

More Than a Feeling: The Impact of Affect and Gender as Contextual Constraints on Perceptions  
of Emerging Leaders

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#### ABSTRACT

Although research in leadership perception tends to show males have an advantage over females as a result of gender stereotypes, researchers have theorized recently some of this gender-related cognitive bias may be offset by perceiver affect (Medvedeff & Lord, 2007). In this experiment, a between-participants factorial design was used to examine the impact of gender stereotypes (male or female) and perceiver affect (positive or negative) on participants' leader networks and dynamic perceptions of leadership. Participants were randomly assigned to a affect and leader gender condition with roughly 33 undergraduate students in each group. Leadership perceptions were assessed by examining connections between concepts in cognitive networks and repeated measurements of dynamic ratings. Data were analyzed using the Pathfinder and GEMCAT II (General Multivariate Methodology for Estimating Catastrophe Models) programs. Results suggested gender stereotypes and perceiver affect yield differential effects on leader networks. There was more stability in leader networks for a male leader than for a female, whereas there was more accuracy for perceivers in a neutral mood when compared to those in a negative mood condition. Furthermore, dynamic ratings showed the perceptual process in leadership emergence recognition was non-linear for both the male and female leader. Additionally, those in the negative mood condition were less resistant to changing their leadership perceptions when compared to those in the neutral mood condition. Potential interpretations for these findings are discussed and recommendations for future work in this area are provided.

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## **Introduction**

Although positions of authority and displays of leadership behaviors may often predict the emergence of a leader, these factors do not guarantee such a rise. Many talented and bright individuals have been promoted to positions of leadership only to fail in their new role (Gentry & Chappelow, 2009). Merely holding a position or acting like a leader is not sufficient, because leadership is founded in the mutual and implicit agreement one has power and another will follow (Meindl, 1995; Uhl-Bien, 2006). Indeed, leadership is a socially constructed phenomenon, and not just a function of traits, behaviors, and role assignments. Consequently, some people are not as likely to be viewed as a leader despite their title or actions. This paradox has led researchers to define leadership as “the process of being perceived by others as a leader” (Lord & Maher, 1991, p.11) and has given rise to research in leader emergence.

Leader emergence manifests itself in a group or dyad when one of the group members gains status by being recognized as influential in comparison to others (Mann, 1959). While traits, behaviors, and role assignments undeniably impact this process, situational factors surrounding the potential leader and perceiver may also constrain leadership perceptions. Context can have a powerful influence on information processing. In particular, abstract mental representations of leadership are sensitive to context and temporal states. For example, leadership may take on different meanings in the context of discussing a newly promoted male versus female executive (Hogue & Lord, 2007; Scott & Brown, 2006). The same behavior depicted by a male leader may convey something different when performed by a female leader. For example, a man who raises his voice with his team may be considered a strong leader, whereas if a woman does the same thing she is considered a bully in the workplace (Heilman, 2001).



The gender of an emerging leader has been studied extensively as an important factor in leadership perception, and although researchers seem to agree it influences information processing; there is a lack of consensus among researchers about its exact impact. Historically, females have been thought to be disadvantaged in terms of their leadership recognition (Duehr & Bono, 2006; Eagly & Carli, 2003; Heilman, Block, Martell, & Simon, 1989; Schein, Mueller, Lituchy, & Liu, 1996). Despite the increasing numbers of women in leadership positions, men are still more likely to be perceived and categorized as leaders (Brown, Marchioro, Tan, & Lord, 1998; Eagly & Carli, 2003; Foti, Knee, & Backert., 2008; Johnson, Murphy, Zewdie, & Reichard, 2008; Schein, 2007; Scott & Brown, 2006). The idea of male characteristics being more aligned with those of leaders has been substantiated time and again, and has led to a body of research called “Think Male-Think Manager” (Eagly & Karan, 2002).

Other research, however, points to a female leadership advantage. A meta-analytic review by Eagly and Karau (1991) of studies examining leader gender and emerging leadership outcomes showed males typically emerge as leaders in short-term groups performing tasks while women were more likely to emerge as social leaders. Additionally, recent research points to the increased possibility of women being acknowledged as leaders to a greater extent than men in times of crisis (Ryan & Haslam, 2007; Ryan, Haslam, Hersby, & Borgiorno, 2011) and for their interpersonal skills (Eagley & Johnson, 1990; Eagley, Karau, & Makhijani, 1995). Also, individuals who have had positive experiences with female supervisors in the past are likely to associate female characteristics with those of successful leaders (Duehr & Bono, 2006).

Regardless of whether the stream of literature shows a female or male leadership advantage, researchers use Bem’s Gender Role Theory (1981) to explain their findings (Johnson et al., 2008; Ryan et al., 2011). The theory broadly states each gender has a tendency to possess

certain characteristics our culture has come to associate with being a man or woman. Although these characteristics are different, they are equal since each gender has positive and negative associated attributes. For example, males may be characterized as being objective, while females are characterized as being intuitive. Applying this theory to leadership perceptions, male stereotypes are more likely to be aligned with the image of a leader in most circumstances (Johnson et al., 2008). However, there are times and contexts where female stereotypes may be favored in a leader (Eagly & Karau, 2002).

While cognitive bias resulting from traditional gender roles has been identified as a potential cause for prejudice in leader perceptions, perceiver affect may also play a role. Affect is integral to cognition, especially when individuals must make sense of ambiguous or contradictory information. In terms of leadership perceptions, affect directs attention and helps perceivers determine the value of the various behavioral cues presented by a potential leader (Damasio, 1994). Therefore, affect acts as a contextual constraint which reduces potential confusion surrounding the significance and connotation of different information. For example, comments made by a manager in jest could be laughed off or taken as a lack of leadership, depending on the mood of the perceiver (Medvedeff & Lord, 2007).

As such, affect is a necessary component of perception, especially in situations where the prior experiences of perceivers and their knowledge regarding leaders may be in direct conflict with the behaviors exhibited by a particular target. Although leader affect and its impact on leadership perception has been investigated, with the notable exception of a handful of studies (Kollée, Giessner, & van Knippenberg, 2013; Naidoo & Lord, 2008; Naidoo, Kohari, Lord, & Dubois, 2010; Ritter & Lord, 2007), perceiver affect and its influence on leadership perception

has been almost entirely absent from the literature despite many researchers noting its importance (Medvedeff & Lord, 2007; Shondrick et al., 2010).

Affect may negate some of the impact of gender stereotypes by altering the way individuals process, judge, selectively attend, and recall the attributes and behaviors of a potential leader (Medvedeff & Lord, 2007). Forgas (1995) developed the Affect Infusion Model (AIM) to integrate the various theories explaining how affect impacts information processing. According to this model, affect determines whether a superficial or substantive level of cognitive processing occurs.

Using the AIM model, researchers have found positive moods encourage superficial processing of information (Mackie & Worth, 1989). One possible explanation for these findings is positive moods tend to occur when things are going well so there is little motivation to process additional information (Mackie & Worth, 1991). Positive moods may reflect a benign and safe environment. These same feelings of wellbeing signify what is currently being done is working and there is no reason for changing thoughts or behaviors. As a result, people start processing information automatically leading to a heuristic-based processing style where individuals use their mood or “gut feeling” to make decisions.

In contrast to positive moods, negative moods may signal something is wrong with the current state of affairs, and additional cognitive resources need to be devoted to processing details in the environment. Therefore, negative moods may lead to substantive processing in the form of a careful and vigilant processing strategy used when the target is atypical and raters have no motivational goal guiding them (Bless, 2001; Schwarz & Bless, 1991).

Research findings support the AIM model and suggest negative affect promotes a processing style which is more focused and alert to details in the environment. Positive affect, on

the other hand, promotes a processing style based on short-cuts and schemas (Bless, 2001). Numerous studies have confirmed this model is applicable to perceptions about people (Fiedler, 2001; Forgas & Bower, 1987; and Forgas, Bower & Krantz, 1984). Individuals in a sad mood are more likely to use individuating information about a potential leader, whereas individuals in a positive mood are more likely to use the person's category membership and rely on stereotypical information (Bless et al., 1996). Therefore, individuals in a negative mood may be more accurate in their perceptions of leadership compared to individuals in a positive mood. In short, perceiver affect may help explain the inconsistencies in the literature regarding the advantage of males as leaders.

The current study was designed to examine how multiple constraints simultaneously impact the dynamic reconstruction of leadership prototypes. First, the interactive effects of leader gender and perceiver affect on leadership perceptions are examined. Second, the study provides an understanding as to how the same contextual constraints differentially impact the leadership perception process from first impressions of leader emergence to shifting from one potential leader to another. Finally, this study extends our understanding of how perceiver affect, rather than leader affect, impacts leadership perception.

## **Review of Literature**

### **The Role of Prototypes in the Leadership Perception Process**

A target is determined to be a leader by comparing an abstract conceptualization of a leader, known as the *prototype*, to the target's actual behaviors and traits (Lord, Foti, & DeVader, 1984). Researchers have identified several attributes associated with leader prototypes including intelligence, sensitivity, dedication, tyranny, charisma, attractiveness, strength, and masculinity (Lord et al., 1984; Offermann et. al, 1994; Epitropaki & Martin, 2004). A match

occurs when there is significant overlap between the attributes associated with the prototype and the target's features. Consequently, a leader prototype can be described as a social-cognitive category which influences the encoding, storage, retrieval, and processing of leader behaviors (Shondrick & Lord, 2010).

Prototypes are an essential part of information processing since humans have a limited capacity to deal with the flood of information constantly flowing into their field of awareness. Prototypes help people make sense of the world by focusing their attention on patterns rather than details (Foti, Bray, Thompson, & Allgood, 2012; Foti & Hauenstein, 2007). As a benefit of this process, people can devote their cognitive resources to other tasks, but the downside is likely perceptual errors caused by primarily remembering specifics consistent with the prototype and forgetting those which are inconsistent.

Across contexts and time, researchers find there is a level of consistency in the content of leader prototypes. However, there are also differences among groups based on contextual variables such as working self-concepts (Foti et al., 2012; Markus & Wurf, 1987), organization types (Solano, Becerra, & Lupano, 2007), leader race (Rosette, Leonardelli, & Phillips, 2008; Sy, Shore, Strauss, Shore, Tram, Whiteley, & Ikeda-Muromachi, 2010), and leader gender (Foti et al., 2008). Thus, contextual variables impacting the dynamic reconstruction of prototypes may be important to understanding what drives leadership perception.

### **Connectionist Models of the Leadership Perception Process**

In the past two decades, studies examining leader prototypes have led to an abundance of research attempting to identify the content and structure of leader attributes (Epitropaki & Martin, 2004; Lord et al., 1984; Offerman, Kennedy, & Wurtz, 1994). Although there has been some agreement about the content associated with leadership perception, recent research

proposes this content may be activated differently across perceivers, contexts, and time (Foti et al., 2012; Schyns & Schilling, 2011). Connectionist models help explain this phenomenon where prototypes remain stable yet dynamic.

Figure 1 provides a simplified representation of a connectionist model based on the work of Lord, Brown, Harvey, and Hall (2001) and Medvedeff and Lord (2007). Within this model, three levels of units are processed in parallel. The first level consists of the sensory information associated with a potential leader such as facial, vocal, or behavioral cues, the next level is comprised of the leader prototype and includes a set of interconnected attributes typically associated with leadership, and the third level includes the contextual constraints. These three levels work together to generate leadership perceptions.

The middle of the figure represents the second level and is the architecture of a leader prototype which is composed of interconnected units of stored information processed in the generation of leadership perceptions. These units are leadership attributes which are inferred from behaviors depicted by the potential leader. Constraints in the third level, such as gender stereotypes and perceiver affect, as well as sensory information from the target in the first level are shown to influence concurrently the dynamic reconstruction of the leader prototype network. These adjustments to the prototype are the activated network and may result in fundamentally different leadership perceptions. The activated network, which is illustrated by coloring in the figure helps the perceiver make sense of the incoming information. In terms of leadership, the activated network connects a disconnected set of behaviors depicted by a target and the perception of leadership.

In connectionist models, prototypes are the architecture and content of the representation, but the activated network is what gives meaning to this representation. Prototypes are analogous

to home floor plans. The same home can be arranged very differently depending on the people living in the house. In one situation a new family turns the guest bedroom into a nursery and the basement into a play room, whereas in the other, a young professional may shut the door to the guest bedroom and never use it while turning the basement into a workout area. For both the residents and outsiders, the house is their home. However, the rooms are there for them to use or not to use as they see appropriate for their circumstances. In the same way, prototypes act as context-free, abstract conceptualizations of a concept; the use or nonuse of each room is the activated network which is the adjustment to the prototype made to meet the demands of contextual constraints.

Activation within a network occurs among units. The units in a connectionist model are connected by pathways. Pathways between units allow for the flow of information throughout the network. When units are related, activation tends to occur (e.g., being considerate may activate the unit where information related to cooperation is stored); however, when units are not related, inhibition tends to occur (e.g., being pushy may inhibit the unit associated with cooperation.) Units are only activated if the signal between them is strong and frequent enough to exceed a threshold of excitation (Lord et al., 2001). The strength of a pathway is determined by the degree of relatedness, or weight, of the units. Weights are the product of repeated experiences where individuals learn how concepts are related to one another (Hogue & Lord, 2007). The stronger the weight, the more likely a pathway will be excited or inhibited, leading to the activation or deactivation of the units associated with the pathway. While weights in prototypes develop slowly over time, activation of units is context-specific and dynamic, often developing in only a few hundred milliseconds (Lord et al., 2001).

Activation of the various units in the prototype will iterate multiple times until a pattern is found which maximizes the predictive generalization of the prototype while minimizing the potential error of misperception due to context. When this equilibrium is reached, “resonance” occurs and perception is rendered into consciousness (Grossberg, 2003). Since activated networks are reconstructed rather than remembered, leader prototypes can accommodate changing environments while staying stable enough to preserve the knowledge acquired in previous experiences with leaders (Carpenter & Grossberg, 2003).

Contextual constraints impact the dynamic reconstruction of a prototype, and the resulting activated network, by taking into account situational factors. For example, it may be easy to think about a female being a leader of a nursing team from a local hospital, but not for a team of Army medics. Although both positions essentially require the same competencies and have the same underlying prototype architecture, gender stereotypes act as a context which adjusts how the prototype is reconstructed and leads to different activated networks in each scenario. Consequently, contextual constraints have a large and wide influence on activated networks and resulting leadership perceptions.

Indeed, as situational or perceiver factors change, so do activated networks of leadership. For example, Hunt, Boal, and Dodge (1999) examined how crisis impacted the perceptions of charismatic leadership and found during times of crisis, emerging leaders displayed two types of charisma: crisis responsive and visionary. However, after the crisis had subsided, only those who displayed visionary charisma were still considered leaders. These findings suggest a crisis acts as a contextual constraint by which activated networks for leaders are changed. During times of crisis, crisis-related leadership behaviors such as those described by crisis-related charisma were part of the activated networks for leadership but not in times of calm (Lord et al., 2001).



The literature suggests crisis is not the only contextual constraint to impact leadership perceptions. Indeed, cultural factors (Hanges, Lord, & Dickson, 2000), organizational variables (Pawar & Eastman, 1997), perceiver goals (Foti et al., 2008), self-concept (Foti et al., 2012), and leader gender (Brown, Lord, Hanges, Marchioro, & Tan, 2005; Foti et al., 2008; Hogue & Lord, 2007; Medvedeff & Lord, 2007) have all been identified as contextual constraints in leadership perceptions. The current study examined two contextual constraints, gender stereotypes and perceiver affect, and how they simultaneously impact leadership perceptions.

### **The Effect of Leader Gender on Activated Networks**

Understanding how leader gender impacts leadership perceptions is important, because women are increasingly making up a larger percentage of the workforce. In 2012, 57.7% of all women over the age of 16 worked (Bureau of Labor Statistics, 2012). Despite these numbers showing an increase in the number of women participating in the labor market, women are still perceived to be less ideal leaders than men (Brown et al., 1998; Eagly & Carli, 2003; Foti et al., 2008; Johnson et al., 2008; Schein, 2007; Scott & Brown, 2006). This phenomenon is evidenced by the stagnant number of women occupying top leadership roles in the past decade, which hovers around 14% (Catalyst, 2012).

Cognitive bias resulting from gender stereotypes is one explanation for why women are not as represented in leadership positions as would be expected by their numbers in the labor force. According to social cognitive theorists, most people have well-developed stereotypes of men and women (Bem, 1981). Females are anticipated to possess communal qualities associated with maintaining interpersonal relationships and showing concern for the welfare of others. Conversely, males are expected to be agentic and to reflect qualities associated with being

decisive, independent, dominant, and competitive (Eagly & Karau, 2002; Scott & Brown, 2006; Cann & Siegfried, 1990; Johnson et. al, 2008).

Connectionist models may provide an appropriate framework for understanding the process by which gender stereotypes influence leadership perceptions. Leader gender is a unique construct as it is related to both the sensory information and contextual constraints associated with network activation of leadership perception. In terms of sensory information, facial and vocal cues associated with being a man or a woman are lower level inputs, while gender stereotypes are higher level contextual constraints. Initial observations of a potential leader's voice and face will activate units for either male or female. The unit activation association with gender feeds forward to higher levels in connectionist models, causing the activation of gender stereotypes. Gender stereotypes then exert a top-down pressure on leadership perception. Consequently, leader gender has been identified as a powerful contextual constraint on leadership perceptions (Medvedeff & Lord, 2007; Brown et al., 2005).

Many researchers have identified quintessentially male characteristics such as dominance, strength, boldness, and masculinity as overlapping with leader attributes (Lord et al., 1984, Offerman et al., 1994; Epitropaki & Martin, 2004). Thus, individuals are quite capable of matching male and leader prototypes; however, negotiating differences in expectations of women and leader prototypes may be more difficult (Foti et al., 2008; Johnson et al., 2008; Scott & Brown, 2006). Consequently, a leadership prototype is inextricably also a male one (Bem, 1981).

Therefore, connectionists theorize there are strong and significant pathways between gender and its associated role components (Hogue & Lord, 2007). Thus, the activated network for a male is more likely to result in a state of resonance for leadership perception compared to the activated network for a female, because activation in the male prototype network

simultaneously stimulates agentic attributes which are also central components in the leader schema (Heilman et al., 1989; Powell, Butterfield, & Parent, 2002). This differential pattern of activation may make it more difficult for women to be perceived as leaders than men (Heilman et al., 1989; Powell et al., 2002). Since women do not fit the stereotypical mold of a leader, many of the attributes associated with a leader are never activated in the perceiver, making it difficult for women to be recognized as leaders (Hogue & Lord, 2007).

Consequently, the same underlying leader prototype can be differentially activated by gender constraints, leading activated networks for males and females to be configured differently. This combination of top-down constraints, within prototype linkages, and bottom-up input, can produce different network activation and different leadership perceptions for male and female leaders, even when their behavioral input is exactly the same (Hogue & Lord, 2007).

Therefore, the following hypotheses are made:

*Hypothesis 1:* The activated cognitive representation for a male leader will be denser and include more pathways among leadership attributes than the cognitive representation for a female leader.

*Hypothesis 2:* The activated cognitive representation for a male leader will be more stable than the activated cognitive representation for a female leader.

### **The Effect of Perceiver Affect on Activated Networks**

The previous section discussed reasons why individuals may hold different stereotypes for male and female leaders. Consequently, these differences are expected to manifest in terms of the way leadership attributes are activated during leadership perception. Affect, however, and its ability to guide our attention and direct focus, may influence the processing of gender-related

concepts with respect to leader perceptions by changing the cognitive style used and type of information attended to, respectively, when making evaluations (Forgas, 1995).

**Affect and its impact on cognitive style.** The AIM postulates affect impacts the type of cognitive style used when making evaluations of leadership. Cognitive styles refer to the manner in which information is processed, recalled, and evaluated. Individuals in a positive mood tend to rely on a simplified processing style based on heuristics, whereas individuals in a negative mood employ a more systematic and precise strategy (Forgas, 1987; 1995; Schwarz & Bless, 1991). When compared to individuals in a positive-mood condition, those in negative-mood conditions have been shown to use more elaborate processing strategies (Elsbach & Barr, 1999), be less affected by bias (Forgas, 1997), and be more accurate (Au, Chan, Wang, & Vertinsky, 2003).

In accordance with AIM, several other researchers have looked at the impact of affect on the impulse to take action and devote energy to effortful cognitive processing. Frijda (1987) proposed affective moods have a functional purpose since there is a causal relationship between them and action tendencies. For example, someone who is angry is more likely to take action to remove the source of anger while someone else who is happy is prone to be inactive and display the absence of any action readiness.

Fielder and Bless (2001) and Bless (2001) have extended the work of Frijda by looking at the impact of mood-inductions on cognitive processing tendencies. Findings from their research suggest negative moods signal to individuals there is something wrong with the current state of affairs, and action needs to be taken to solve those problems by devoting increased cognitive resources to effortful thought. Positive moods, on the other hand, reflect a benign and safe environment where no changes are needed and additional action and thought is unnecessary. Illustrating these hypotheses, Naidoo and colleagues (2010) found leadership ratings more

strongly correlated with negative affect were also more accurate. Integration of this literature suggests negative moods lead to elaborate processing strategies aimed at challenging the status quo, whereas positive moods lead to simplistic processing strategies intended to maintain the current positive mood state.

Applying these findings to connectionist models of leadership perception suggests perceiver affect will impact how accurately a potential leader is perceived (Medvedeff & Lord, 2007). As a result of depending on different cognitive styles, those in a positive mood may miss information and make limited, crude adjustments to their cognitive expectancies. On the other hand, negative moods promote a sharpening of the senses and awareness to novel information which may result in a greater degree of association between what is done and perceived.

On this basis, it is expected individuals in a negative mood will rely on behavioral evidence more than their cognitive expectancies of leadership when forming leadership perceptions. Consequently, negative moods increase the likelihood of accurately perceiving the potential leader, despite the gender of the leader. Conversely, if individuals are in a positive mood they will rely on their gender stereotypes when forming perceptions more than behavioral evidence. This effect is predicted to be stronger for females, because there are typically more perceptual errors made when viewing a female leader compared to a male leader (Johnson et al., 2008). Therefore, the following hypotheses are made regarding how perceiver affect differentially impacts the accuracy of leadership perceptions:

*Hypothesis 3a:* There will be a main effect of mood such that individuals in a negative mood will rely on behavioral evidence rather than abstract conceptualizations of leaders, leading to more accurate activated cognitive representations than individuals in a positive mood.

*Hypothesis 3b:* There will be an interaction effect between gender and mood such that individuals in a negative mood will rely on behavioral evidence rather than abstract conceptualizations of leaders, leading to more accurate activated cognitive representations of a potential female leader than a potential male leader. For individuals in a positive mood, there will be no difference in the accuracy of activated cognitive representations for a potential male or female leader.

**Affect and its impact on attention and recall.** In addition to affect influencing the cognitive style individuals use to make evaluations, research also suggests it impacts the type of information individuals selectively attend to, and how input is used to make evaluations. Damasio (1994) found patients who have had brain tumors removed from the ventromedial prefrontal cortex location, an important area of the brain for emotional processes, were unable to make evaluations despite cognitive abilities such as memory, intelligence, and verbal and quantitative abilities remaining intact. According to Damasio, moods are responsible for directing attention and helping individuals make sense of an abundance of information. Because leadership perception involves complex integration of an enormous amount of information in real-time, affect may play an essential role in signaling what type of information is important to attend to and recall during this process.

Research by Forgas and his colleagues (Forgas, 1995; Forgas & Bower, 1987; and Forgas et al., 1984) has demonstrated individuals are able to attend and recall mood-congruent information more readily than mood-incongruent information. For example, individuals in a positive mood are more likely to perceive positive features about a potential leader and remember them, while individuals in a negative mood are more likely to perceive, attend, and recall negative features. Then, this mood-congruent information is used to make evaluations.

Indeed, those in a positive (negative) mood rate themselves and others more favorably (unfavorably) than those in negative (positive) moods, because they are able to recall flattering (unflattering) details more so than critical ones (Forgas et al., 1984; Forgas & Bower, 1987; Forgas, 1995).

In terms of leadership perceptions, perceivers in a positive mood may view the world through “rose-colored glasses” enabling them to see and remember only the good while disregarding all the bad behaviors depicted by a potential leader. Since leaders are often considered to be inherently superior and the best of the best (Schyns & Schilling, 2011), it is reasonable to assume a predisposition to attend and recall the positive would be associated with remembering behaviors reflective of leadership (Foti & Lord, 1987). Conversely, individuals in a negative mood may have a tendency to attend and recall novel behavioral information which may not necessarily be consistent with the leader prototype.

In the context of connectionist models, mood may influence the activation of different attributes in the dynamic reconstruction of the leader prototype (Lord et al., 2001). Positive moods are expected to increase the attention and memory for positive leadership behaviors leading directly to unit activation in the leader prototype. Consequently, positive moods may be associated with the resulting activated network being relatively unchanged from the leader prototype. Negative moods, on the other hand, are expected to increase the attention and memory for negative behaviors. Since there is a lack of romanticism involving the potential leader, new behavioral information may be used to dynamically impact unit activation resulting in an activated network which is quite different from the leader prototype (Uhl-Bien, 2006).

While the enhancement in evaluations accompanying positive moods is expected to help both males and females, males who are stereotypically perceived as leaders will especially

benefit from the increased attention and recall for positive behaviors. As discussed previously, positive moods promote simplistic cognitive strategies. Simplistic cognitive strategies increase the extent to which individuals rely on gender stereotypes, which benefit male leaders and hurt female leaders. Since positive moods promote both positive evaluations of targets and simplistic cognitive strategies, male leader networks are expected to be especially resistant to change.

Therefore, the following hypotheses are proposed:

*Hypothesis 4a:* There will be a main effect of mood such that individuals in a positive mood will selectively attend to and recall positive behavioral information, leading to more stable activated cognitive representations than for those in a negative mood.

*Hypothesis 4b:* There will be an interaction effect between affect and gender such that activated cognitive representations of male leaders for individuals in a positive mood will be more stable than activated cognitive representations of female leaders. For individuals in a negative mood, there will be no difference in the stability of activated cognitive representations for male or female potential leaders.

### **Impact of Leader Networks on Leader Emergence Evaluations**

In order to understand how leader networks influence overall impressions of leadership, both the accuracy and stability of activated networks were examined as potential mediators of the relationship between the contextual constraint, perceiver affect, and leader emergence ratings for both the male and female leader. Based on the discussion in the sections above, negative affect is expected to increase accuracy in the perception for potential female leaders. Additionally, accurate perception should be related to higher evaluations of leadership emergence for a potential female leader. Given these relationships, the following hypothesis is proposed:



*Hypothesis 5a:* The accuracy of the activated cognitive representation for a potential female leader will mediate the relationship between perceiver negative affect and evaluations of leader emergence.

On the other hand, positive affect is expected to increase attention and recall for positive behavioral cues leading to a greater tendency for the leader prototype to be resistant to disturbances in stability, especially for potential male leaders. Further, the extent to which the leader prototype remains stable for a potential male leader should be positively associated with the overall evaluations of leadership emergence for the same man. Given these relationships, the following hypothesis is proposed:

*Hypothesis 5b:* The stability of the activated cognitive representation for a potential male leader will mediate the relationship between positive affect and evaluations of leader emergence.

### **Dynamic Models of Leadership Perceptions**

Activated networks for female leaders can be particularly vulnerable to instability, because there are two equally plausible, yet competing, abstract conceptualizations which could be activated. A female leader could be principally perceived as a leader or as a woman. According to Gender Role Theory, the likelihood of her being perceived as both simultaneously is marginal, because female stereotypes are inconsistent with abstract conceptualizations of leaders (Hogue & Lord, 2007; Johnson et al., 2008).

Since gender expectancies are activated immediately, it is not likely a woman will be perceived as a leader initially (Hogue & Lord, 2007). As a result, women start in a deficit in terms of leadership perceptions. Only with repeated displays of leadership behaviors does the female have a chance of being accepted as a leader.

The reduction of gender bias depends on the ability of perceivers to successfully negotiate multiple competing abstract conceptualizations in such a way an activated network can account for a woman being both feminine and a leader. As discussed in the previous section, it is not likely an activated network for a female leader will be stable. Therefore, the extent to which behavioral input and abstract conceptualizations must match in order to result in leadership recognition is very important for the perception of female leaders (Grossberg, 2003; Medvedeff & Lord, 2007).

Carpenter and Grossberg (2003) proposed two different types of patterns by which people match and shift their perceptions of leadership. The first is called “flexible vigilance” and is characterized by superficial processing. This pattern leads to the use of stereotypes which makes it difficult for perceivers to notice small changes in information. In terms of shifting leadership perceptions, this proposed pattern results in initial perceptions of leadership being retained longer than they should when a stimulus changes. Therefore, change in leadership perception is abrupt and discontinuous. The second is called “rigid vigilance” and is characterized by substantive processing. This pattern leads to effortful scrutiny which results in the ability to use multiple abstract conceptualizations to describe a stimulus. In terms of shifting leadership perceptions, this proposed pattern implies individuals reevaluate potential leaders on a continuous basis as new behavioral information presents itself. Therefore, change in leadership perception is gradual and continuous.

One of the factors potentially impacting which of the proposed patterns by Carpenter and Grossberg (2003) is used in leadership perception is perceiver affect (Hogue & Lord, 2007; Medvedeff & Lord, 2007). Positive moods broaden thinking and promote the use of superficial processing which is associated with flexible vigilance (Fredrickson, 2004; Mackie & Worth,

1989). Conversely, negative moods narrow attention and promote the use of substantive processing which is associated with rigid vigilance (Forgas, 1995). Consequently, positive moods may result in needing a greater amount of behavioral information before leadership recognition occurs. This can be especially problematic for potential female leaders, because they start in a place of deficit when it comes to leadership perceptions.

While the focus in connectionist models is on how individuals create evaluations regarding leaders at a fixed moment in time, researchers use dynamic models to investigate how perceptions of potential leaders change over time when there are competing cognitive categories which could explain the incoming stimuli equally well (e.g., a businesswoman as a leader or a non-leader). The Cusp Catastrophe Model by Thorn (1975) is one example of a dynamic model and is described in greater detail below.

The Cusp Catastrophe Model, as illustrated in Figure 2, describes a system where two latent variables, the asymmetry and bifurcation variables, influence the movement between perceptions aligned with one conceptualization (one attractor state) through ambiguity to perceptions aligned with an alternative conceptualization (the competing attractor state) (Hanges, Lord, Godfrey, & Raver, 2002). A Cusp Catastrophe Model is considered appropriate when there is the presence of one or more catastrophe flags (Gilmore, 1981).

There are five types of catastrophe flaps: catastrophe, bimodal, hysteresis, inaccessibility and divergence. *Catastrophes* are sudden changes in a response as a result of on-going, gradual changes in stimuli. For example, initial resistance in perceiving a female colleague as a leader may be overcome, although quite suddenly, with enough repeated and continuous exposure to her leader traits and behaviors. *Bimodality* refers to the outcome (value for the dependent variable). In the previous example, leader and non-leader perceptions are two alternative

schemas and represent bimodality in the outcome. *Hysteresis* is derived from the Greek word for “lagging behind” and refers to how the abrupt changes from one schema to another depend on whether the asymmetry variable is increasing or decreasing in value. More specifically, it is more difficult to associate a colleague with a non-leader once recognized as a leader or vice versa. *Inaccessibility* refers to the concept proposing certain values of the outcome are unlikely to occur. The final flag is *divergence*, and refers to how minor initial variations in the causal factors will lead to large, diverging behavior from one extreme to another extreme.

While past research has shown linear models are useful for modeling leader perceptions for males, the discontinuous nature of leader perceptions for females as well as the potential for additional variables to impact the overall pattern of shifting perceptions suggest the Cusp Catastrophe Model may be more appropriate to use when examining leadership perceptions over time (Medvedeff & Lord, 2007; Foti et al., 2008). Dynamic systems, demonstrated with a Cusp Catastrophe Model, examine the shift which occurs between conceptualizations, such as leader or non-leader, after enough expectation-inconsistent information accumulates. In leadership perception, the cusp catastrophe model is used to estimate the asymmetry and bifurcation variables, which are two causal factors acting independently to predict changes in leader recognition. The asymmetry variable is a continuous variable which builds up consistently over time, and upon reaching a threshold point, leads to a sudden jump in the outcome. In the current study, the frequency of exhibited leadership behaviors is a function of the leader gender condition and acts as the asymmetry variable, whereas the perception of the target as a leader rather than non-leader is the outcome.

In general, due to cognitive inertia created by gender stereotypes, the frequency at which a female displays leadership behaviors may initially have little to no impact on perceptions of her

as a leader. However, as evidence of her leadership continues to be exhibited, the initial resistance of perceivers to acknowledge her leader role will suddenly be yielded resulting in an abrupt shift in perceiving her as a leader rather than a non-leader. The bifurcating variable moderates how smoothly this transition will occur.

Several variables have been explored as potential bifurcating factors in the relationship between leader gender and leader perceptions (Brown et al., 1998, Foti et al., 2008). Only a few of these bifurcating variables, such as follower and leader gender, self-conceptualization as a leader, and egalitarianism, were found to adjust the movement between the attractor states of leader or non-leader. The present study seeks to build on the current dynamic leadership perception research by examining another potential bifurcating variable, perceiver affect. Positive moods are associated with superficial processing and a flexible vigilance parameter, whereas negative moods are associated with substantive processing and a stringent vigilance parameter. Accordingly, affect may impact the degree of discontinuity between shifts in leader perceptions over time (Medvedeff & Lord, 2007). Specifically, as female leaders emerge, negative moods may lead to a continuous shift in leader perception, whereas positive moods may lead to discontinuous shift in leader perception. Therefore, the following hypothesis is made.

*Hypothesis 6a:* A cusp model will fit the dynamic ratings of leadership perception better than a linear model.

*Hypothesis 6b:* Perceiver affect should load positively on the bifurcation parameter since perceivers in a positive mood are more likely to exhibit a discontinuous change in leadership ratings than perceivers in a negative mood, while perceivers in a negative mood are more likely to exhibit a continuous change in leadership ratings than perceivers in a positive mood.

*Hypothesis 6c:* Leader gender should load on the asymmetry parameter indicating two competing conceptualizations of leaders, a male and female emerging leader.

## **Method**

### **Participants**

One hundred thirty-three undergraduate students from a large southeastern university participated in exchange for course credit. They were recruited from introductory psychology and management courses. Participants ranged in age from 18 to 36 ( $M = 20.63$ ,  $SD = 1.86$ ). The sample consisted of 67 men and 65 women; 77.4% of the sample was Caucasian, 4.5% African-American, 10.5% Asian, 3.8% Hispanic, and other 3.8%. Differences in demographics among the four conditions were also explored and no significant ones were found.

### **Design**

A between-participants factorial design was used to examine the impact of gender stereotypes (male or female) and perceiver affect (positive or negative) on participants' leader networks and dynamic perceptions of leadership. Participants were randomly assigned to a mood and leader gender condition. There were roughly 33 participants in each of the four groups.

### **Procedure**

The study consisted of one experimental session lasting one hour. Participants were recruited through the psychology department's experimental management system, SONA, and through management classes in the business school. Those interested in participating came into the computer lab at the designated time. Prior to the start of the experimental session, participants were randomly assigned to one of the four between subject conditions. Upon arrival to the lab, participants were seated at a computer station, signed an informed consent, and asked if they were left-handed or right-handed so the mouse could be positioned appropriately. Next,

participants completed questionnaires regarding demographics and baseline affect. After this introductory period, participants were told they would be completing a series of tasks including watching videos and completing questionnaires.

At this time, participants began the leader prototype rating task where they were instructed to think about their ideal leader and rate the similarity of the ten attribute-pairs shown in Table 1 in regards to their ideal leader. The specific instructions for the leader prototype rating task were the following:

Please think about your ideal leader, by either thinking of examples of leaders or your experience working with an ideal leader. Your first task in this study will involve judging the relatedness of pairs of concepts in reference to your *IDEAL LEADER*. In making these types of judgments, there are several ways to think about the items being judged. For instance, two concepts might be related because they share common features or because they frequently occur together. Since this kind of detailed analysis is impossible, our concern is to obtain your initial impression of overall relatedness.

**Therefore, please base your ratings on your first impression of relatedness.** Each pair of concepts will be presented on the screen along with a "relatedness" scale. You are to indicate your judgment of relatedness for each pair on the corresponding survey. If you feel the concepts are not related at all select "1". If you feel the concepts are highly related you would select "5". You can think of these numbers as points along a "relatedness" scale, with higher numbers representing greater relatedness.

After participants finished the leader prototype rating task, participants were instructed to raise their hand to let the research assistant know the participant was ready to begin the next part of the study. At this time, participants were shown the first affect-inducing video of 25 images

shown from the International Affective Picture System (IAPS) designed to illicit either negative or positive affect, depending on condition. Participants were told specifically,

The research assistant will show you a photo video consisting of 25 images. It is important you watch this video closely and try to remember the images in the video as much as possible. Future tasks will ask you to determine whether you have seen these images before or not.

After watching the first affect-inducing video, the video-viewing task began where both the second affect-inducing video and Emerging Leader Video were played simultaneously to participants in order to place a higher demand on cognitive resources and force participants to divide their attention between the two videos. Participants were given the following instructions:

In the next task you will be watching two videos simultaneously. Please stop and wait for the research assistant to indicate when you can begin the next task.

One of the videos you will be viewing will be another photo video where you will see 45 images, some of which were presented to you in the first video. Please watch this video carefully as you will be asked which photos were shown in both the first and second photo videos after completion of this task.

In addition to the second photo video, you will also watch a video consisting of five business scenes where four managers are meeting to work on various business tasks. For this video, please move the mouse cursor toward the name of the individual whom you most perceive to be the leader of the group during this time.

The distance of the cursor from the name should reflect the strength of the person's leadership. To be precise, the closer the mouse cursor is to the name of the manager, the more likely you perceive the manager to be the leader of the group at that time.



Furthermore, you can move the cursor as much or as little as you desire to convey your perceptions of any change in the group leadership.

To summarize, you will be watching two videos. The two videos will be shown simultaneously: a second photo video and a business meeting video. In the second photo video, watch closely to see if the images displayed in the first video are shown again. In the business meeting video, move your mouse cursor towards the name of the person you think is the leader of the group at that time. You must try to watch both videos as close [sic] as possible and perform these tasks at the same time.

If you have any questions or concerns, please let the researcher know now.

At this time, participants put on headphones and were asked to confirm they could hear the videos. The volume was adjusted to a comfortable level and both videos were begun at the same time for each participant by the research assistant.

Upon completion of the video-viewing task, participants completed a second measure of affect in order to determine whether or not the affect induction was successful. Then, the leader rating task began where participants rated the relatedness of the 10 attribute-pairs again; however, this time the ratings were of the manager they perceived to be the leader from the Emerging Leader Video shown in the video-viewing task.

Upon completion of the leader-rating task, participants completed measures to assess the leadership emergence for both the male and female leader in the video. Finally, participants in all conditions were shown a funny video clip before being thanked and debriefed. The funny video clip was added to ensure all participants leave the experiment in a positive state of mind including, those who were placed in a negative affect condition.

## **Stimulus Materials**

**Emerging Leader Video.** Leader gender was manipulated through the Emerging Leader Video. The Emerging Leader Video consisted of a subset of five workplace scenarios originally created by Hanges and colleagues (1998) depicting two male and two female managers engaging in a work setting. The creators of the videos identified ten behaviors from previous research indicative of male or female leadership attributes and included examples of these in each of the videos (Hanges et al., 1998).

In the Male Leader condition, the female manager, Sue, started out displaying more leadership behaviors, but as the scenes continued, the number of leadership behaviors displayed by the male manager, Bob, increased while they were simultaneously decreased for the female manager, Sue. In the Female Leader condition, Bob started out displaying more leadership behaviors, but as the scenes continued, the number of leadership behaviors displayed by Sue was increased and decreased for Bob. In both conditions, the same number of leadership behaviors and the same scripts were used - the only difference between the two was the gender of the emerging leader.

Table 1 lists the male and female leadership attributes inferred from the male and female leadership behaviors depicted in the Emerging Leader Video. Table 2 indicates the frequency of male (blue font), female (red font), and total (black font in parentheses) leadership behaviors by manager and scene number for both the female and male leader conditions.

**Mood manipulation.** To induce affect in participants, two videos were presented depicting 25 images from the International Affective Picture System (IAPS; Lang, Bradley, & Cuthbert, 1997). Each image was shown for 15 seconds for a video lasting six minutes and 25 seconds. The IAPS is a set of affective laden stimuli and each of the 25 photos were chosen on the basis of its standardized levels of arousal and valence.

Participants in the positive condition were shown pleasant pictures of people, nature, and food, while participants in the negative condition were shown unpleasant pictures of war, disease, and death. These selected images were calibrated for each condition to elicit similar valence and arousal levels (Lang, 1995).

For the second affect inducing video, 20 additional neutral images were added to the 25 original images for a total of 45 images. These images were repeated to create a 22-minute video.

The second affect-inducing video was designed to provide an affect-induction booster throughout the Emerging Leader Video while also increasing the cognitive demand of the task. Participants were instructed to pay close attention to both the second affect-inducing video as well as the Emerging Leader Video. They were told they would have to indicate in future surveys whether the photos they were currently viewing were the same as those shown in the previous video.

### **Dependent Measures**

**Leader Networks.** The list of attributes, shown in Table 1, was used to create three different leader networks. These ten attributes were identified by Hanges and colleagues as representative of male and female leaders during development of the Emerging Leader Video. Each of the attributes was paired in combination with each of the other attributes for a total of 45 attribute-pairs to be presented randomly and only once for participants to rate. Responses were rated on a five-point scale, “1” indicating “not at all related” and “5” indicating “highly related” for both tasks.

**Leader prototype network.** Before the video-viewing task, the context-free prototype was measured by asking participants to think of an ideal leader and to provide ratings in regards to an “ideal” leader.

**Activated network.** After the video-viewing task, participants performed the same rating task with the same ten attributes; however, participants were asked the second time to provide ratings of the leader in the Emerging Leader Video. These ratings were used to develop the activated leader networks. The degree of similarity between the leader prototype and activated network represents the stability of the abstract conceptualization of a leader.

**Expert Network.** The final leader network was developed by asking subject matter experts in leadership to view the Emerging Leader Video and rate the relatedness of the same ten attribute-pairs on the same five-point scale in regards to both the male (Bob) in the male leader condition and female (Sue) in the female leader condition. The degree of similarity between the activated network and the expert network represents the accuracy of the activated cognitive representation of a leader. This value was used to test Hypotheses 3 and 5a.

**Leadership Emergence Evaluations.** Evaluations of emergent leadership were measured using the seven-item General Leadership Impression scale (GLI; Lord et al., 1984). Perceivers rated both the male and female leader on items assessing leadership ability such as, “How much leadership did Bob exhibit?” and “How much did Bob contribute to the discussion in a meaningful way?” Responses were rated on a five-point scale ranging from “1” indicating “Nothing” to “5” indicating “Extreme Amount” for statements regarding how much each target exemplified leadership emergence. Previous research has shown the GLI scale to have high internal consistency (Cronbach’s alpha for male leader = .85; Cronbach’s alpha for female leader = .87).

**Dynamic Leadership Perceptions.** Vallacher’s (1997) “mouse paradigm” was used to assess changes in participant’s perceptions of leadership. During the video viewing task, participants were instructed to move their mouse cursor towards the name of the person in the

video they saw as the leader at the moment in the Emerging Leader Video. Participants continuously moved their mouse cursors and the computer program read the location (distance from either Bob or Sue's name). The mouse paradigm computer program was able to record the cursor distance from the potential leader every 0.1 seconds for a total of 13,362 dynamic ratings of leadership per participant. The shorter the distance was from the leader's name, the greater the participant viewed the individual as a leader.

**Mood Manipulation Check.** Participants completed the Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) by rating the extent to which they were experiencing each mood on a five-point scale (1 = very slightly or not at all to 5 = very much). The ten PANAS items assessing positive affect were interested, excited, strong, enthusiastic, proud, alert, inspired, determined, attentive, and active. The ten items assessing negative affect were distressed, upset, guilty, scared, hostile, irritable, ashamed, nervous, jittery, and afraid. For both the positive and negative affect schedule, items were summed to yield separate positive and negative affect scale scores which had high internal consistency (Cronbach's alpha for the positive affect schedule = .93; Cronbach's alpha for the negative affect schedule = .86).

**Leadership experience.** To control for the amount of leadership experience a participant had, s/he was asked "How much leadership experience do you have?" Participants answered either none, very little, moderate, or a great deal.

**Experience with a female leader.** To control for differences in participants who had and had not previously worked with a female leader, the question "Have you previously worked for a female supervisor?" was posed. Participants responded either no or yes.

**Supplementary information.** Additional information about the age, gender, and employment status of the participants was collected at the beginning the study.

**Recall Memory Task.** After watching the Emerging Leader Video, participants were asked whether or not five images were shown in the first video only, second video only, both videos, or neither video. The calculation of the percentage of correct responses to the five images was used to determine whether paying attention to the video was related to any of the other outcome measures.

### **Data Analysis and Software Overview**

**Pathfinder overview.** First, in order to examine the organization and structure of leader networks, Pathfinder software was used to model the relatedness of raw scores given for the leadership attributes for the leader prototype and the leader in the Emerging Leader Video provided by participants and experts. The raw scores, also known as proximity data, were input to the Pathfinder program in the form of an upper triangular matrix. Proximity data offer information on the similarity or relatedness between two concepts. Pathfinder software then generates a visual representation of a network where the concepts are symbolized as units and the lines or pathways between the concepts symbolize the shortest-path link distance between those two units also called the path weight. Pathfinder achieves this representation and calculates the number of pathways as well as the weights associated with each by incorporating two major elements of graph theory into an algorithm using both the Minkowski Distance Metric and the triangle inequality (Dearholt & Schvaneveldt, 1990).

The Minkowski Distance Metric is indexed in the Pathfinder algorithm by the parameter  $r$  and determines how the distance between two concepts not directly linked is calculated. When  $r = 2$ , the traditional Euclidean Metric for examining distance is used, but when  $r = 1$  the weight of the pathway is just the sum of the link weights along it. Only when  $r = \text{infinity}$  does it act as a

limiting value where the maximum weight is equal to the largest weight associated with any connection along the pathway (Dearholt & Schvaneveldt, 1990).

The second element involved in the generation of a Pathfinder network is the triangle inequality postulate and is indexed in the Pathfinder algorithm by the  $q$  parameter. This postulate states the sum of the lengths of any two sides must be greater than the length of the third side for any triangle. This postulate assures the final structure of a network contains the minimal number of pathways between any two units. For example, in a network composed of units A, B, and C in triangle ABC, if the similarity ratings between A and C are greater than the sum of similarity ratings between A and B and B and C, then there will not be a pathway between A and C. Including a connection between units A and C would violate the triangle inequality, because there is a shorter path from A to C via unit B (Lim & Klein, 2006).

When  $r$  is set to infinity and  $q$  is set to the number of units minus one, a unique pathfinder model of a network with the fewest number of pathways is created. This generated model is representative of the most parsimonious network and consists of all the original units and the pathways not removed for violation of the triangle inequality computed by the Minkowski Distance Metric (Schvaneveldt, Durso, & Dearholt, 1989).

Consequently, two networks can be compared and estimates of similarity can be calculated by determining the correspondence of pathways in the two networks. Similarity is conceptualized as the number of pathways in common divided by the total number of unique pathways in the two networks. The similarity index ranges in value from 0 to 1 where 0 indicates two networks share no links in common and 1 indicates two networks are identical. In addition to the similarity index, the value associated with the probability the observed number of common pathways in the two networks occur by chance in a hypergeometric probability distribution is

provided. Thus, values of probability greater than .05 are indicative of networks statistically different from one another (Golsmith & Davenport, 1990).

Pathfinder also provides coherence values which are used to assess the dependability of the proximity data. Coherence is a measure of consistency and describes the extent to which a participant's ratings are logical. Specifically, ratings are deemed logical if they meet the property of transitivity which states when "a" is equal to "b" and "b" is equal to "c", "a" is equal to "c". When individuals repeatedly violate this rule, they produce a network with lower coherence. Values less than .20 indicate the participant did not take the task seriously or lacked the attention required to complete the activity. As a first step, participant data files (n=17) which had coherence values of .20 or below were excluded from subsequent network analyses since they correspond to careless responding while providing similarity ratings. Remaining data files (n = 116) having coherence values of .20 and higher were used for network analyses.

**Gemcat II Overview.** To examine how dynamic ratings of leadership change over time, The General Multivariate Methodology for Estimating Catastrophe Models, or GEMCAT, software (Lange, Oliva, & McDade, 2000) was used in this study. GEMCAT II is an improvement on GEMCAT I and is capable of testing multivariate catastrophe models with preselected variables of interest in a confirmatory fashion. GEMCAT II is multivariate because it allows multiple indicators to represent the independent and dependent parameters, and it is confirmatory because it allows researchers to identify the variables to load on each parameter prior to running the model (Oliva, DeSarbo, Day, & Jedidi, 1987).

The equation for the cusp catastrophe model is

$$F(y) = \frac{1}{4}y^4 - \frac{1}{2}by^2 - ay,$$



where Y is the dependent parameter, B is the bifurcation parameter, and A is the asymmetry parameter. Predicted values of the dependent parameter are obtained by taking the first derivative of this equation and setting this differential equation to zero giving the following equation:

$$F(y) = y^3 - by - a .$$

The program utilizes two algorithms, Downhill Simplex Method and Powell's Conjugate Gradient approach, to determine the coefficients best estimating the parameters and minimizing the squared residuals across observations. A non-parametric bootstrapping approach where a specified number of observations are randomly drawn with replacement from the available sample of observations is taken and yields model fit statistics (Oliva, DeSarbo, Day, & Jedidi, 1987).

Through this procedure, the parameters are defined in a way where the residuals are as close to zero as possible and the best fitting cusp model is identified. Resulting values of Pseudo  $R^2$  are provided for the model and its parameters by dividing the residual sums of squares by the total sums of squares and subtracting this value from one. Additionally, a Pseudo-F test examining whether the fit of the data to a cusp model is statistically significant is computed by the program. Finally, Achieved Significance Level (ASL) values are provided for each of the variables in the model and are used as an estimate of how many bootstrap replications were necessary in order for estimates to be reliable. Higher values indicate the variable associated with the ASL is not statistically significant (Lange, Oliva, & McDade, 2000).

Relevant to the current study, we are interested in the suitability of a cusp catastrophe versus linear model where emerging leader condition (male or female) and participant affect (positive or negative) are independent variables and the dynamic leader perception ratings are the dependent variable.

Consequently, the first part of the dynamic analyses is to fit both the cusp catastrophe model and the linear model of leader perceptions to identify which model fits best. A mixed-model ANOVA with a within-subject factor of scene and the between-subject factors of leader gender condition and perceiver affect was performed on the dynamic leader perception ratings. The eta-squared value obtained from the mixed-model ANOVA was compared to the pseudo-R<sup>2</sup> value computed by GEMCAT II for the cusp catastrophe model. Based on previous research, the cusp catastrophe model is expected to account for more variance in the dynamic leader perception ratings.

Since the cusp catastrophe was expected to account for more variance than the linear model, the next dynamic analysis examined the movement from perception of the target as a non-leader to a leader. In this analysis, perceiver affect condition and leader gender was examined as potential bifurcation and asymmetry variables, respectively, by examining their ASL values.

## **Results**

### **Construct Validity of Emerging Leader Video**

To assess the construct validity of the Emerging Leader Video, the dynamic and GLI ratings were examined. It was anticipated that perceivers would have final dynamic ratings consistent with the emerging leader in their condition. The Emerging Leader Video was designed to present participants with two potential leaders to select from either a male or female emerging leader. In the male leader condition, the first half of the video is designed to portray the female as the leader, whereas the second half depicts the male emerging as the leader. In the female leader condition, the opposite occurs. The first half of the video is designed to portray the male as the leader, whereas the second half depicts the female emerging as the leader.

To test for group differences in the Emerging Leader Video conditions, participants' final dynamic ratings of leadership indicating whether the male or female was perceived to be leader were examined. Significant group differences were found for those in the male and female leader conditions ( $M_{MaleCondition} = 289.39, SD = 220.62; M_{FemaleCondition} = -53.62, SD = 263.01, t(114) = -7.63, p < .01$ ). Positive values indicate Bob was chosen as the leader, while negative values indicate Sue was chosen as the leader, ultimately. Further, out of 55 participants in the male leader condition, only five did not rate Bob as the leader in the final moments of the video. Conversely, out of 61 participants in the female leader condition, 25 participants saw Bob, and not Sue, as the leader in the final moments of the video.

These findings show the leader gender manipulation was more successful for the male leader condition than the female leader condition. This seems to be further evidence individuals are more likely to see males emerge as leaders, even when females present the same behavioral evidence. Additional analyses examined data provided only by those participants who viewed the target of the expected gender to emerge as leader are included as supplementary analyses.

### **Manipulation Check**

**Affect Manipulation.** To establish the effectiveness of the mood-manipulation procedure, participants rated their current mood state on the PANAS prior to the manipulation and after viewing videos on leadership. Prior to the induction, there were no significant differences in positive affect ( $M_{NegativeCondition} = 3.17, SD = .79$ ) ( $M_{PositiveCondition} = 2.93, SD = .89$ ),  $t(131) = 1.60, p > .05$ , two-tailed,  $d = .29$ ) or negative affect ( $M_{NegativeCondition} = 1.31, SD = .47$ ) ( $M_{PositiveCondition} = 1.31, SD = .45$ ),  $t(131) = -.07, p < .01$ , two-tailed,  $d = -.01$ ) between the two affect conditions. Following the mood induction, though, participants in the negative affect condition ( $M_{NegativeCondition} = 1.44, SD = .57$ ) reported feeling significantly more negative than

participants in the positive affect condition ( $M_{PositiveCondition} = 1.22, SD = .34, t(131) = 2.72, p < .01$ , two-tailed,  $d = .49$ ). Yet, there were no significant difference in positive affect between the two groups after the induction ( $M_{NegativeCondition} = 2.59, SD = .85$ ) ( $M_{PositiveCondition} = 2.49, SD = .96, t(131) = .64, p > .05$ , two-tailed,  $d = .11$ ).

These findings show the mood manipulation was only partially successful. While negative affect was significantly greater for participants in the negative affect condition, positive affect was not significantly greater for participants in the positive affect condition. Subsequently, the two groups will be referred to as the negative affect and neutral affect conditions. Possible issues with the affect manipulation will be discussed in the discussion section.

### **Descriptive Statistics**

Internal consistency reliability coefficients for the scales measuring GLI showed a high internal consistency for both the scales rating the male and female leader (Cronbach's alpha for the male leader GLI scale = .85; Cronbach's alpha for the female leader GLI scale = .87).

Potential covariates of participant gender, leadership experience, and experience with a female supervisor were also examined as a means of controlling for alternative explanations in the findings. These covariates were not intercorrelated with any of the outcome variables of interest with one exception. Both the male and female leader's ratings for leadership emergence were significantly and negatively related to perceiver gender. This finding indicates female participants rated both the male and female leader higher, in terms of leadership emergence, than male participants ( $r_{MaleGLI}(131) = -.20, p < .01$ ;  $r_{FemaleGLI}(131) = -.24, p < .01$ ). Additionally, most of the participants (78.2%) reported they had moderate or a great deal of leadership experience. Further, 72.9% of the participants reported working with a female supervisor in the

past. For those who had worked with a female supervisor, the amount of time they spent working with her ranged from half a month up to five years.

Finally, the extent to which participants accurately recalled the images in the Emerging Leader Video was explored. Results indicated none of the intercorrelations between the percentage of correct response in image recall and outcome measures were significant. This finding suggests the extent to which participants paid attention to the film had little impact on their leader networks and average dynamic ratings of leadership. This is interesting and may point to the larger issue of perceivers relying on their leader prototypes and stereotypes when making evaluations of potential leaders.

### **Analyses of Leader Networks**

In order to examine the hypotheses dealing with leader networks, Pathfinder network analysis was used to create and examine three leader networks: leader prototype, activated, and expert networks. Since the interest in the current study was revealing the underlying structure of a large amount of data,  $r$  was set to infinity while the  $q$  parameter was set to equal  $n-1$  where  $n$  equals the number of units or traits in the network, or eleven, as suggested by Schvaneveldt and others (Schvaneveldt et al., 1989).

Leader networks were examined in two ways. First, the average leader prototype and activated networks were compared to determine how participants perceived ideal leaders in relation to male and female leaders. Second, similarity indices measuring both the accuracy and stability of activated networks were computed for each participant and tested in an ANOVA and mediation framework.

**Average Leader Prototype Network.** The first step in understanding how gender acts as a contextual constraint and impacts the dynamic reconstruction of a network was to compute a

context-free abstract conceptualization of a leader. Figure 3 was generated in Pathfinder and provides a graphical representation of the average leader prototype network before being exposed to any stimuli. The average leader prototype network produced 28 links with a coherence of .46. Stereotypically male and female leadership attributes are all represented, the center of the network is confidence, which was linked to all of the other leadership attributes.

Interestingly, the female and male leadership attributes are grouped together at opposing ends of the network. The stereotypically male leadership attribute associated with being pushy and the female leadership attribute associated with being appeasing are furthest from the middle of the knowledge network, indicating these two attributes are not central to leadership perceptions. On the other hand, the male leadership attribute associated with confidence and the female leadership attribute associated with being considerate are connected to one another and most of the other leadership attributes making them the focus of the network.

**Differences in Average Activated Networks for Male and Female Leaders.** To understand how participants viewed male and female leaders and to test Hypothesis 1, an average male and female leader activated network was generated and compared. Note the script and behaviors for both the female and male leader were exactly the same, hence any differences found in the average networks are the result of gender differences.

Pathfinder analysis was used to create an activated network for both the male and female leader conditions by taking the average proximity ratings of participants in each group as suggested by Goldsmith and Davenport (1990). The male leader activated network had 26 links on average, whereas the female leader had 31, with respective coherences of .67 and .77.

Figure 4 shows the comparison of the average male to female leader networks. The resulting Pathfinder model of the merged networks was comprised of 33 total connections, 24 of

which were shared in both the average female and male leader networks, leaving two unique pathways in the activated network for the male leader and seven unique pathways in the activated network for the female leader. The similarity between the two networks was provided by Pathfinder and yielded a value of .73 indicating a high degree of overlapping in the pathways. The probability of the observed number of common links or more using the hypergeometric probability distribution was reported to be less than 0.01 which provides further evidence the two networks are statistically the same. Thus, Hypothesis 1 was not supported.

**Comparison of Stability in Activated Networks for Male and Female Leaders.** To understand how stable the activated networks were for the male and female leaders and to test Hypothesis 2, the average leader prototype was compared to the average activated networks for the male and female leaders. Figure 5 shows the comparison of the average male leader network to the average leader prototype network. The Pathfinder model of the two merged networks was comprised of 31 total connections, 23 of which were shared in both the average activated network for the male leader and leader prototype networks.

There were three unique pathways in the average activated network for the male leader and five unique pathways in the activated network for the leader prototype. The similarity between the two networks was provided by Pathfinder and yielded a value of .74 indicating a high degree of overlapping in the pathways. Moreover, the probability of the observed number of common links or more using the hypergeometric probability distribution was reported to be less than 0.01 which provides further evidence the two networks are very similar.

Figure 6 shows the comparison of the average activated network for the female leader to the leader prototype network. The Pathfinder model of the two merged networks was comprised of 37 total connections, 22 of which were shared in both the average activated network for the

female leader and leader prototype networks. There were nine unique pathways in the average activated network for the female leader clustering around behaviors associated with being pushy, appreciative, praising and appeasing. In the average leader prototype network, there were six unique pathways all associated with being competitive. The similarity between the two networks was provided by Pathfinder and yielded a value of .59 indicating a moderate degree of overlapping in the pathways. Moreover, the probability of the observed number of common links or more using the hypergeometric probability distribution was reported to be 0.07 indicating the two networks are not statistically the same.

These two networks were statistically different and so there were many unique pathways in both networks; however, the unique connections in the leader network were all linked to being competitive. This finding seems to suggest perceivers expect leaders to be more competitive than the female in the video. Thus, Hypothesis 2 which predicted the activated cognitive representation for a male leader would be more stable than the one for a female leader was supported.

### **Impact of Perceiver Affect and Leader Gender on Network Stability and Accuracy**

The first step in understanding how emerging leader gender and perceiver affect impacted the organization and structure of leadership attributes was to generate an index measuring the similarity between target leader and expert networks in addition to the similarity between target and prototype leader networks. Based on previous research on networks, *Accuracy* and *Stability* were chosen as the focus for this study (Edwards, Day, Arthur, & Bell, 2006; Foti et al., 2008; Marks, Zaccaro, & Mathieu, 2000). These two network indices represent two aspects of networks both associated with leadership. Accuracy is the correspondence of the activated network for a leader to one for experts and represents the extent to which a perceiver views all of



the leadership attributes displayed by a potential leader correctly. Stability is the correspondence of the activated network for a potential leader to one for a leader prototype and represents the extent to which the dynamic reconstruction of the prototype was not disturbed.

In order to compare leader networks with those of an expert, an expert network was created. Four subject matter experts, two males and two females, in the area of leadership rated the female and male leader in the video on the same ten attribute-pairs as participants rated their prototype leaders. The resulting networks for the subject matter experts were then averaged to produce one network (shown in Figure 7) which was used in subsequent analyses as the expert network. This procedure of deriving an expert network has been followed by other researchers and has been found to be more valid than other methods (Edwards et al., 2006). Coherence values for the networks produced by each of the subject matter experts were .51, .75, .85, and .80.

Using the expert network, the accuracy index computed the overlap between each participant's activated network and one for an expert. The accuracy index describes the overlap between a participant's activated network for the perceived leader in the video and the expert network. Higher values in this index indicate the participant perceived the leader in the video more accurately, according to the experts.

The stability index was the second index created for each participant, and it was computed by comparing each participant's activated network to their leader prototype network using Pathfinder. The stability index describes the overlap between a participant's activated network for the perceived leader in the video and their leader prototype network. Higher values in this index indicate the dynamic reconstruction of the prototype resulting from viewing the potential leader was more stable than for those participants who have lower stability values.

Using these two indices, Hypotheses 3 and 4 predicting relationships between experimental variables and leader networks were explored. To test these hypotheses, a 2 (Leader Gender) X 2 (Perceiver Affect) ANOVA on each of the two similarity indices was conducted. Participant gender, leadership experience, and experience with a female supervisor were all entered as covariates, none of which yielded significant results or interacted with either of the independent variables.

The results for the ANOVA of the main effects model for accuracy are detailed in Table 3 and displayed in Figure 8. There was no significant effect for leader gender ( $F(1, 115) = 1.62, p > .05, \eta^2 = .02$ ). Participants perceived the female leader ( $M = .36, SD = .08$ ) as accurately as the male leader ( $M = .34, SD = .07$ ). On the other hand, there was a significant effect for perceiver affect ( $F(1, 115) = 4.23, p < .05, \eta^2 = .04$ ). Participants in the negative mood condition ( $M = .34, SD = .08$ ) perceived the target leader less accurately than participants in the neutral mood condition ( $M = .37, SD = .08$ ). There was not a significant interaction between the two experimental variables on accuracy ( $F(1, 115) = .01, p > .05, \eta^2 = .01$ ).

Hypothesis 3a proposed negative affect would be associated with accurately perceiving the potential leader, and was not supported. Although affect was associated with accuracy, it was not in the expected direction. Participants in a neutral mood were on average more accurate than their negative mood counterparts. Further, Hypothesis 3b predicted there would be an interaction between leader gender and perceived affect since the impact of negative moods for a female leader would be stronger than for a male leader in terms of accuracy. This hypothesis was not supported.

The results for the ANOVA for stability are detailed in Table 4 and displayed in Figure 9. There was a significant main effect for leader gender ( $F(1, 115) = 8.28, p < .05, \eta^2 = .07$ ) but not

for perceiver affect ( $F(1, 115) = .10, p > .05, \eta^2 = .01$ ) or the interaction between the two experimental variables ( $F(1, 115) = .91, p > .05, \eta^2 = .01$ ), Participants perceived the female leader ( $M = .36, SD = .30$ ) as less similar to the prototype than the male leader ( $M = .51, SD = .26$ ). Participants in the negative mood condition ( $M = .44, SD = .28$ ) perceived the target leader as similar to the prototype as participants in the neutral mood condition ( $M = .43, SD = .29$ ).

Hypothesis 4a predicted affect would be associated with stability, and Hypothesis 4b predicted an interaction between leader gender and perceiver affect since the impact of positive moods for a male leader would be greater in terms of stability. Neither of these hypotheses was supported. Contrary to what was expected, a main effect of leader gender was found where the activated cognitive representation for the male leader was more stable than the one for a female leader. Possible reasons for these findings are explained in greater detail in the Discussion section.

### **Similarity Indices as Mediating Variables between Perceiver Affect and Leadership**

#### **Emergence Evaluations**

Hypothesis 5a stated accuracy in cognitive representations mediates the relationship between perceiver affect and leadership emergence evaluations for a female leader. More specifically, negative affect is predicted to be associated with greater accuracy in perception which will be associated with higher ratings of leadership emergence for a female. Hypothesis 5b stated stability of cognitive representations mediates the relationship between perceiver affect and leadership emergence evaluations for a male leader. More specifically, positive affect is predicted to be associated with a greater degree of stability in activated networks which will be associated with higher ratings of leadership emergence for a male.

To test these hypotheses, the data were split into two sets, one which included only participants viewing the female target, Sue, as the emerging leader and another in which participants viewed the male target, Bob, emerge as the leader. Next, bootstrapping analyses were conducted using methods described by Preacher and Hayes (2008) for estimating direct and indirect effects of mediators. There are two major advantages of using this statistical method especially in the present study where the sample size is small: 1) it does not rely on the assumption of a normal sampling distribution, and 2) there is a lower likelihood of type 1 error as a result of fewer inferential tests (MacKinnon, Lockwood, & Williams, 2004; Preacher & Hayes, 2008; Shrout & Bolger, 2002).

In the first set of analyses, the data were restricted to only participants who viewed the female target, Sue, emerge as a leader. Participant GLI ratings for Sue were entered as the dependent variable, perceiver affect condition as the independent variable, and accuracy of abstract conceptualizations as the proposed mediator in the SPSS macro created by Preacher and Hayes (2008) for bootstrap analyses. Figure 10 graphically depicts these relationships. Gender of the participant, leadership experience, and experience with a female leader were entered as covariates to statistically control for any effects these demographics might have on the proposed relationships.

The results indicated the total effect of perceiver affect on GLI ratings for Sue (total effect =  $-.10$ ,  $p > .05$ ) was not significant. It is a classic requirement to have a significant direct effect of the independent variable on the dependent variable for mediation to be present (MacKinnon et al., 2004). Further, neither the relationship between perceiver affect and accuracy (a path =  $.03$ ,  $p > .05$ ) nor the relationship between accuracy and GLI ratings of Sue (b path =  $1.45$ ,  $p > .05$ ) was significant.

To examine the indirect effect, 2,000 bootstrap samples were generated. These analyses revealed, with 95% confidence, the total indirect effect (i.e., the difference between the total and direct effects) between perceiver affect on GLI ratings for Sue through accuracy in abstract conceptualizations was not significant, with a point estimate of .04 and a 95% BCa (bias-corrected and accelerated; see Efron, 1987) bootstrap confidence interval of -.01 to .16. Thus, Hypothesis 5a was not supported.

In the second set of analyses, the data were restricted to only participants who viewed the male target, Bob, emerge as a leader. It is important to note again, the affect manipulation was only partially successful. There was not a powerful induction of positive affect so the following analysis is not a strong test of Hypothesis 5b. GLI ratings for Bob were entered as the dependent variable, perceiver affect as the independent variable, and stability in abstract conceptualizations as the proposed mediator in the SPSS macro created by Preacher and Hayes (2008) for bootstrap analyses. Figure 11 graphically depicts these relationships. Participant sex, leadership experience, and experience with a female leader were entered as covariates to statistically control for any effects these demographics might have on the proposed relationships. Again, 2,000 bootstrap samples were generated to test the indirect effect.

The results indicated the total effect of perceiver affect on GLI ratings for Bob (total effect =  $-.17$ ,  $p > .05$ ) was not significant. Further, neither the relationship between perceiver affect and stability in abstract conceptualizations (a path =  $.02$ ,  $p > .05$ ) nor the relationship between stability in abstract conceptualizations and GLI ratings for Bob (b path =  $-.19$ ,  $p > .05$ ) was significant. Finally, the bootstrap analyses revealed, with 95% confidence, the total indirect effect (i.e., the difference between the total and direct effects) of perceiver affect on GLI ratings for Bob through stability in abstract conceptualizations was not significant, with a point estimate

of -.01 and a 95% BCa (bias-corrected and accelerated; see Efron, 1987) bootstrap confidence interval of -.10 to .02. Thus, Hypothesis 5b was also not supported.

### **Dynamic Ratings of Leadership Perception Analyses**

Hypothesis 6 predicted the dynamic ratings of leadership perceptions would fit a cusp catastrophe model where the two categories of leader gender, male and female, would represent attractor states and perceiver affect would be related to sporadic shifts in leadership perception. Further, positive moods would be associated with a smooth transition in the recognition of one manager as leader to another. In order to investigate this hypothesis, it was first necessary to investigate the appropriateness of using a dynamic model. To test this, the following data analysis plan was followed.

**Dynamic Rating Data Analysis.** While watching the video, participants indicated their perceptions of leadership in real-time by moving their mouse closer to the person's name whom they believed to be leader. Mouse positions in the form of x- and y- coordinates were recorded every millisecond. Recorded coordinates were then transformed into dynamic ratings by calculating the Euclidean distance between the cursor and the two target leaders' names (Bob and Sue). The female distance was subtracted from the male distance so large positive values indicated the cursor was close to the male leader's name and negative values indicated the cursor was closer to the female leader's name. As a result, positive values of dynamic ratings suggest the participant perceived the male as the leader, whereas negative values indicated the participant perceived the female as the leader.

After the mouse coordinates were converted, the resulting continuous, dynamic ratings of leadership were averaged across the first minute to get a baseline estimate of leadership perceptions, each of the five scenes in the video, and the final minute of watching the video to

yield a total of seven dynamic ratings of leadership. Although it would have been preferable to use all of the dynamic ratings, the calculations needed to be made in order to reduce the total number of dynamic ratings since the software program used in subsequent analyses, GEMCAT II, can only handle a maximum of ten values. Consequently, the seven dynamic ratings of leadership were used in subsequent data analyses. This approach to dynamic data has also been used in previous research with success (Foti et al., 2008).

**Model Identification.** To determine the appropriate model for the dynamic ratings, linear and cusp catastrophe models were fit to the data. To examine a linear model, a repeated measures ANOVA with emerging leader gender and perceiver affect as between-subjects factors and the dynamic ratings of leadership (e.g., baseline, mean ratings for each of the five scenes in the video, and the final rating) as a within-subjects factor was performed. Table 4 lists the means for dynamic ratings for each condition by video time, and Figure 12 illustrates these means.

**Linear model.** The eta-squared value for the full model was .29 signifying the linear model accounted for about 30% of the variance in the dynamic ratings. The first step in determining whether the linear model accounts for more variance than the cusp model was to decide whether a univariate repeated measures ANOVA or a multivariate repeated measures ANOVA was the appropriate test.

Data were analyzed using a mixed-design ANOVA with a within-subjects factor of scene and between-subject factors of leader gender (male, female) and perceiver affect (negative, neutral). Mauchly's test indicated that the assumption of sphericity had been violated ( $W = .23$ ,  $\chi^2(20) = 180.52$ ,  $p < .01$ ), therefore degrees of freedom were corrected using Greenhouse-Geisser estimates of sphericity. The results indicated there were significant interactions between leader gender and video scene ( $F(3.87, 479.69) = 34.45$ ,  $p = .01$ , partial  $\eta^2 = .22$ ) and perceiver

affect and video scene ( $F(3.87, 479.69) = 18.91, p = .01, \text{partial } \eta^2 = .13$ ). Table 5 reports the effects for the full model.

*Main effect of Leader Gender on Dynamic Ratings of Leadership in Linear Model.* Table 6 lists the means and standard deviations for the dynamic ratings for each time point by leader gender condition. There were significant differences between the ratings of the two leader gender conditions at scene one ( $(M_{Male} = -54.82, SD = 16.00; M_{Female} = 149.28, SD = 15.97), t(131) = -9.10, p < .05, \text{two-tailed}, d = 1.59$ ), scene two ( $(M_{Male} = -74.50, SD = 19.91; M_{Female} = 108.72, SD = 19.92), t(131) = -6.54, p < .05, \text{two-tailed}, d = 1.14$ ), scene three ( $(M_{Male} = -10.65, SD = 150.76; M_{Female} = 74.34, SD = 146.47), t(131) = -3.29, p < .05, \text{two-tailed}, d = .57$ ), scene four ( $(M_{Male} = 178.20, SD = 144.44; M_{Female} = -111.90, SD = 197.40), t(131) = 9.64, p < .05, \text{two-tailed}, d = 1.70$ ), and scene five ( $(M_{Male} = 19.74, SD = 123.29; M_{Female} = 8.33, SD = 167.43), t(131) = -2.48, p < .05, \text{two-tailed}, d = .08$ ). The leader gender groups did not differ in their dynamic ratings of leadership at baseline or the final moments of the video.

As illustrated in Figure 13, with the exception of baseline and final ratings, participants in the two leader gender conditions differed significantly in their dynamic ratings of leadership. For the first three scenes of the video, participants in the female leader condition were more likely to perceive the male as being the leader as indicated by positive dynamic ratings. On the other hand, participants in the male leader condition were more likely to perceive the female as being the leader as indicated by negative dynamic ratings. During scene 3 there is lessening in the gap between the two groups and their perceptions of who they perceive to be leader. By scene 4 there is a dramatic difference in leadership perceptions between the two groups, and participants in the female leader condition now view the female as the leader while those in the male emerging leader condition view the male as the leader. During scene five the difference between groups



decreases again. At both the baseline and final moments in the video, both emerging leader groups perceived the male to be the leader.

*Main effect of Perceiver Affect on Dynamic Ratings of Leadership in Linear Model.* Table 7 lists the means and standard deviations for the dynamic ratings for each time point by affect condition. As illustrated in Figure 14, participant evaluations of leadership made within the first minute of the watching the video differed by whether they were in a neutral or negative affect condition baseline ( $M_{\text{Neutral}} = 18.47, SD = 58.11; M_{\text{Negative}} = 76.35, SD = 60.44$ ),  $t(131) = -5.44, p < .05$ , two-tailed,  $d = .10$ ). Considering negative ratings indicate the participant perceived the female to be a leader while positive ratings indicate the participant perceived the male to be a leader, neither group strongly endorsed the female as a leader initially. Although both endorsed the male leader initially, these ratings were higher for those in a negative mood as opposed to those in a neutral mood. In addition, both perceiver affect groups were more likely to view the male as leader throughout the duration of the video. There was no significant difference in leadership perceptions during the video scenes for either the male or female emerging leader in either affect condition until the final rating where there is a drastic split between ratings ( $M_{\text{Neutral}} = 281.44, SD = 220.71; M_{\text{Negative}} = -43.66, SD = 265.67$ ),  $t(131) = 7.68, p < .05$ , two-tailed,  $d = 1.34$ ). As expected, the male was perceived to be a leader in the neutral affect condition, whereas the female was perceived to be the leader in the negative affect condition.

*Cusp catastrophe model.* GEMCAT II was used to examine the fit of the cusp catastrophe model. GEMCAT II is an improvement on GEMCAT I and is capable of testing multivariate catastrophe models with preselected variables of interest. Using a combination of Downhill Simplex method and Powell's Conjugate Gradient approach, the GEMCAT program minimizes the total squared residuals and estimates the various model parameters.

GEMCAT computes a fit index called the Pseudo- $R^2$  value for each of the model parameters as well as an overall measure of the model's fit. It is predicted emerging leader gender acts as an asymmetry (A) variable, while perceiver affect acts as a bifurcation (B) variable in the hypothesized cusp model with the dynamic ratings of leadership as the outcome (Y) variables. A run of 500 bootstrap replications produced a pseudo- $R^2$  of .89 for this model demonstrating the cusp model accounted for more variance than the linear model. Thus, Hypothesis 6a was supported.

The Pseudo- $R^2$  values for the A and B parameters, however, produced mixed results. The Pseudo- $R^2$  value of the bifurcation variable, perceiver affect, is .80 (Pseudo-F (8,123) = 53.83,  $p < .05$ ) indicating perceiver affect condition significantly impacts the extent to which dynamic ratings of leadership shift smoothly. This value was positive, meaning neutral moods were associated with discontinuous shifts while negative moods were associated with continuous shifts. Thus, Hypothesis 6b was supported. The asymmetry variable, emerging leader gender, was not significant and produced a negative Pseudo- $R^2$  value of -25.08 (Pseudo-F (8,123) = -12.60,  $p > .05$ ). According to Lange and colleagues (2000), negative values indicate this model parameter is not working well in the cusp model. Thus, Hypothesis 6c was also not supported.

In summary, the cusp catastrophe model is superior to the linear model in terms of the amount of variance explained in the dynamic ratings of leadership. Since emerging leader gender was not significant in the cusp model, there is no support for the idea leader conditions act as attractor states in the cusp model. However, perceiver affect did load positively and significantly on the bifurcation variable indicating negative moods were associated with a greater degree of smoothness in shifting leadership perceptions, regardless of emerging leader gender.

### **Supplementary Analyses**

As mentioned previously in the manipulation check section, there were significant group differences in final dynamic ratings for those in the male and female leader conditions ( $M_{MaleCondition} = 289.39, SD = 220.62; M_{FemaleCondition} = -53.62, SD = 263.01, t(114) = -7.63, p < .01$ ). On average, participants in the male leader condition rated the male as leader in the final moments of the video and vice versa in the female leader condition. However, in the female leader condition there were many participants ( $N=25$ ) who had their final dynamic ratings consistent with perceiving the male emerge as a leader rather than the female. The following supplementary analyses examine within condition differences in activated networks for those who perceived the male and female as leaders and retest hypotheses associated with the networks.

**Summary of Findings from Supplementary Analyses.** In terms of examining within condition differences between those who saw the intended target versus those who saw the opposite gendered target as leaders, there was a difference between the male and female leader condition. There was a significant difference in activated networks for those in the male leader condition who perceived the male to be leader compared to those who perceived the female as leader (Figure 15). The main difference was participants who perceived the male as leader also saw him as pushy, whereas those who perceived the female to be leader also saw her as competitive and independent. On the other hand, there was no significant difference in activated networks for those in the female leader condition who perceived the female to be leader compared to those who perceived the male as leader (Figure 16).

Next, the network hypotheses were reexamined using only those participants who viewed the intended target as leader. Figure 17 shows the comparison of the average male to female leader network for participants who had final dynamic ratings consistent with perceiving the

intended target emerge as leader. Pathfinder analyses showed there was no significant difference in activated networks for those who perceived the male compared to the female as leader. Figure 18 shows the comparison of the average male leader network with the leader prototype network, while Figure 19 shows the comparison of the average female leader network to the leader prototype network. There were no differences in the stability of prototypes for male or female leaders; both the male and female leader-activated network was statistically the same as the leader prototype.

## **Discussion**

The purpose of this research was to move beyond the theoretical suppositions made by researchers regarding the impact of contextual constraints on leadership perceptions and study them empirically (Lord et al., 2001; Lord & Medvedeff, 2007). Emerging leader gender and perceiver affect were examined in order to determine the impact of dual contextual constraints on the structure and organization as well as the shifting of leadership perceptions. Specifically, this study sought to empirically demonstrate predictions made regarding the moderating impact of affect on differences in leadership perception for male and female leaders using connectionist and dynamic models (Medvedeff & Lord, 2007). While this study is not the first to examine leadership in connectionist and dynamic models, it is one of the first to examine two contextual constraints and how they combine to influence perceptions.

### **Average Leader Prototype**

In this study, participants were asked to provide similarity ratings for leadership attributes associated with an *ideal* leader. The average leader prototype resulting from this prompt consisted of pathways among stereotypically male and female leadership attributes. Although these attributes seemed to cluster at opposing ends, the male attribute of confidence

and the female attribute of consideration are at the center of the network, while the male attribute associated with being pushy and the female attribute associated with being appealing are the least central to the network. In some respects, being pushy and appealing could be considered the worst representation of their respective genders in a leadership role, while confidence and consideration represent the best each gender traditionally has to offer.

This finding is consistent with Romance of Leadership theories which suggest leaders have assumed a heroic status in our culture and are characteristic of the best qualities in a person (Meindl & Erlich, 1987). Additionally, this finding conflicts with the notion suggesting bias against women as leaders is the result of relationship-oriented attributes associated with female stereotypes being inconsistent with the stereotypically male attributes of agency and dominance traditionally thought to be necessary for an effective leader (Eagly & Karau, 2002; Heilman, 2001; Powell et al., 2002).

Based on these results, the ideal leader prototype should be characterized as a combination of the best both men and women stereotypically have to offer in a leadership role (Eagly & Carli, 2003). This finding may be in part impacted by the large number of participants who reported having previous experience with a female leader. As individuals encounter more female leaders, it is expected the weights in their leader prototype would change to reflect these new experiences. Students have historically been slower to change gender stereotypes related to leadership; because they have not been exposed to as many different types of leaders (Duehr & Bono, 2006). Extending previous work examining gender stereotypes and leadership perceptions, the current study found stereotypes may be changing, even for students.

### **Leader Gender and Leadership Perceptions**

The first part of this study examined the differences on average between the networks activated by perceivers who viewed either a male or female emerge as a leader. The resulting average networks for the leaders were then compared. The results suggested there were no significant differences in the leader networks from the male and female emerging leader conditions. for a leader prototype, and a difference was found between the similarities to the leader prototype for the two leader networks.

Although the two average leader networks were not significantly different from each other, the female leader network, but not the male leader network, was significantly different from the leader prototype. On average, there was a greater degree of overlap between the male leader and leader prototype networks than between the female leader and leader prototype networks. Further, subsequent ANOVAs showed participants perceived the male leader to be more similar to their individual leader prototype.

Compared to the leader prototype, the female leader network included unique pathways between the behaviors associated with being pushy and appreciative, considerate, and independent; appreciative and independent and cooperative; considerate and praising; appeasing and confident; and praising and decisive. For the most part, these unique pathways involve attributes more stereotypically aligned with a female prototype than the leader prototype. In addition, all five of the unique links in the average leader network were connected to being competitive.

Taken together, these results suggest there is still a preference for a male over a female leader; despite awareness the ideal leader should possess both stereotypically masculine and feminine attributes. This suggests participants may have responded in a socially desirable manner, indicating a lack of explicit gender stereotypes in relation to leadership; however, the

presence of implicit biases may still exist. These findings are consistent with those from previous research showing female leaders are disadvantaged because of the perceived mismatch between communal attributes associated with females and agentic attributes associated with males. While individuals may have no problem perceiving female and male attributes connected in a female target leader, the same set of behaviors are viewed as incongruous in leader prototypes (Eagly & Karau, 2002; Heilman, 2001).

The differences in the activated network pathways for the male and female leader are interesting. The male leader was perceived as both competitive and cooperative, while the female leader was not. Additionally, when the female was acting in a stereotypically feminine manner by expressing consideration and appreciation, it was viewed as being pushy. This finding may speak to the larger problem of women being portrayed as “nags” (Mavin, Bryans, & Cunningham, 2010). Repeated requests to perform a task or respond to a question coupled with displays of consideration and appreciation, especially by a woman, may be reminiscent of treatment during childhood. Managing in this manner may lead to feelings of hostility. Thus, attempting to show consideration and respect when making a request may actually backfire in business settings for female leaders.

Additionally, both the average leader prototype network and male leader network included more connections with competitive behaviors than the female leader network. This finding extends other research showing male leaders are not only overrepresented in competitive business contexts (Melmendier & Tate, 2008), but they are also preferred to female leaders despite ability in these situations (Reuben, Rey-Biel, Sapienza, & Zingales, 2012). Also, this finding may provide a basis for why gender differences in leadership emergence in competitive environments occur. Even when women display behaviors associated with being competitive,

they are not perceived that way by others making them less likely to be promoted to leadership roles in high pressure, cut-throat business environments.

While network analyses showed leader gender impacted the similarity between leader and prototype networks, the same was not the case for dynamic leadership perceptions. Unlike previous researchers (Foti et al., 2008; Hanges et al., 1997) who examined the impact of gender on dynamic ratings of leadership perception, emerging leader gender was not found to be a significant attractor of dynamic leadership perceptions. Several limitations, discussed below, may help explain why these findings were not replicated.

### **Perceiver Affect and Leadership Perceptions**

In addition to leader gender, perceiver affect was examined as a contextual constraint on leadership perceptions. By examining the similarity between leader and expert networks, findings from this study suggested perceiver affect impacted the degree to which perceivers accurately viewed a leader. Specifically, negative moods were found to be associated with inaccurate perceptions of leaders overall. However, when examining the dynamic leadership ratings in a cusp model, affect was found to act as a bifurcating variable, and negative moods were associated with continuous shifts in leadership perception. Thus, participants induced to feel negatively were likely to smoothly change their perceptions as evidence of leadership was presented, regardless of whether the leader was male or female.

These findings were somewhat contrary to what was originally hypothesized. The AIM predicts negative affect will be associated with substantive cognitive processing and lead to greater accuracy in perception. Although negative moods were associated with continuous shifts in leadership recognition, which is consistent with substantive processing strategies, those in the negative mood condition also produced less accurate activate cognitive representations of the



leader in the video. The opposite was true for those in the neutral mood condition. They were more accurate overall in their leadership perceptions; however, they were more likely to stick with prior leadership evaluations when newer ones were more appropriate given the behavioral information presented in the video.

These findings echo sentiments by other researchers who examined the complex interplay of affective and cognitive systems. Affect has been found to have a wide range of effects on person perception and evaluation, depending on the situation. Specifically, motivation and capacity are two of the underlying factors moderating the influence of affect on information processing, (Mackie & Worth, 1989). In the context of the current study, negative moods may have increased the motivation to pay attention to details leading to a greater willingness to change leadership perceptions from moment to moment during the video. Yet once the video was completed and the participants were asked to make their final evaluations of the leader in the video, those in the negative mood condition may have been fatigued and made less accurate evaluations overall. Therefore, neutral moods potentially facilitated the accuracy of leadership perceptions overall, because negative moods caused a capacity overload in cognitive resources for participants.

Further, participants in the negative mood condition may have had to deal with an increase in activation of material related to negative incidents. As a result, those in the negative mood may have been unable to systematically process as much information as those in the neutral moods during the final tasks in the experiment (Riediger, Wrzus, Schmiedek, Wagner, & Lindenberger, 2011). Although negative moods facilitated leadership perception from moment to moment as measured by the dynamic ratings, the presence of all the additional activated material may have distracted and confused participants when making their final ratings of the leader.

The above discussion is just one explanation for these findings, and since motivation and capacity were not measured in the current study, is hypothetical. Future studies in this area should examine potential underlying mediators, such as motivation and capacity, in the relationship between affect and leadership perception. Additionally, these findings highlight the importance of defining the precise moment of interest in the leadership perception process when trying to determine the impact of any factor in future studies.

### **The Combined Impact of Emerging Leader Gender and Perceiver Affect and Leadership Perceptions**

It was predicted emerging leader gender and perceiver affect would interact to impact the accuracy and stability of cognitive representations of leaders. Neither of these hypotheses was supported, indicating emerging leader gender and perceiver affect act differentially to impact leadership perceptions. It appears perceiver affect impacts the accuracy to which a target leader is perceived, while leader gender impacts the degree to which this target is viewed to be similar to a leader prototype. Therefore, there was no evidence to support the idea affect mitigates any of the bias associated with differences in leadership perceptions for males and females. In light of the partial success of the mood manipulation, perhaps the amount of affect experienced by the perceivers was not strong enough to overcome the predispositions of the participants.

In addition to predicted interactions, the accuracy of the activated cognitive representation for a potential female leader was expected to mediate the relationship between perceiver affect and ratings of leadership emergence for the female leader. Additionally, the stability of the activated cognitive representation for a potential male leader was hypothesized to mediate the relationship between affect and ratings of leadership emergence for the male target leader. The requirement to have a significant direct effect between the independent variable,

perceiver affect, and the dependent variable, ratings of leadership emergence, for mediation to be present was not met in either analysis. This may also be attributed to the lack of affect manipulation resulting in differences in leadership emergence ratings.

### **Limitations**

There were several limitations associated with this study. First and foremost, the mood manipulation was only partially successful. While participants in the negative affect condition showed an increase in negative mood after the mood induction, participants in the positive affect condition were no happier than those in the negative mood after the mood induction. Examining the means of the positive affect scale for the two mood induction groups both before and after the mood induction showed most participants were happier before the experiment began and less happy after the mood induction. It may be argued the study itself acted as a mood induction since it was a long, tedious, and focused task which lacked excitement and interest for undergraduates. Future experimental studies looking to manipulate affect may have better luck by inducing affect through real-life situations (e.g., positive affect induced by getting extra credit or negative affect induced by computer system failures) rather than viewing images.

Another second potential limitation surrounds the fact participants viewed both the male and female targets as emerging leaders in the video. It was expected participants in the emerging male leader condition would view the male as the leader while participants in the emerging female leader condition would view the female as the emerging leader; however, there was not a significant difference in leadership emergence ratings for the two conditions. This lack of difference in rating between the two targets may be the result of social desirability on the part of the participants to rate female targets as highly as male targets in terms of leadership.

Further, in the task where participants were asked to rate the similarity between the attributes shown in the emerging leader video for the person they perceived to be the leader, it is not known which target was actually rated by the participants. These similarity ratings were the same used subsequently to develop the target leader networks so while there were group differences in the similarity between target leader and prototype leader networks for the male and female target leader, it cannot be said with certainty the male target was rated in the emerging male condition or vice versa. Therefore, these results must be interpreted with caution.

Additionally, future research examining the impact of perceiver affect on leadership perception may need to be conducted in situations where study participants can connect their affective states to the target leader. Projection of internal moods onto external evaluation targets may have only a limited impact on leadership perception in comparison with moods directly linked to the object of judgment (Hall and Lord, 1995). For example, leaders who display expressions of positive emotions evoke positive emotions in followers and are rated as more effective by followers (Bono & Ilies, 2007).

Finally, there were some issues with the sample which need to be taken into consideration. First, the sample consisted of college students. Leadership perceptions have been shown to be influenced by past experiences with leaders (Foti et al., 2008; Hogue & Lord, 2007). Therefore, future research needs to test whether the current findings replicate in an organizational sample. Second, the sample size for each condition was rather small. The data for 17 participants were removed from data analyses involving networks as a result of low coherence levels. As a result, each condition was comprised of only 27 to 32 participants each making it difficult to detect significant differences between conditions, especially for analyses examining interactions with small effect sizes (Aguinis, Beaty, Boik, and Pierce, 2005).

## **Implications and Future Directions**

There has been a debate about the existence of a female leadership advantage in certain contexts, and the current study shows the answer is much more complex than just whether or not women are rated the same as men in terms of leadership. Although some researchers have even gone as far as to argue gender no longer matters in leadership perceptions (Eagly, 2007; Veccio, 2003), others have found a female leadership advantage in times of crisis (Ryan & Haslam, 2007). Findings from this study show gender did not impact the overall ratings of leadership emergence; however, in terms of similarity to a network structure of a leader prototype, gender differences were important. Perceivers were not able to negotiate seemingly contrasting male and female attributes linked together in the leader prototype, even when the individual effects of these attributes on leadership perceptions were positive. As a result, examining only the ratings of leadership attributes in isolation to other attributes may misrepresent the whole perception of the target. Consequently, methods using the pattern-oriented approach should be considered in future research since they view individuals as a holistic entity and focus on the multidimensional, interactive pattern across traits within individuals (Foti et al., 2012).

Recently the field of social neuroscience has also tried to answer the question of how perceptions of people shift over time using neuroimaging studies that examine the parts of the brain activated during information processing (Van Overwalle, 2009). Results from these studies show emotional experiences activate parts of the brain beyond the ventral and dorsal parts of the mPFC which are parts of the brain directly associated with social perception. Therefore, it is likely the impact of affect is limited to the integration of data about leadership attributes and the variation of the inferences made about objects of perception (Amodio & Frith, 2006; Van Overwalle, 2009). In the future, leadership researchers may want to consider borrowing methods

from neuroscience in order to examine the influence of contextual constraints on leadership perceptions.

## **Conclusions**

In sum, there was limited support for the predictions presented in this study. Potential explanations for these findings were provided including the lack of mood manipulation success which is arguably the most significant limitation of this study. Despite this limitation and the others mentioned, results supported the prediction that perceiver affect influences the accuracy to which a target leader was perceived and the shifting of dynamic impressions of leadership over time. There was also evidence to suggest leader gender may impact the extent to which participants viewed target leaders to be similar to their leader prototype.

The current research lends support to the connectionist and dynamic models of leadership by illustrating how contextual variables can activate different patterns of attributes in perceptions of leaders. Further, it extends the findings of prior studies by examining gender and affect on leadership perceptions. However, the effect sizes for these findings were very small, accounting for only a modest amount of explained variance by these contextual constraints. Future studies should investigate the impact of affect on perceptions of leadership in situations where the affective state is a direct result of the target leader.

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## Tables

Table 1

*Female and Male Leader Attributes Depicted in the Video*

Male Leader Attributes	Female Leader Attributes
Decisive	Appreciative
Independent	Considerate
Confident	Appeasing
Pushy	Cooperative
Competitive	Praising

Table 2

*Number of male (blue font), female (red font), and total (black font in parentheses) leadership attributes by manager and scene number for female and male leader condition.*

Female leader condition						
Scene	1	2	3	4	5	Total
Manager 1 (Bob)	5, 5 (10)	5, 5 (10)	5, 5 (10)	3, 3 (6)	3, 2 (5)	21, 20 (41)
Manager 2 (Sue)	2, 2 (4)	3, 3 (6)	5, 5 (10)	6, 5 (11)	5, 5 (10)	21, 20 (41)
Manager 3 (Dave)	0, 0 (0)	0, 1 (1)	2, 0 (2)	1, 1 (2)	2, 0 (2)	5, 2 (7)
Manager 4 (Libby)	1, 0 (1)	0, 0 (0)	1, 1 (2)	0, 1 (1)	1, 1 (2)	3, 3 (6)
Male leader condition						
Scene	1	2	3	4	5	Total
Manager 1 (Bob)	2, 2 (4)	3, 3 (6)	5, 5 (10)	6, 5 (11)	5, 5 (10)	21, 20 (41)
Manager 2 (Sue)	5, 5 (10)	5, 5 (10)	5, 5 (10)	3, 3 (6)	3, 2 (5)	21, 20 (41)
Manager 3 (Dave)	1, 0 (1)	0, 0 (0)	1, 1 (2)	0, 1 (1)	1, 1 (2)	3, 3 (6)
Manager 4 (Libby)	0, 0 (0)	0, 1 (1)	2, 0 (2)	1, 1 (2)	2, 0 (2)	5, 2 (7)

*Note.* In each condition, all participants are shown all five scenes in order.

Table 3

*Summary of ANOVAs for Accuracy with Expert and Stability of Leader Prototype*

Variable	Type III Sum of Squares	df	Mean Square	F	Partial $\eta^2$
<i>Accuracy with Expert</i>					
Leader Gender	.01	1	.01	1.62	.02
Perceiver Affect	.03	1	.03	4.26*	.04
Leader Gender X Affect	.01	1	.01	.01	.01
Error	.67	108	.01		
<i>Stability of Leader Prototype</i>					
Leader Gender	.01	1	.64	8.28*	.07
Perceiver Affect	.07	1	.01	.10	.01
Leader Gender X Affect	.02	1	.07	.91	.01
Error	8.37	108	.03		

Note.  $N = 116$ . \* $p < 0.05$

Table 4

*Means of dynamic ratings for each condition by video time (standard deviations)*

Group	N	Means						
		Baseline	Scene 1	Scene 2	Scene 3	Scene 4	Scene 5	Final
Negative Affect - Male Target Leader	33	82.83 (10.74)	-62.03 (22.58)	-91.94 (28.16)	-6.37 (26.05)	201.26 (30.12)	11.31 (25.62)	-56.03 (42.69)
Neutral Affect - Male Target Leader	34	16.82 (10.74)	-47.61 (22.58)	-57.06 (28.16)	14.94 (26.05)	155.16 (30.12)	28.17 (25.62)	313.10 (42.69)
Negative Affect - Female Target Leader	34	71.41 (10.91)	150.93 (22.93)	109.87 (28.60)	67.23 (26.46)	-131.29 (30.58)	59.98 (26.01)	-36.71 (43.35)
Neutral Affect - Female Target Leader	32	20.01 (10.58)	147.62 (22.25)	107.57 (27.75)	81.04 (25.67)	-93.77 (29.67)	105.17 (25.24)	250.73 (42.05)

*Note.* N = 133.

Table 4

*Summary of ANOVA for Dynamic Ratings of Leadership Perception*

Sources of variation	Type III Sum of Squares	df	Mean Square	F	$\eta^2$	Partial $\eta^2$
<i>Between treatments</i>						
Leader Gender	223832.14	1	223832.14	7.13**	.01	.05
Perceiver Affect	686160.88	1	686160.88	21.89**	.02	.15
Perceiver Affect X Leader Gender	12017.26	1	12017.26	.38	.01	.01
Error	3893096.96	124	31395.94			
<i>Within treatments</i>						
Scene	210879.89	3.87	54512.19	1.40	.01	.01
Scene X Leader Gender	5200070.11	3.87	1344211.64	34.45**	.16	.22
Scene X Perceiver Affect	2853538.56	3.87	737636.16	18.91**	.09	.13
Scene X Leader Gender X Perceiver Affect	46788.94	3.87	12094.88	.31	.01	.01
Error	18714980.46	479.69	39014.51			
Total	31841365.20					

Note.  $N = 133$ . \* $p < 0.05$ , \*\* $p < 0.01$



Table 6

*Means and Standard Deviations of Dynamic Ratings by Leader Gender*

		Means						
Group	N	Baseline	Scene 1	Scene 2	Scene 3	Scene 4	Scene 5	Final
Male	67	49.82 (7.60)	-54.82 (16.00)	-74.50 (19.91)	-10.65 (18.42)	178.21 (21.29)	19.74 (18.11)	128.53 (30.18)
Female	66	45.75 (7.60)	149.28 (15.97)	108.72 (19.92)	74.14 (18.43)	-112.53 (21.30)	82.56 (18.12)	107.01 (31.20)

*Note.*  $N = 133$ .

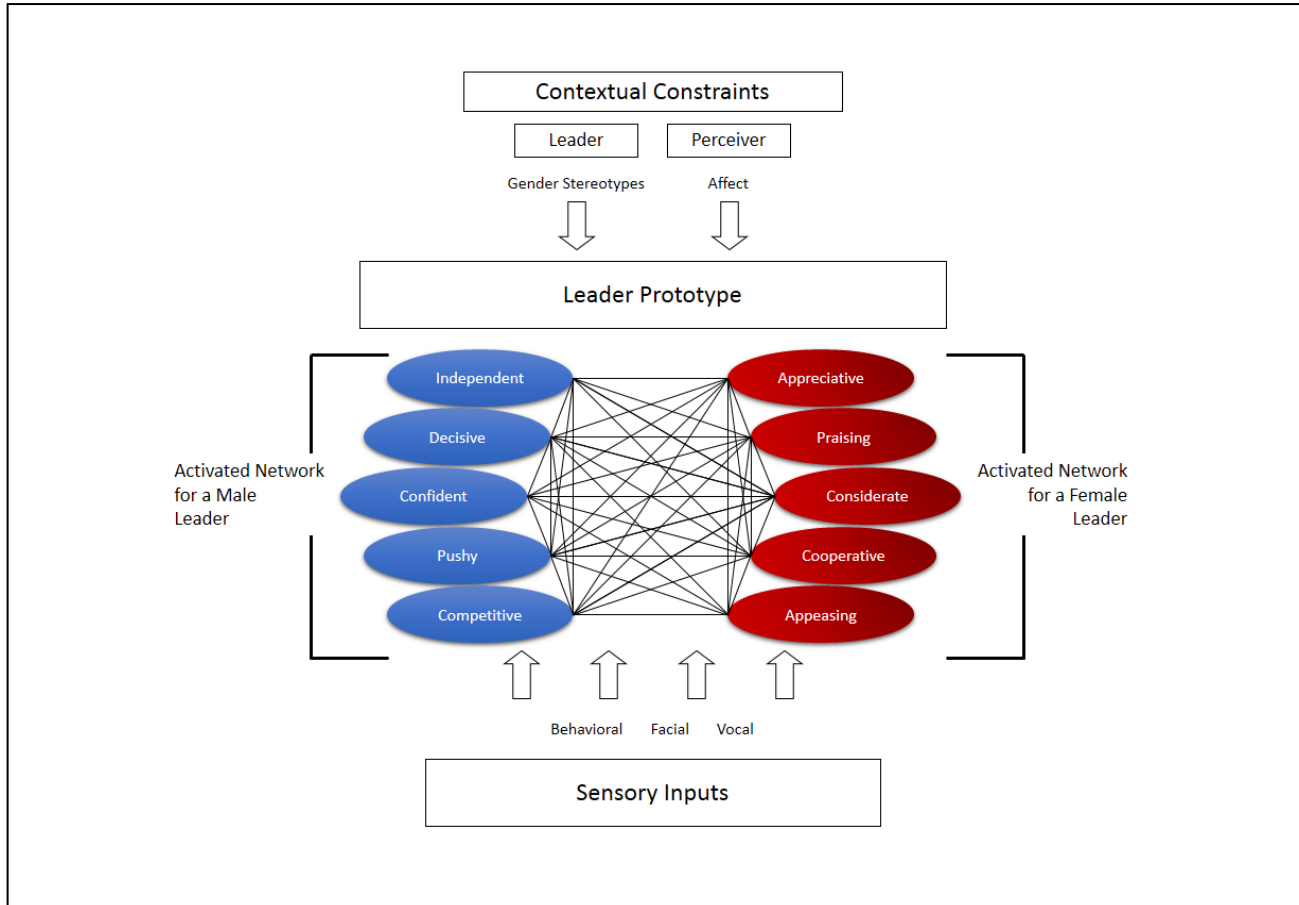
Table 7

*Means and Standard Deviations of Dynamic Ratings by Affect Condition*

Group	N	Means						
		Baseline	Scene1	Scene 2	Scene3	Scene 4	Scene 5	Final
Negative	66	77.12 (7.66)	44.45 (16.09)	8.96 (20.10)	30.43 (18.57)	11.94 (21.46)	35.65 (18.26)	-46.37 (30.42)
Neutral	67	18.45 (7.54)	50.01 (15.85)	25.25 (19.77)	33.05 (18.29)	53.74 (21.14)	66.67 (17.98)	281.91 (29.96)

*Note.* N = 133.

## Figures



*Figure 1.* Connectionist model of gender stereotypes and affect resulting in different activated networks. Based on models presented by Lord, Brown, Harvey, and Hall (2001), and Medvedeff and Lord (2007).

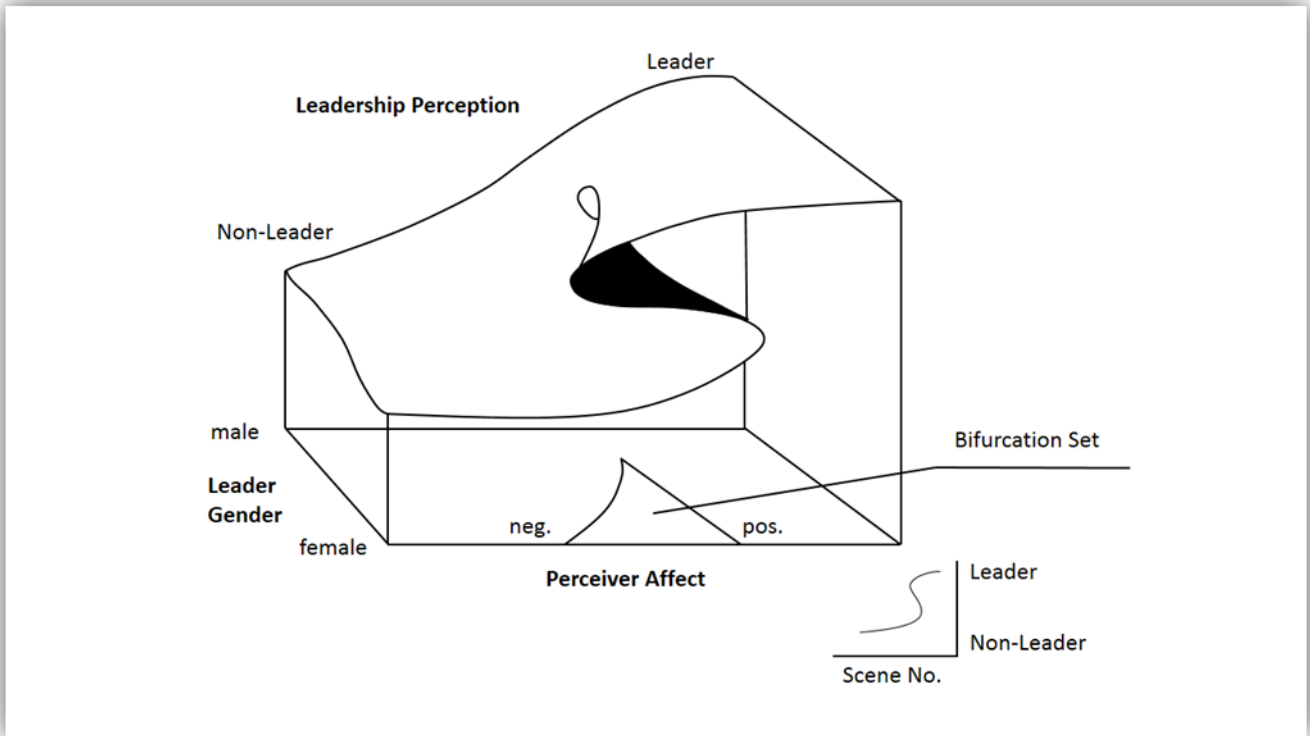


Figure 2. Dynamic, cusp catastrophe model of changing leader perceptions modeled after Medvedeff and Lord (2007, p. 38).

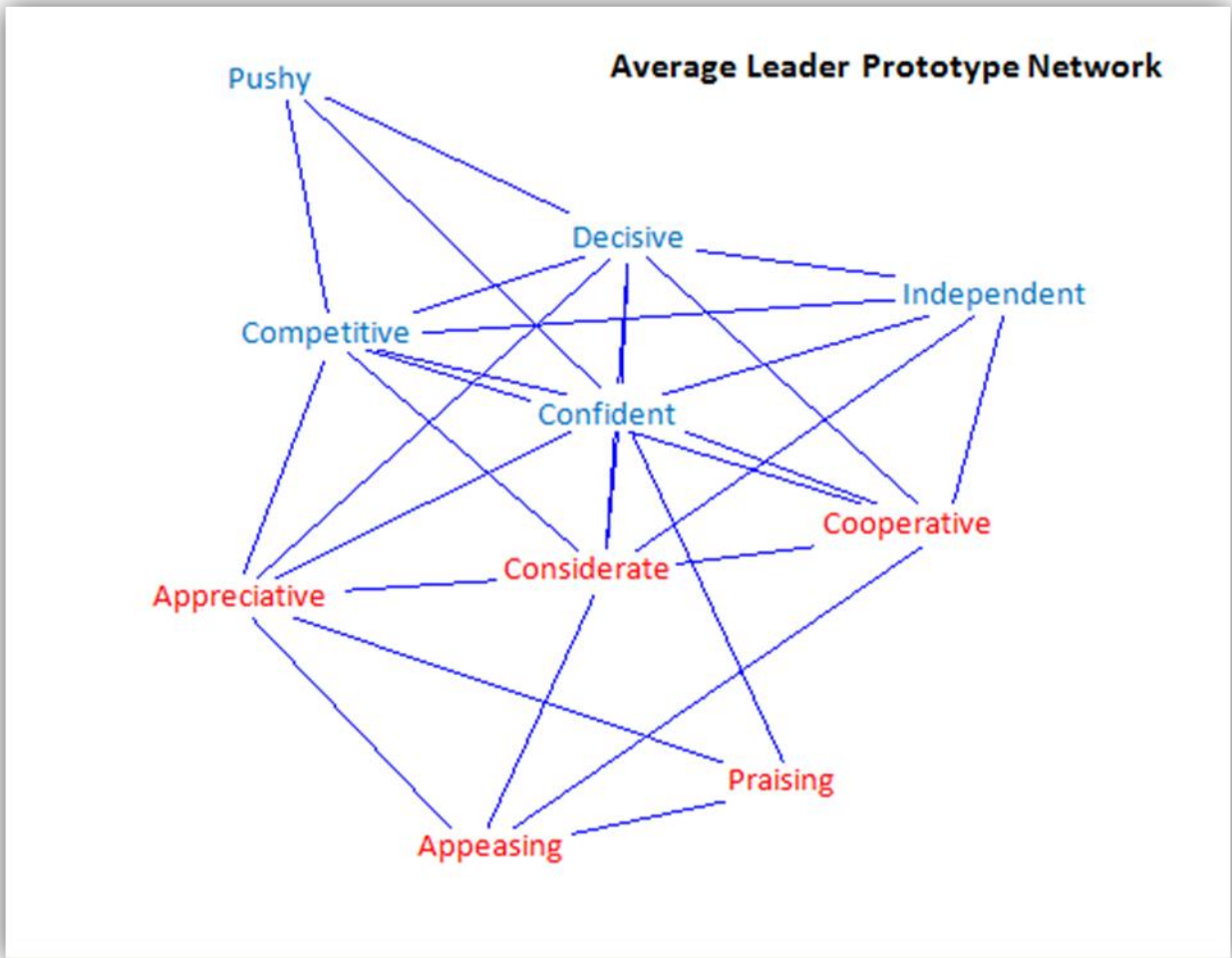
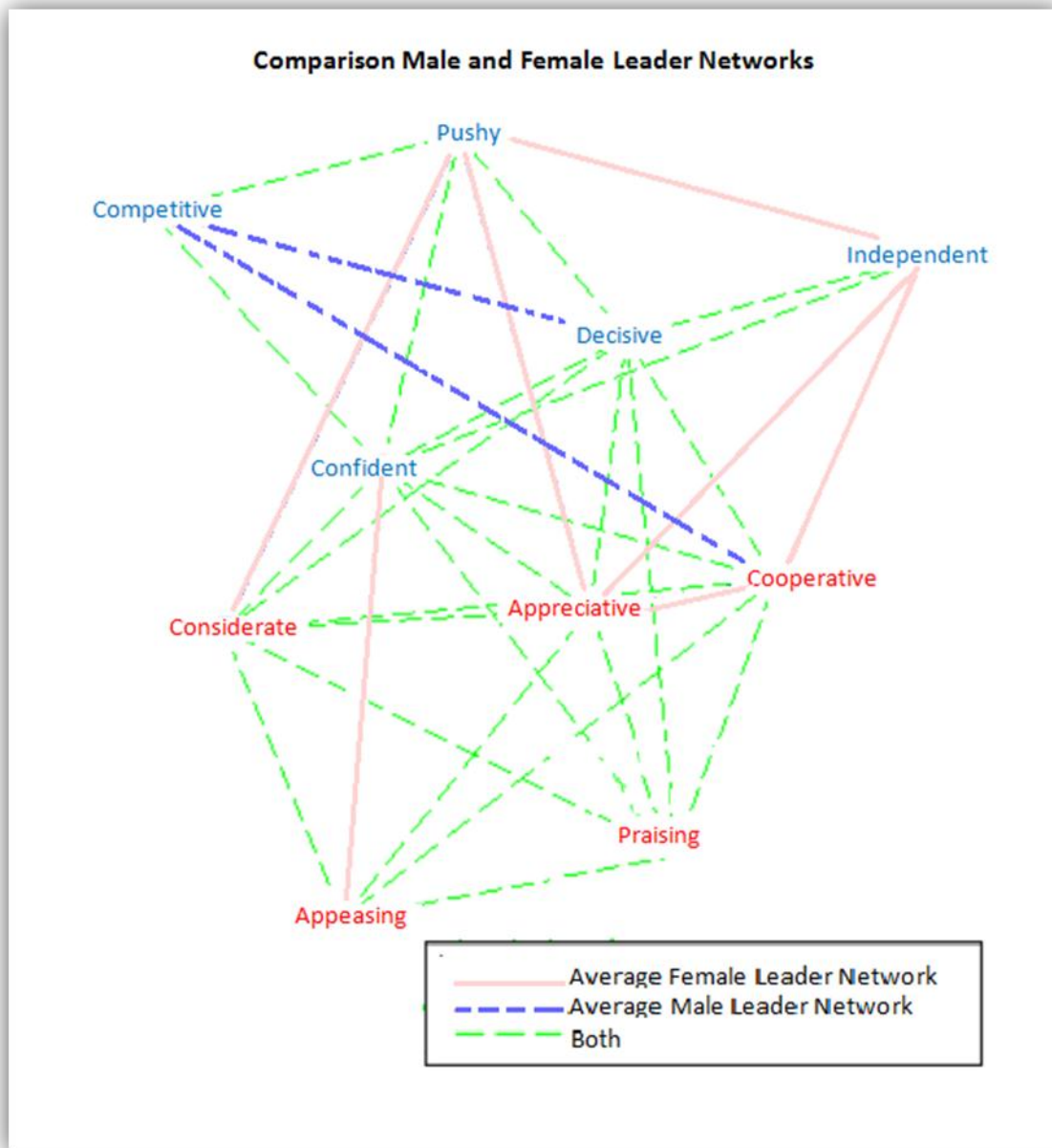
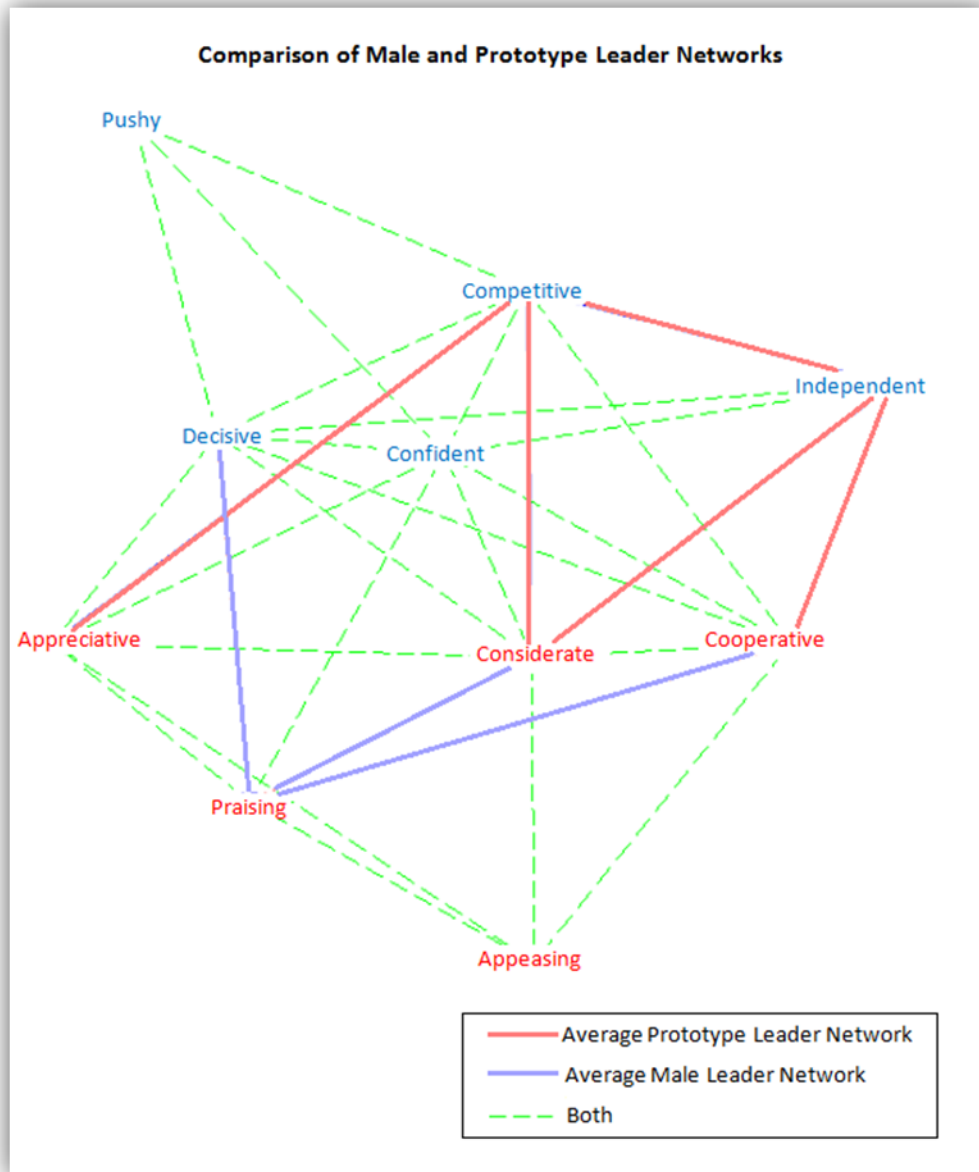


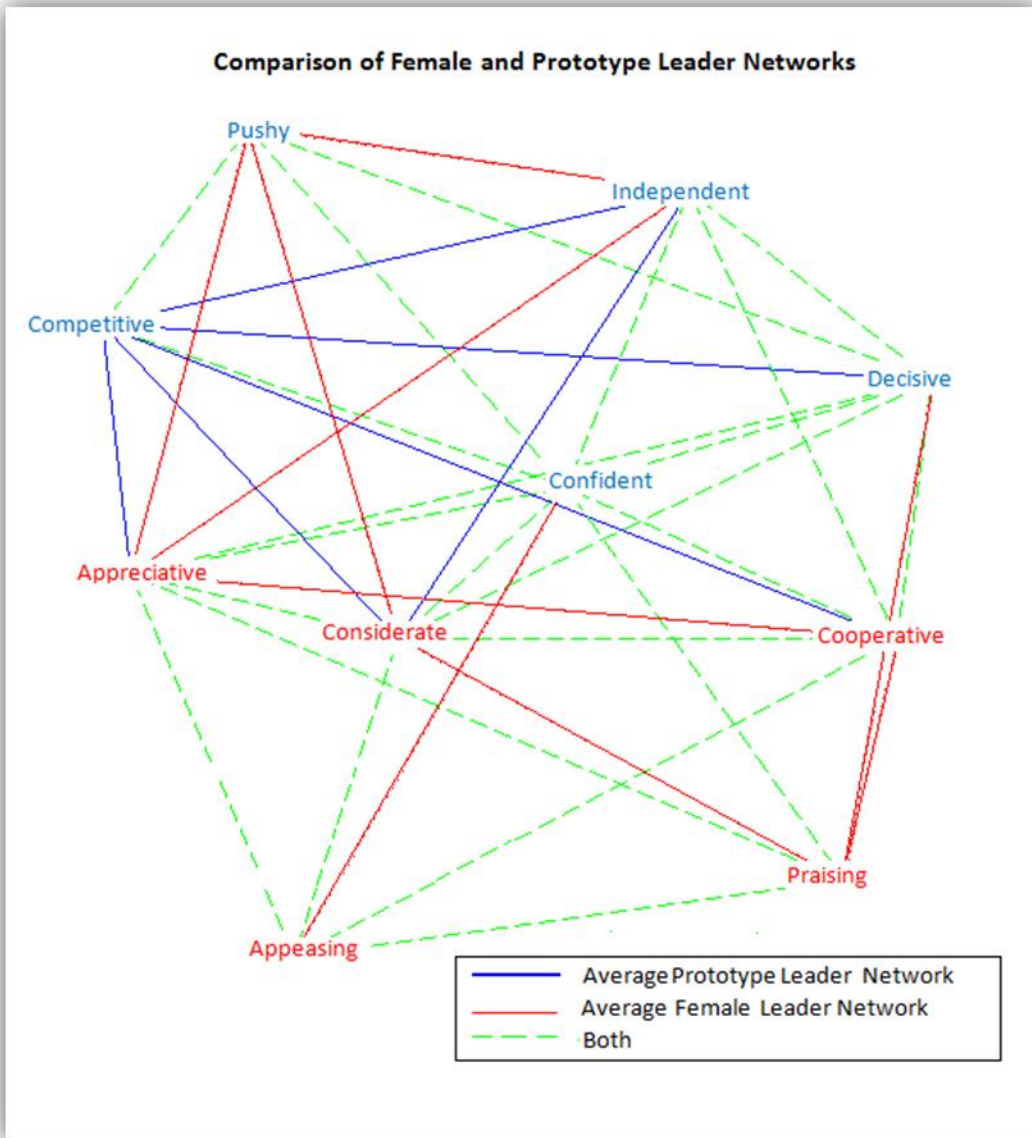
Figure 3. Average Network for the Leader Prototype. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue.



*Figure 4.* Comparison of Average Female and Male Target Leader Networks. Green lines represent common connections, red lines represent connections only present for the target leader in the female emerging leader condition, and finally, blue lines represent connections only present for the target leader in the male emerging leader condition.



*Figure 5.* Comparison of Average Male and Prototype Leader Networks. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue. Different color lines indicate connections in various networks: blue for the average target leader network unique pathways, red for the average leader prototype network unique pathways, and green for pathways in both.



*Figure 6.* Comparison of Average Female and Prototype Leader Networks. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue. Different color lines indicate connections in various networks. Blue lines represent unique pathways in the average leader prototype network, red lines represent unique pathways in the average target network for the female emerging leader condition, and green lines represent pathways common to both.



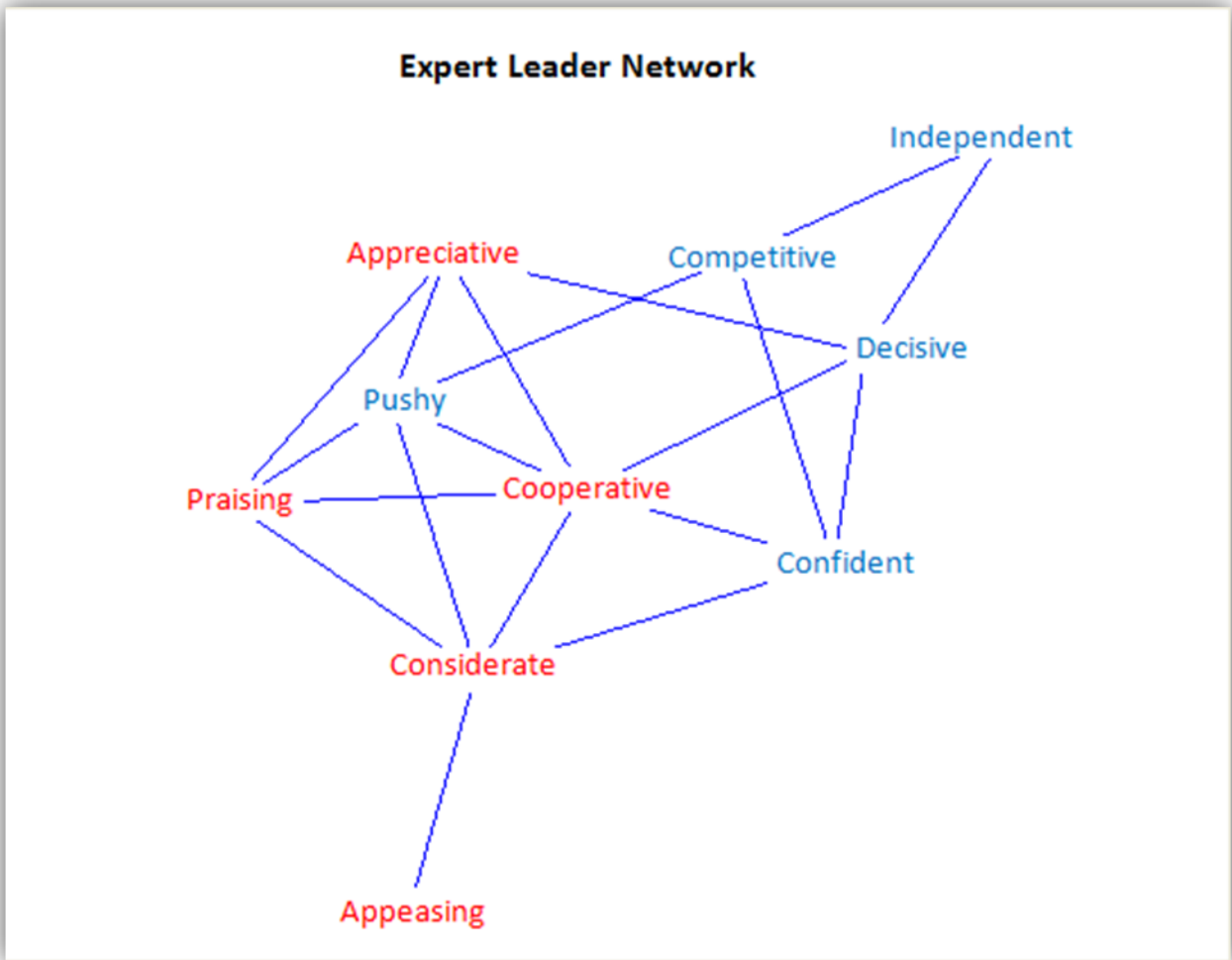
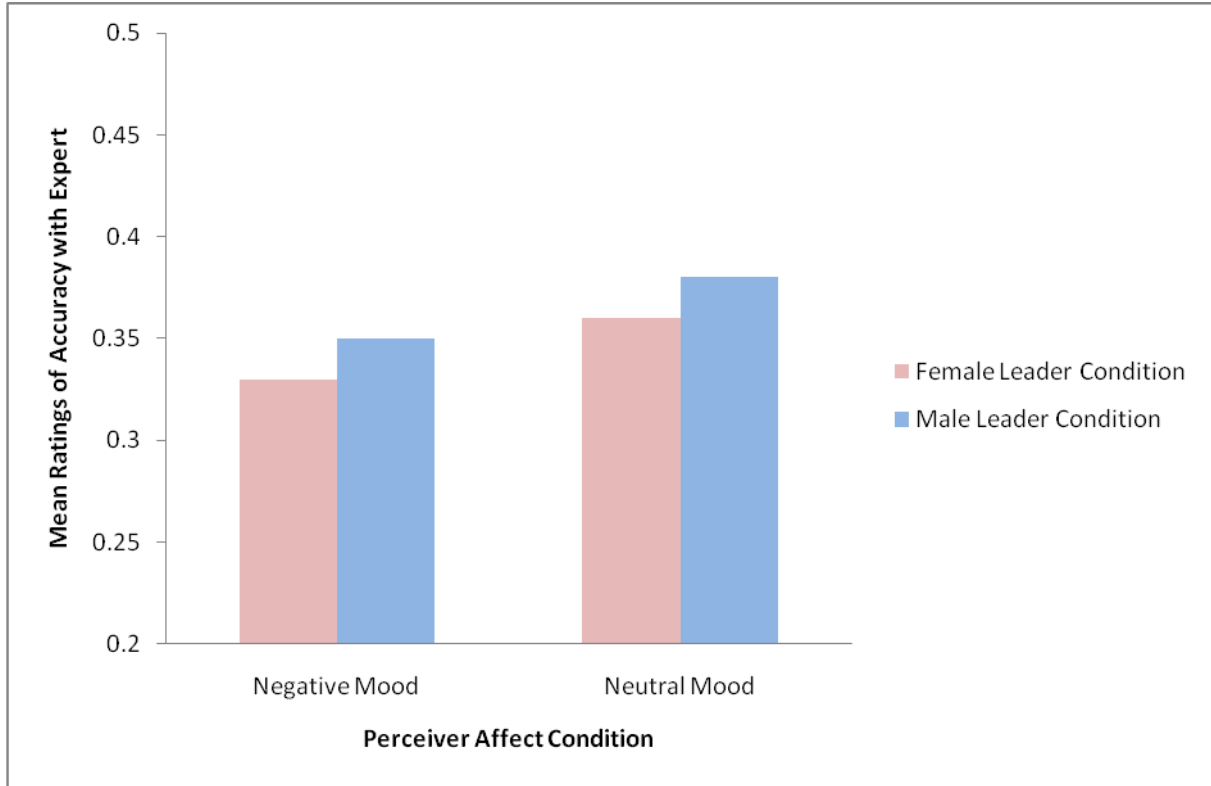
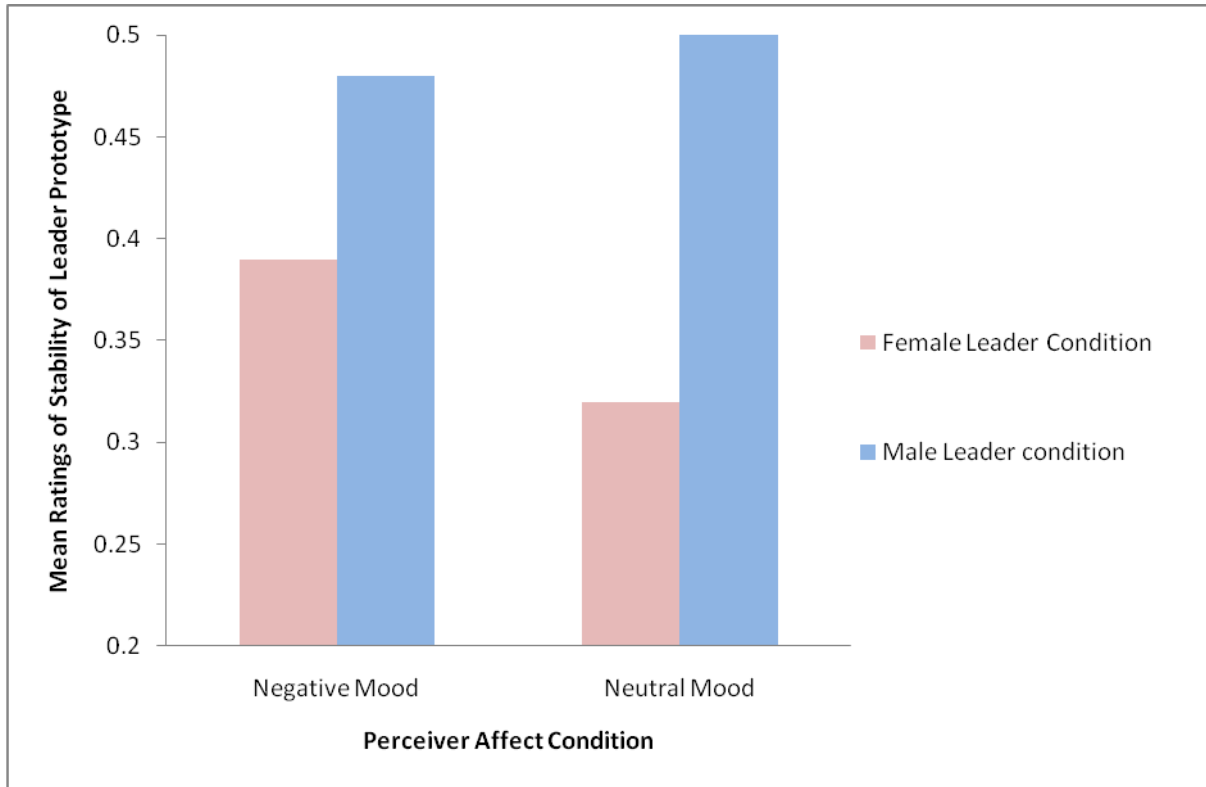


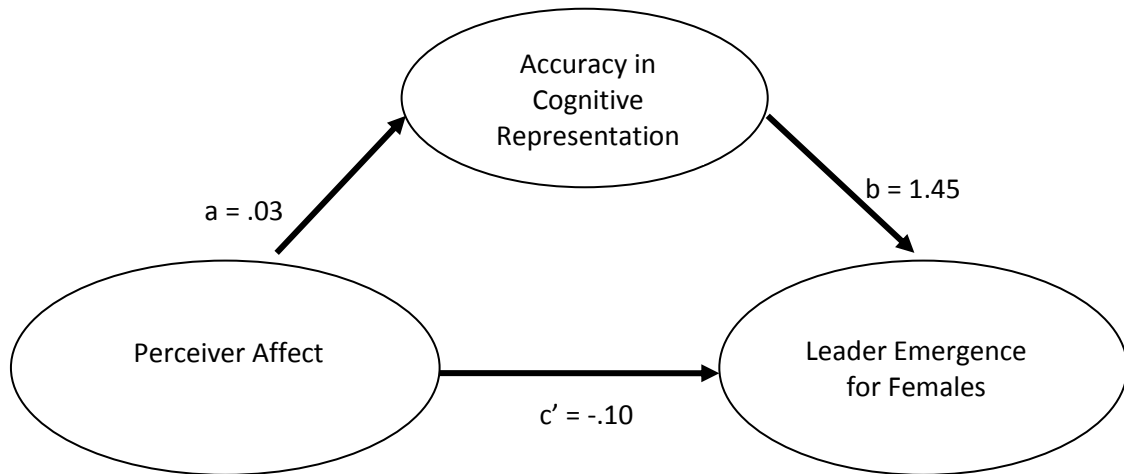
Figure 7. Expert knowledge network for target leader. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue.



*Figure 8.* Mean ratings of accuracy with expert for affect by leader gender group.

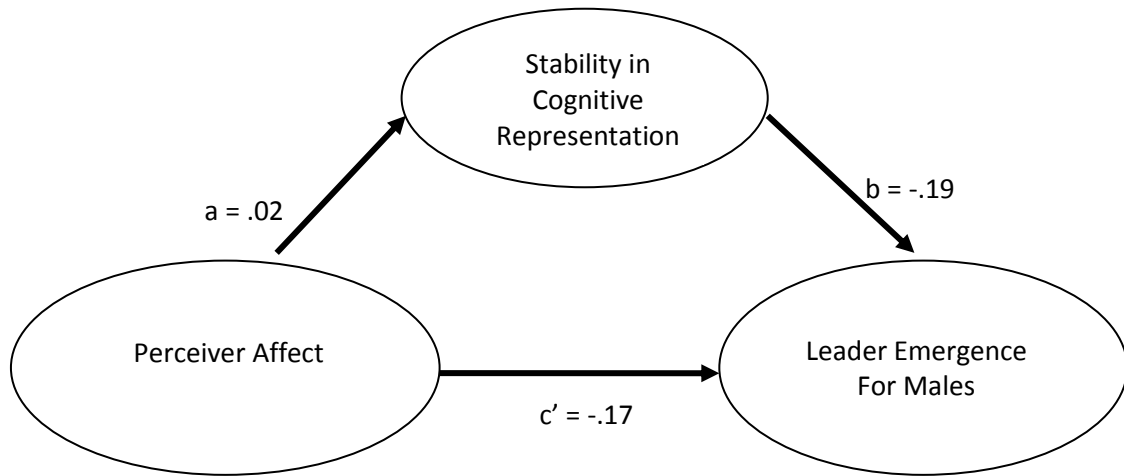


*Figure 9.* Mean ratings of stability of leader prototype for affect by leader gender group.



*Figure 10.* Model showing accuracy in abstract conceptualization as a mediator of the association between perceiver affect and leader emergence for females. *Note:* Model included sex of the participant, leadership experience, and experience with a female leader as covariates.

\* $p < .05$ .



*Figure 11.* Model showing stability in abstract conceptualization as a mediator of the association between perceiver affect and leader emergence for females. *Note:* Model included sex of the participant, leadership experience, and experience with a female leader as covariates. \* $p < .05$ .

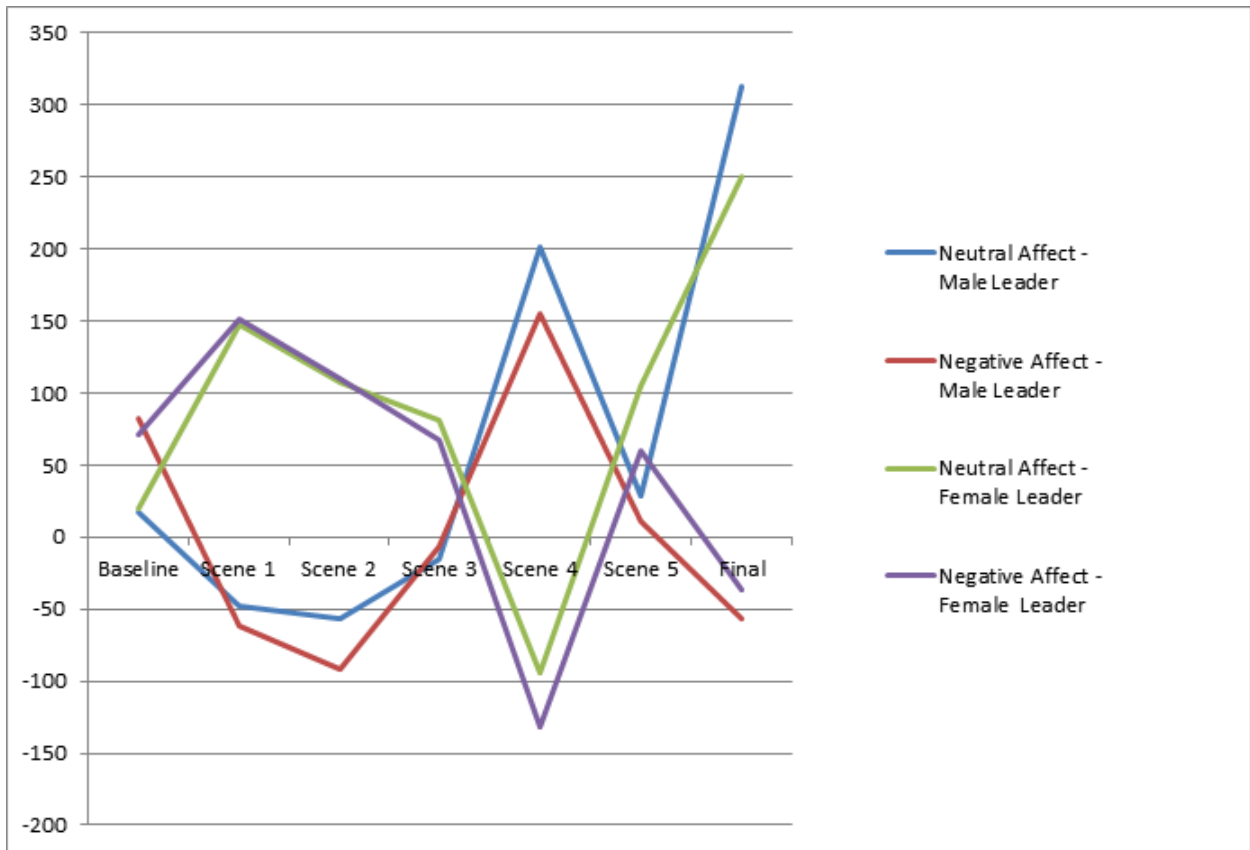


Figure 12. Mean dynamic ratings by group across scenes in the video.

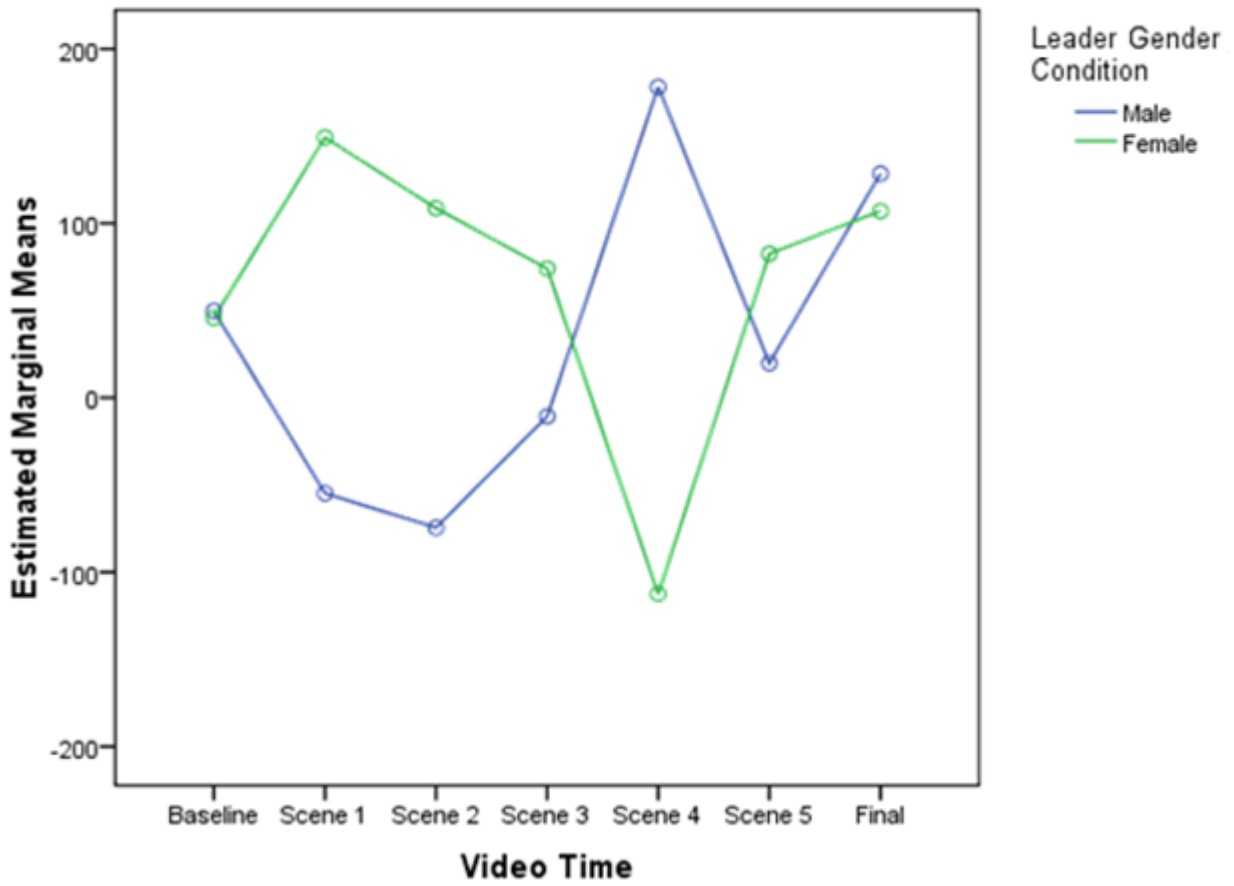


Figure 13. Estimated marginal means of dynamic ratings of leadership for each leader gender condition.

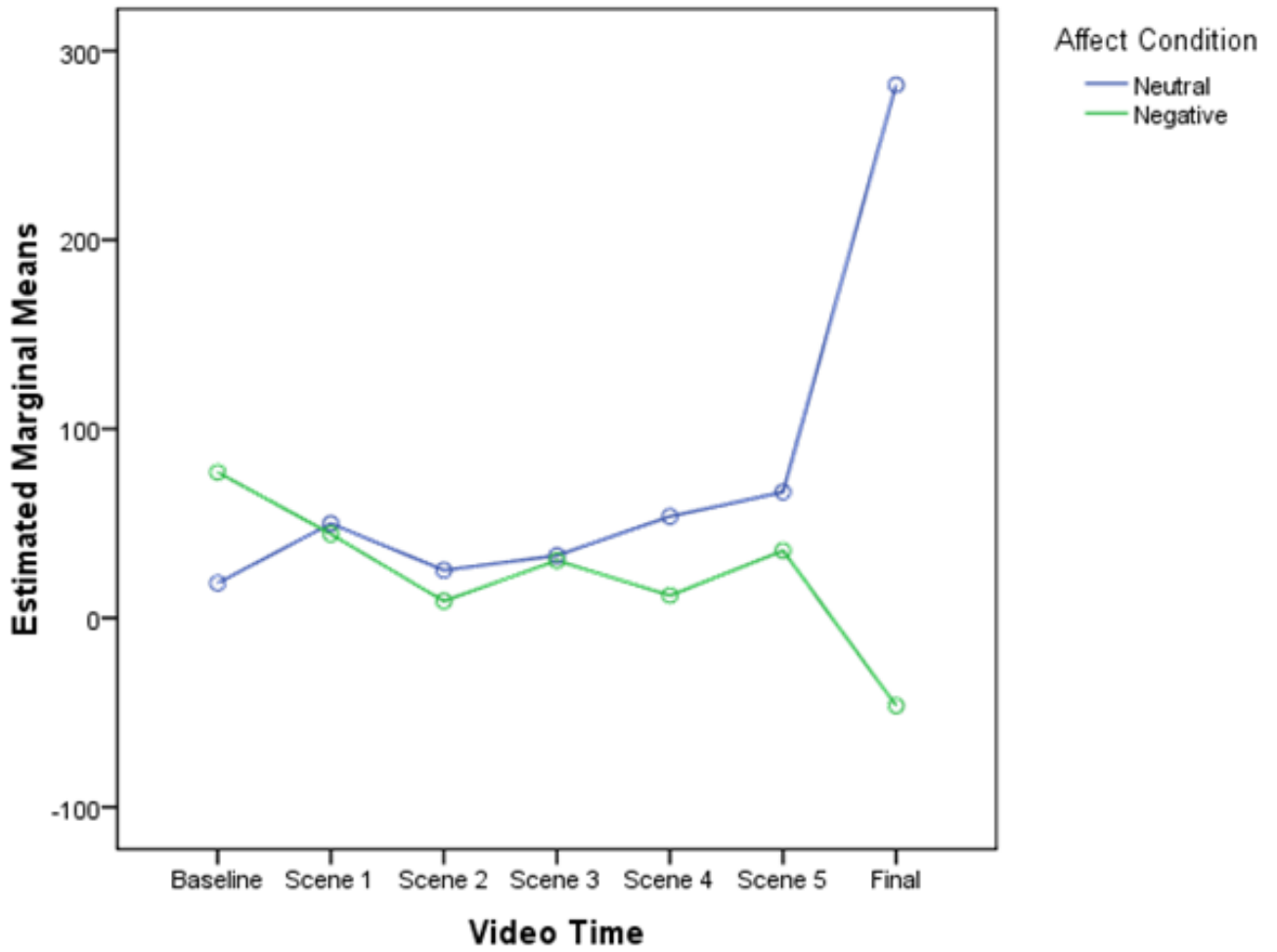
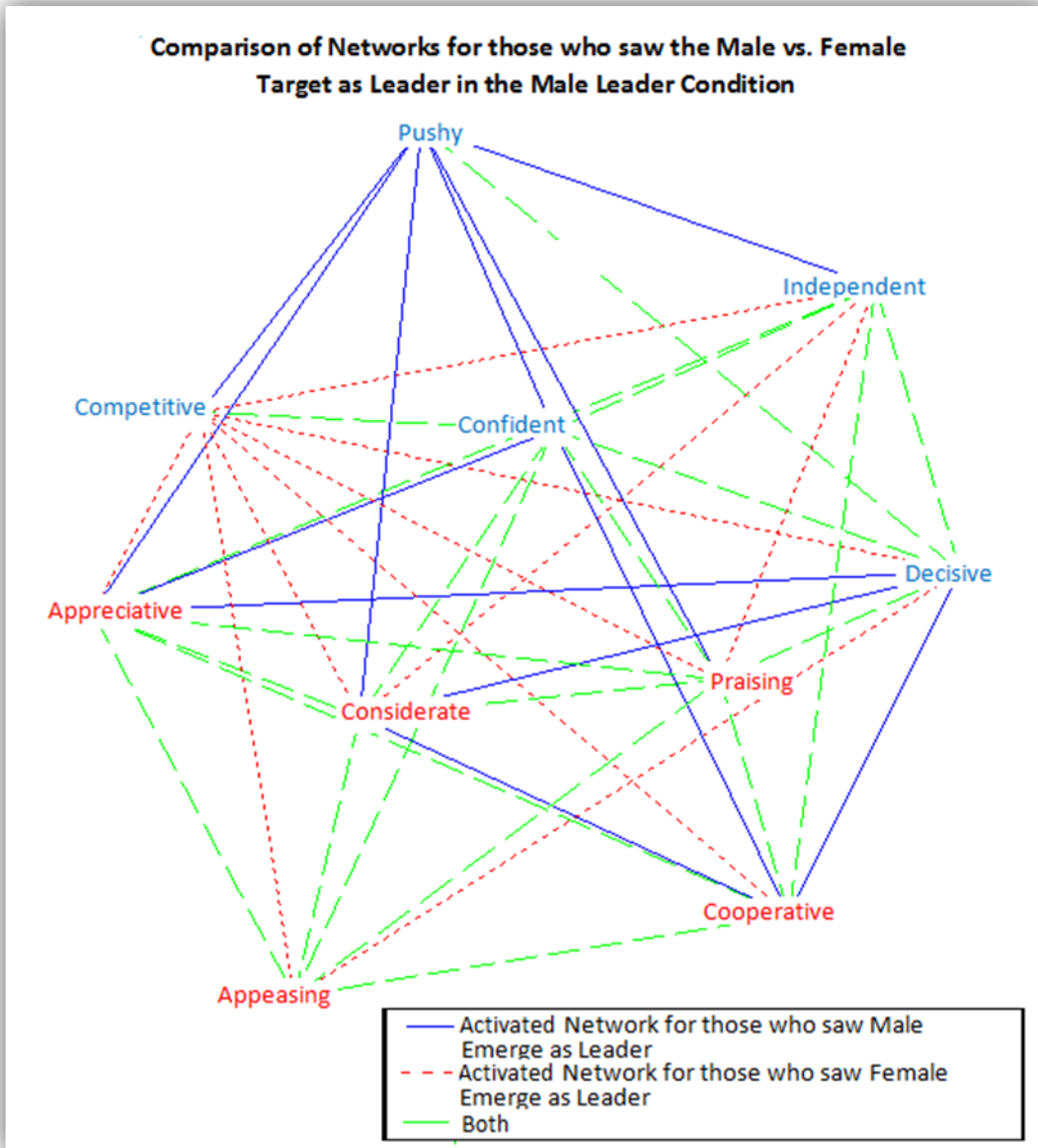
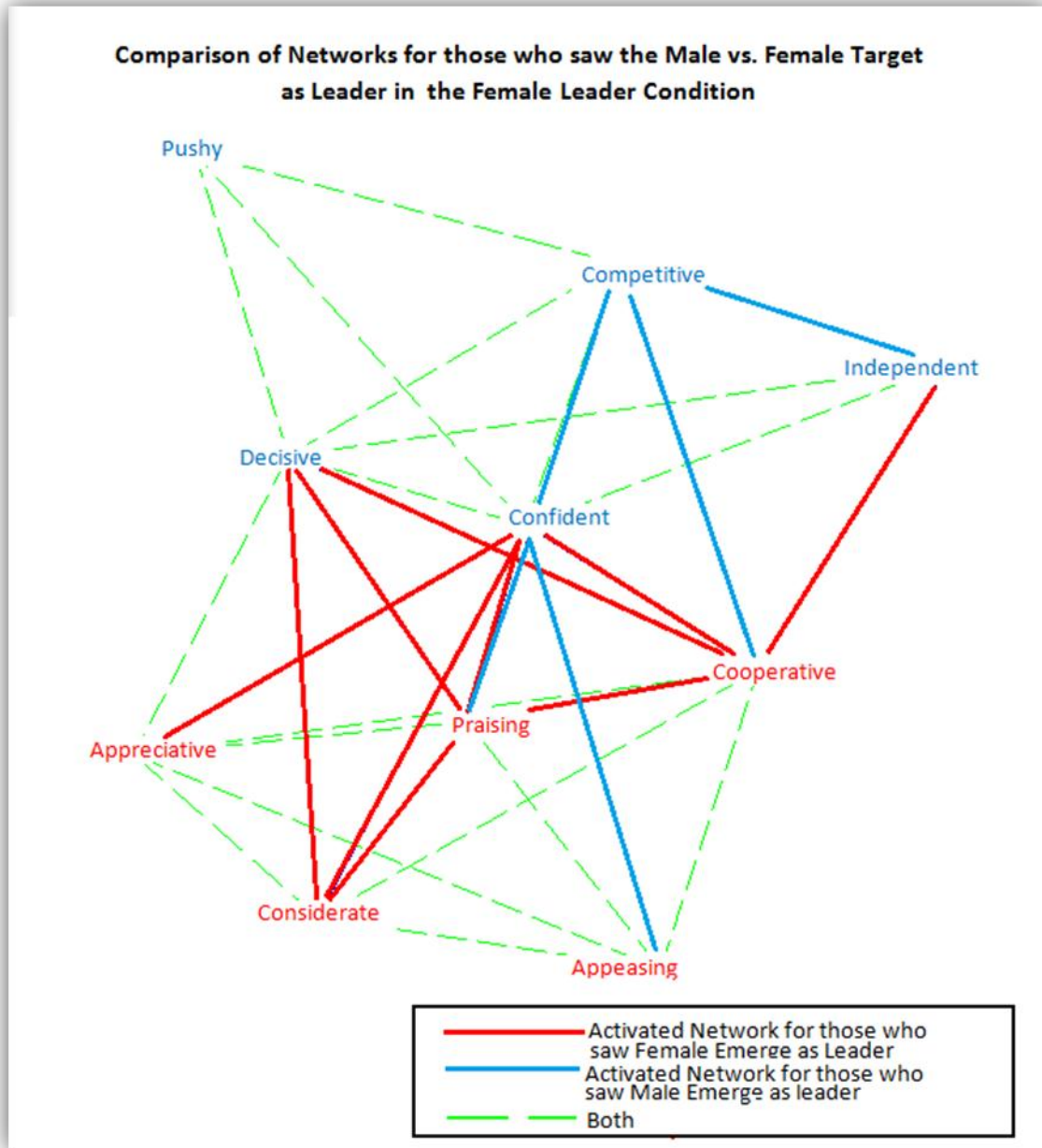


Figure 14. Estimated marginal means of dynamic ratings of leadership for each affect condition.





*Figure 15.* Comparison of Networks for those who saw the Male vs. Female Target as Leader in the Male Leader Condition. Green lines represent common pathways, red lines represent pathways only present in the activated network for those who saw the female emerge as leader, and finally, blue lines represent pathways only present in the activated network for those who saw the male emerge as leader.



*Figure 16.* Comparison of Networks for those who saw the Male vs. Female Target as Leader in the Female Leader Condition. Green lines represent common pathways, red lines represent pathways only present in the activated network for those who saw the female emerge as leader, and finally, blue lines represent pathways only present in the activated network for those who saw the male emerge as leader.

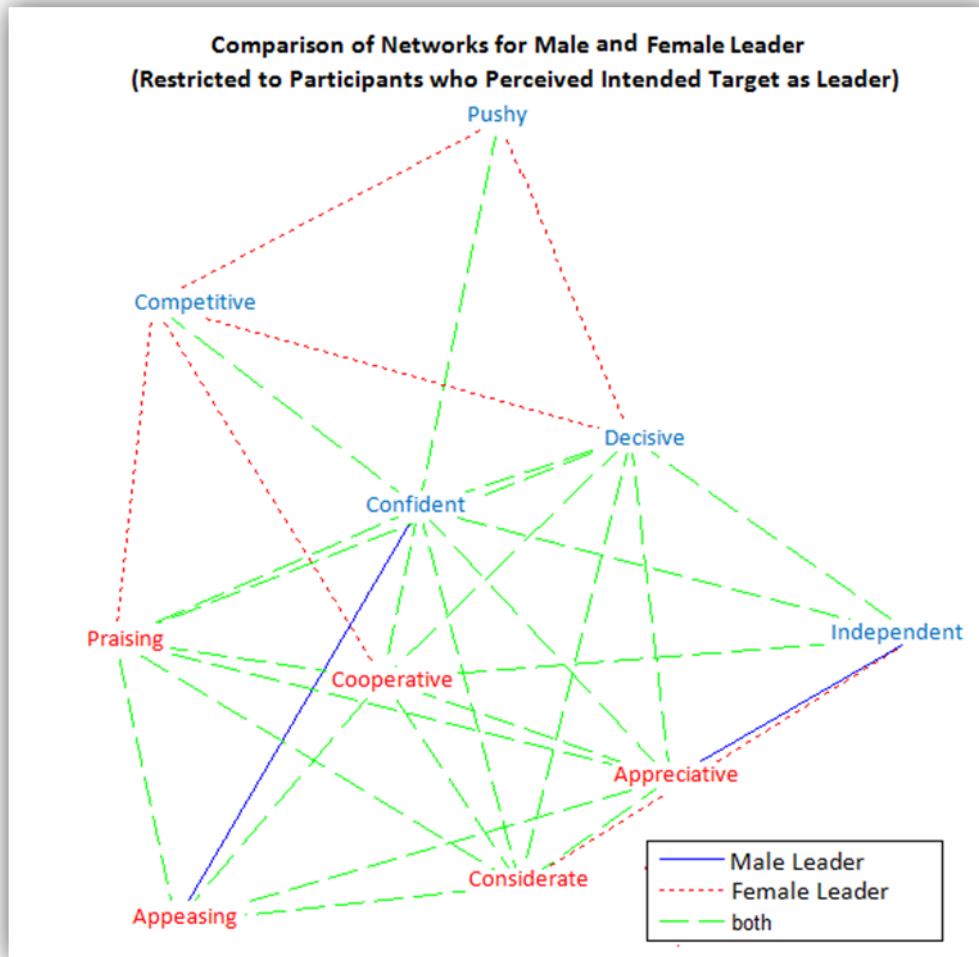


Figure 17. Comparison of Networks for those who saw the Male vs. Female Target Regardless of Leader Gender Condition. Green lines represent common pathways, red lines represent pathways only present in the activated network for those who saw the female emerge as leader, and finally, blue lines represent pathways only present in the activated network for those who saw the male emerge as leader.

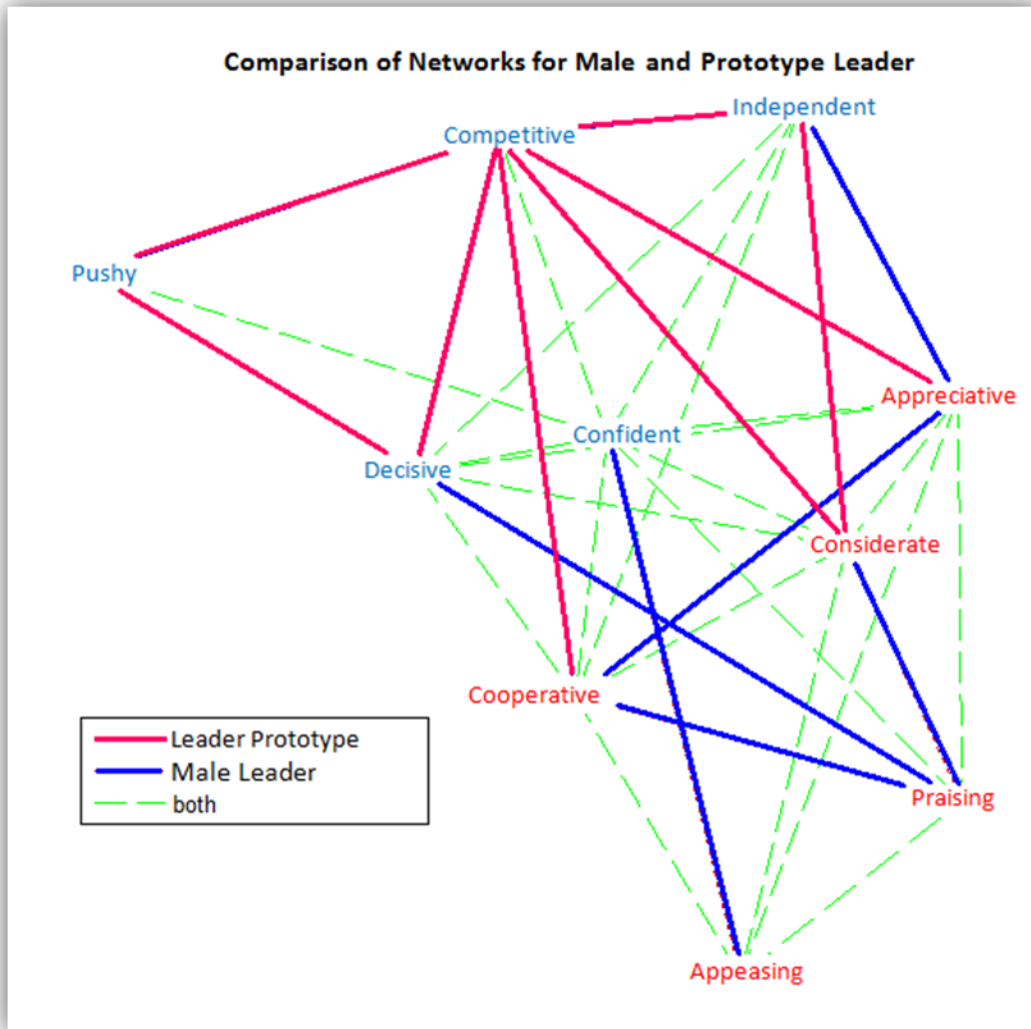


Figure 18. Comparison of Male and Prototype Leader Networks for Participants who Perceived Intended Target as Leader. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue. Different color lines indicate connections in various networks. Blue lines represent unique pathways in the male leader network, red lines represent unique pathways in the prototype network, and green lines represent pathways common to both.

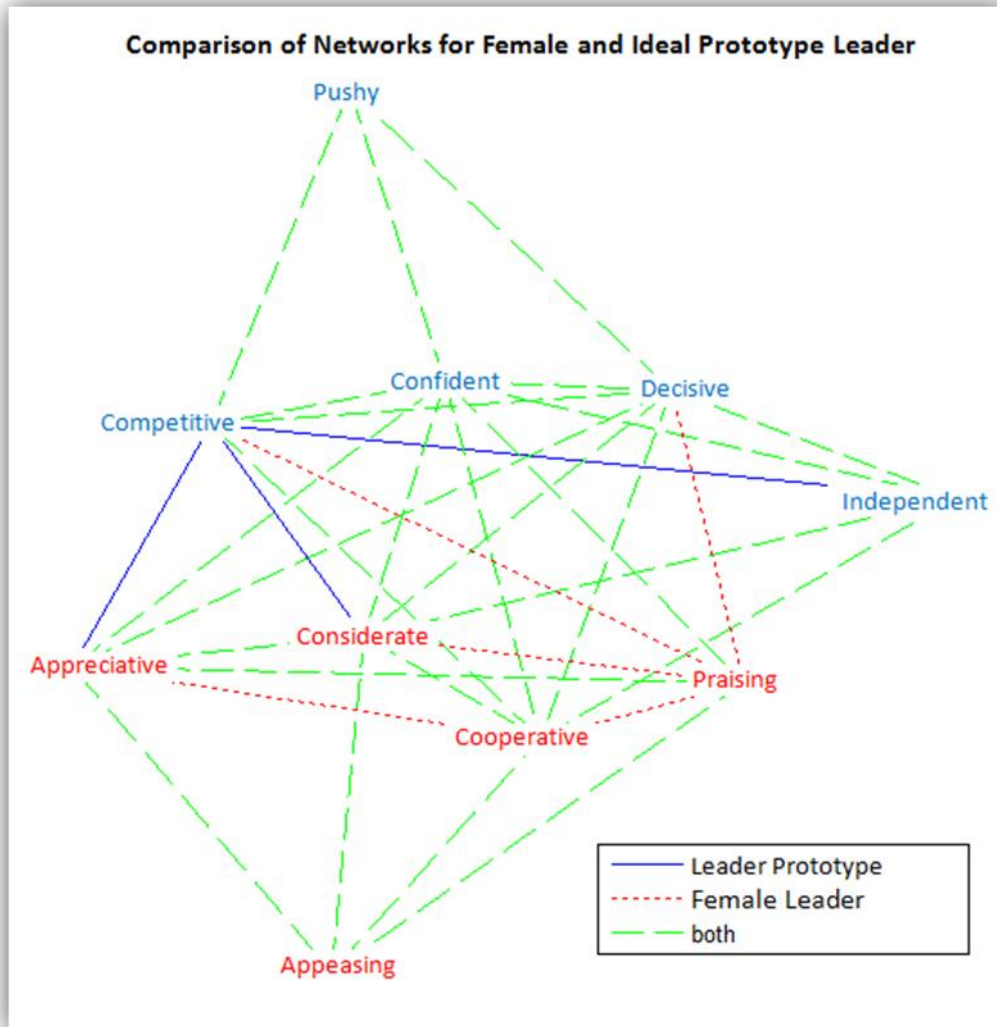


Figure 19. Comparison of Female and Prototype Leader Networks for Participants who Perceived Intended Target as Leader. Leadership attributes traditionally associated with females are red, whereas leadership attributes traditionally associated with males are blue. Different color lines indicate connections in various networks. Red lines represent unique pathways in the female leader network, blue lines represent unique pathways in the prototype network, and green lines represent pathways common to both.

## **Appendices**

### **APPENDIX A**

#### **Informed Consent Form**

##### **Consent Form**

Title of Study: Leadership, Emotions, And Decision (LEAD) Study

Principal Investigator: Roseanne Foti, Ph.D., Associate Professor, Department of Psychology, Virginia Tech

Co-Investigator: Sarah Allgood, Graduate Student, Department of Psychology, Virginia Tech

Welcome to the Leadership, Emotions, And Decisions (LEAD) study site. Thank you for your interest in participating in this study! Please read the information below carefully. If you agree to all the terms of the study and would like to proceed, please enter your Virginia Tech email address, and then click the Submit button at the bottom of the page to acknowledge your willingness to participate. Thank you very much!

##### **I. Purpose of this study**

This study examines how emotionally-charged visual stimuli may impact the process of forming and shifting leadership perceptions over time. Data from this study will be used to meet the requirement of a dissertation study.

##### **II. Procedures**

This study is a lab-based study. You will complete a series of tasks that include watching videos and completing surveys. This session will require no more than 1 hour to complete.

##### **III. Risks**

There are no more than minimal risks associated with participation in this study.

##### **IV. Benefits**

The results of this study will be used to inform researchers about the process of leadership perception formation and change as well as factors that may impact this process. These results may have important implications in the leadership research field.

##### **V. Extent of Anonymity and Confidentiality**

Your participation in this study will remain confidential. Your name will not appear anywhere in any study report or publication. Any personal information that may reveal your identity (i.e.

email addresses) will remain anonymous and only be used to assign credit. All data will be retained five years post publication.

## **VI. Compensation**

You will receive credit for participating in this study. One point will be rewarded. As an alternative to earning credit through participation, you may write article critiques, or otherwise instructed in your course syllabus.

## **VII. Freedom to Withdraw**

If at any point in the study, you do not feel comfortable continuing, you may withdraw without penalty. If you choose to withdraw, you will not be penalized by reduction in points or course grade. You are free not to respond to questions without penalty.

## **VIII. Permission**

If you have read the conditions of this project and voluntarily agree to participate in the study, please click the agreement button to continue to the surveys.

**By entering my Virginia Tech email address and clicking the Submit button, I acknowledge that I have read the statement, printed a copy for my files, and agree to participate in the study. I accept that personal information will be electronically supplied to the researcher to document my participation (such as name, e-mail name, and date).**

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Principle Investigator

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Sarah Allgood  
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David W. Harrison, Ph.D.  
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Blacksburg, VA 24060

540-231-4991/

## APPENDIX B

### Demographics Questionnaire

What is your gender?

- Male
- Female

How old are you (years)?

What is your race?

- White/Caucasian
- African-American
- Hispanic
- Asian
- Native American
- Pacific Islander
- Other \_\_\_\_\_

What is your class standing?

- freshman
- sophomore
- junior
- senior

What is your current employment status?

- Employed full-time (not in school)
- Employed part time (not in school)
- Full time student (not employed)
- Work part-time and go to school full-time
- Work part-time and go to school half-time
- Work full-time and go to school full-time
- Work full-time and go to school half-time
- Unemployed (no work or school)

How much leadership experience do you have?

- none
- very little
- moderate
- a great deal



If you do have leadership experience, what type? (Please check all that apply)

- Work (supervisor and/or training at work)
- Extracurricular activities (club, fraternity, sorority, volunteer, church)
- In Class (group projects, etc.)
- Other \_\_\_\_\_

How many years have you been working for your current employer?

Have you previously worked for a female supervisor?

- No
- Yes, please indicate how long (months) \_\_\_\_\_

## APPENDIX C

### Positive and Negative Affect Schedule

#### Positive And Negative Affect Schedule (PANAS – X)

This scale consists of a number of words and phrases that describe different feelings and emotions. Read each item and then mark the appropriate answer in the space next to that word. Indicate to what extent you CURRENTLY feel this way. Use the following scale to record your answers:

	Very Slightly or Not At All	A Little	Moderately	Quite a Bit	Extremely
active	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
alert	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
attentive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
determined	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
enthusiastic	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
excited	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
inspired	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
interested	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
proud	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
strong	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
afraid	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
scared	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
nervous	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
jittery	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
irritable	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
hostile	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
guilty	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
ashamed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
upset	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
distressed	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX D

### Ideal Leader Rating Task

Please think about your ideal leader, by either thinking of examples of leaders or your experience working with an ideal leader. Your first task in this study will involve judging the relatedness of pairs of concepts in reference to your IDEAL LEADER. In making these types of judgments, there are several ways to think about the items being judged. For instance, two concepts might be related because they share common features or because they frequently occur together. Since this kind of detailed analysis is impossible, our concern is to obtain your initial impression of overall relatedness.

Therefore, please base your ratings on your first impression of relatedness. Each pair of concepts will be presented on the screen along with a “relatedness” scale. You are to indicate your judgment of relatedness for each pair using the scale. If you feel the concepts are not related at all please choose “1”. If you feel the concepts are highly related you would choose “5”. You can think of these numbers as points along a “relatedness”; scale, with higher numbers representing greater relatedness

Please rate the relatedness of the two concepts in each of the 45 statements below in terms of your IDEAL LEADER.

	Not Related At All (1)	2	Neither Related or Unrelated (3)	4	Highly Related (5)
Decisive and Independent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Independent and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appeasing and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appeasing and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooperative and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX E

### Target Leader Rating Task

Please think about the leader from the video, by either thinking of examples of leadership in the video or your experience working with someone similar to the leader in the video. Your first task in this study will involve judging the relatedness of pairs of concepts in reference to the LEADER FROM THE VIDEO. In making these types of judgments, there are several ways to think about the items being judged. For instance, two concepts might be related because they share common features or because they frequently occur together. Since this kind of detailed analysis is impossible, our concern is to obtain your initial impression of overall relatedness.

Therefore, please base your ratings on your first impression of relatedness. Each pair of concepts will be presented on the screen along with a "relatedness" scale. You are to indicate your judgment of relatedness for each pair by using the scale. If you feel the concepts are not related at all choose "1" on the scale. If you feel the concepts are highly related you would choose "5". You can think of these numbers as points along a "relatedness" scale, with higher numbers representing greater relatedness.

Please rate the relatedness of the two concepts in each of the 45 statements below in terms of the LEADER FROM THE VIDEO.

	Not Related At All (1)	2	Neither Related or Unrelated (3)	4	Highly Related (5)
Decisive and Independent	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Decisive and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

Decisive and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Confident	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Independent and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Pushy	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Confident and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Competitive	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Pushy and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Appreciative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Competitive and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Considerate	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appreciative and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Appeasing	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Considerate and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appeasing and Cooperative	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Appeasing and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
Cooperative and Praising	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX F

### General Leadership Impression Scale for Male Target Leader

Please answer the following questions regarding Bob's behavior when interacting with a group of people (e.g., working on a class project, working in a student organization, leading a sports team).

	Extreme Amount	Substantial Amount	Moderate Amount	Very Little	Nothing
1. How much did Bob contribute to the effectiveness of a task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. What degree of influence did Bob exert in determining the final outcome of a task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. How much leadership did Bob exhibit?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. How much control over the group's activities did Bob exhibit?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. If you had to choose a leader for the group, how willing would they be to vote for Bob as the leader?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. How much does Bob encourage the contributions of the other group members?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. How much did Bob contribute to the discussion in a meaningful way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>

## APPENDIX G

### General Leadership Impression Scale for Female Target Leader

Please answer the following questions regarding Sue's behavior when interacting with a group of people (e.g., working on a class project, working in a student organization, leading a sports team).

	Extreme Amount	Substantial Amount	Moderate Amount	Very Little	Nothing
1. How much did Sue contribute to the effectiveness of a task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
2. What degree of influence did Sue exert in determining the final outcome of a task?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
3. How much leadership did Sue exhibit?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
4. How much control over the group's activities did Sue exhibit?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
5. If you had to choose a leader for the group, how willing would they be to vote for Sue as the leader?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
6. How much does Sue encourage the contributions of the other group members?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>
7. How much did Sue contribute to the discussion in a meaningful way?	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>	<input type="radio"/>



## APPENDIX H

### Debriefing Letter

Thank you for participating as a research participant in the present study examining the impact of emotionally charged photos on leadership perceptions. The present study seeks to gain a greater understanding of the factors which impact the formation and shifting of leadership perceptions over time. One of the factors of interest was whether or not positive or negative moods, induced through the use of emotionally stimulating photos, impacts this process.

Again, we thank you for your participation in this study. If you know of any friends or acquaintances that are eligible to participate in this study, we request that you not discuss it with them until after they have had the opportunity to participate. Prior knowledge of questions asked during the study can invalidate the results. We greatly appreciate your cooperation.

If you have any questions regarding this study, please feel free to email me, Sarah Allgood, at [sfa@vt.edu](mailto:sfa@vt.edu).

In the event that you feel psychologically distressed by participation in this study, we encourage you to contact a person associated with this study.

If you are feeling distressed and are unable to contact a person associated with this study, please contact the Cook Counseling center at Virginia Tech at (540) 231- 6557.

THANK YOU FOR YOUR PARTICIPATION!

Should you have any questions about this research, you may contact:

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