evaluating the success of workplace multiculturalism programs. In M. Paludi (Ed.), *Managing Diversity in Today's Workplace*.