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# Gender-Based Stereotype Threat and Competitive Interactive Games

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GENDER-BASED STEREOTYPE THREAT AND  
COMPETITIVE INTERACTIVE  
GAMES

being

A Thesis Presented to the Graduate Faculty  
of the Fort Hays State University in  
Partial Fulfillment of the Requirements for  
the Degree of Master of Science

by

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Chair, Graduate Council

## ABSTRACT

Stereotype threat has been examined in numerous areas of performance, including entrepreneurial intentions, negotiation, math, and chess (Gupta, Turban, & Bhawe, 2008; Kray, Thompson, & Galinsky, 2001; Maass, D'Ettole, & Cadinu, 2008; Spencer, Steele, & Quinn, 1999). Women who identify more strongly with their gender are also more vulnerable to stereotype threat (Schmader, 2002). The masculine stereotype includes such qualities as aggressiveness and risk-taking, and the feminine stereotype includes qualities such as cooperating and nurturing (Best, Williams, & Briggs, 1980; Gupta et al., 2008; Kray et al., 2001).

Men tend to play competitive interactive games, particularly complex board games and table-top games, more often than women and are believed to be superior players, possibly because the feminine stereotype excludes qualities that are considered essential for gameplay. Nevertheless, in some games (particularly video game role playing games), women have been found to be superior players to men by many measures (Williams, Consalvo, Caplan, & Yee, 2009). Studies of social games show that women are more cooperative than men in mixed-sex groups, but less in same-sex groups (Balliet, Li, Macfarlan, & Van Vugt, 2011).

In the present study, women were expected to manifest stereotypical gender qualities with higher frequency during a complex board game played with both men and women than during a game played with only members of their own gender, and to do so to a greater extent the more they self-identified as feminine according to the PAQ.

Women in mixed-sex groups were actually found to perform less feminine actions and more masculine actions relative to women who played in all-female groups. A significant correlation was found between PAQ femininity and the relative number of feminine-typed actions taken during the game. No evidence of stereotype threat was found, but there were signs that some type of gender-based interference occurred during the games, causing women to behave differently according to their group type.

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## INTRODUCTION

Stereotypes are a normal part of daily life in the human experience. People use them to ease the burden of their busy thoughts by simplifying and sorting new information into existing mental categories, allowing them to determine actions appropriate for their situation. Perhaps some of the most common stereotypes are those regarding gender. Social expectations and judgments about behavior appropriate for men or women both reward conformity to gender stereotype and deter people from varying from the norm for fear of negative evaluation (Ashmore & Del Boca, 1979).

Negative stereotypes are especially harmful, as they may lead to stereotype threat, a condition in which people feel at risk of confirming a negative stereotype about their group (Steele & Aronson, 1995). Even if members of a group do not believe in the stereotype, they may still be affected by it if they believe that other people believe it. Stereotype threat has been shown to apply to a variety of areas, including tests that are academic, physical, cognitive, and career-oriented. Women have been shown to perform more poorly than usual in stereotype threat conditions. Threat conditions may vary considerably, depending on the intensity of the negative stereotype and the extent to which members of the derogated group (women, in this case) believe that it applies to their particular situation.

In a study on mathematics, the experimental group was told that gender differences were expected, whereas the control group was told that no gender differences had ever been noted (Spencer et al., 1999). Scores of women in the experimental group

were significantly lower than scores of women in the control group. In chess, women were found to perform worse when they believed they were facing a male opponent compared to when they were told they faced a female opponent (Maass et al., 2008). Studies on entrepreneurial intentions and negotiation have also shown how stereotype threat can have a detrimental effect on women's performance and motivations (Gupta et al., 2008; Kray et al., 2001).

According to stereotype activation theory, stereotype threat can lose its power when a stereotype is made explicit (Gupta et al., 2008). People in a derogated group will seek to defy the negative stereotype, often outperforming those in the favored group who are impeded due to the pressure of directly-stated high-expectations. Women who identify more strongly with their gender are also more susceptible to the detriments of stereotype threat, while less feminine women, or those who place less personal importance on their womanhood, remain unaffected (Schmader, 2002).

Researchers have found that the traits linked to the masculine stereotype are: autonomy, aggression, dominance, exhibition, risk-taking, and being rational and assertive; those linked to the feminine stereotype are deference, abasement, succorance (being helped or protected by others), nurturance (taking care of others), and being emotional, passive, and overly accommodating (Best et al., 1980; Gupta et al., 2008; Kray et al., 2001).

Men are assumed to be more proficient at complex competitive interactive games, such as strategy board games, because the masculine stereotype includes qualities such as

being assertive and risk-taking that are considered essential for skillful game play. In a study of online role-playing gamers, women made up 40% of the players, were more committed, quit less often than men during conflicts, and had in their ranks more “intense” and “hardcore” gamers than men (Williams et al., 2009). Women played more often than men, but they were found to under-report hours played far more often than men as they sought to prevent negative social repercussions.

One of the major reasons for women downplaying their involvement in games can be seen in a study by Parks and Stone (2010). They found that in a public goods game, those who contributed the least in the group were not the only targets of expulsion from the group: benevolent group members who contributed a great deal but used very little were also considered undesirable. Through their excessive altruism, such individuals simultaneously violated the expected norms of group behavior and inadvertently set their own behavior as a social comparison that was undesirable by their companions, thus making themselves targets of exclusion from the group’s future activities. This demonstrates the pressures under which women operate who consider acting in a way that is not stereotypically feminine.

Since social pressure to conform to group norms increases as group size decreases, women feel more social pressure to conform to gender stereotype in smaller groups than in larger groups (Kerr et al., 2009). Women are more cooperative than men in mixed-sex groups, but less cooperative in same-sex groups (Balliet et al., 2011). Overall levels of cooperation between men and women are about the same, indicating

that the stereotype of women being more cooperative than men is inaccurate (Balliet et al., 2011). In addition, mixed-sex interactions appear adequate to activate stereotypic behavior, and therefore stereotype threat, when a relevant negative stereotype exists regarding one sex.

Behavioral economics and game theory provide a framework for examining gender dynamics in games and social systems. In the Nash equilibrium, players make their choices based on their expectations of other players, and being aware of the fact that their opponents will be trying to guess what they will do, as well (Sugden, 1989). This provides a framework for two opposite, though not always equally viable, strategies that can prove successful. In the correlated equilibrium, an external mediating device exists that indicates how a player should behave (Cartwright & Wooders, 2010). Cartwright and Wooders suggest that one such external mediating device may be gender, and that the simple act of people identifying themselves as men or women can lead them to exhibit in-game behaviors consistent with those predicted by the corresponding gender stereotype. Successful strategies for survival may have evolved in accordance with gender stereotypes, increasing efficiency and benefitting the group as a whole, and with those who exemplified their gender role best attaining the greatest reward relative to others of their gender (Sugden, 1989).

In the present study, during a 4-player competitive interactive board game, women were expected to manifest stereotypical gender qualities with higher frequency during a game played with both genders than during a game played with only members of

their own gender. They were also expected to perform more femininely-stereotyped actions the more they self-identified as feminine according to the Personal Attributes Questionnaire (Spence, Helmreich & Stapp, 1973; Spence & Helmreich, 1978; see Appendix A). These results were anticipated in accordance with theories of stereotype threat and gender conformity.

During the game, relevant actions taken by players were recorded. Feminine actions included cooperation (working together), nurture (providing help), and succorance (asking for help). Masculine actions included aggression (hurting another player) and risk-taking behavior (risking a loss to try for a big gain). Following game play, each player took the Personal Attributes Questionnaire (Spence, Helmreich & Stapp, 1973; Spence & Helmreich, 1978; see Appendix A).

This study of stereotype threat differed from others in that it explored an activity considered recreational instead of a domain that is academic (like math), career-based (like entrepreneurship), cognitively-based (like intelligence or negotiation), or a sport (such as golf or chess). It had the potential to show that stereotype threat can occur in an even wider spectrum of human interactions than previously demonstrated. Although gender conformity behavior has been noted in social games, as well as general gender differences in performances, this study sought to indicate the degree to which such phenomena can occur in games that are more common in society. This study was also geared toward aiding in understanding the depth of penetration of stereotyped gender behavior in normal social interactions, indicating how much individual behavior can

change based on a situational variable as simple as the presence of opposite-sex group members.

### *Stereotypes and Gender*

One of the earliest definitions of stereotype in psychological literature is “a structured set of beliefs about the personal attributes of a group of people” (Ashmore & Del Boca, 1979, p. 222). Stereotype generation is a normal part of organizing data, allowing a person to create cognitive structures that help them better understand the behavior of other people. Stereotyping is an adaptive behavior, allowing a person to form snap judgments about unfamiliar people based on their group affiliations, saving the time that would otherwise be spent studying each individual on a case-by-case basis.

However, while such a process may be convenient, it also often includes flawed assumptions, leading to oversimplifications and faulty generalizations. It is related to the representativeness heuristic, which, in dealing with people, is characterized by a person fitting someone into an existing mental category according to perceived qualities, and is based on beliefs about a group or past experience. For example, upon meeting a man from Italy, a woman may say to herself, “The Italians I’ve known are loud and aggressive, therefore this Italian man must also be loud and aggressive.”

In addition to influencing perception, stereotypes also impact behavior, since actions are determined based on expectations. With regard to gender, the societal role of a man or woman is defined by his or her sex, and personal attributes are associated with each. The pressure of social role expectations makes behaving in a way that confirms a



stereotype more rewarding than behavior that contradicts it (Ashmore & Del Boca, 1979). The awareness that a person will be judged according to what is considered normal masculine or feminine behavior is ever-present, increasing the likelihood of gender stereotype conformity (West & Zimmerman, 1987).

For example, a man may expect women to be submissive and indecisive, and expect men to be assertive and decisive. When interacting with a woman, he will be likely to behave in a manner consistent with his stereotype as a man. When his options include taking charge of planning an activity they will both do together, or asking for her for input, he will usually choose the former, since the latter option could lead to her assessing him as less masculine. He will also probably expect that his own actions will be anticipated and valued. In this interaction, the woman will usually wait for the man to propose a course of action, thus reinforcing his stereotypic expectations; otherwise, if she presents her own ideas on an activity, she may risk challenging his views about women being indecisive, forcing him to either view her as less feminine, or change his stereotypic beliefs (unlikely).

Since the choice of being assertive is more likely to result in conflict, and being submissive more likely to lead to a positive personal assessment (she will be seen as more attractive and socially acceptable), a woman in this situation will tend to conform rather than resist. Unfortunately, while adhering to the man's expectations may make the woman's particular situation easier, it contributes in a small but significant way to the

social pressure that will prevent her from being able to assert her own plans in the future without encountering negative reactions.

In the previous example, not only is the woman's behavior influenced by stereotype, but the man's as well. His own conception of what it means to be a "real man" dictates his own actions. A man striving for this image may avoid interaction with women who are independent and assertive, since such women would challenge his beliefs about women in general and indirectly level a potential threat to his own self-concept (Ashmore & Del Boca, 1979). Therefore, a woman who violates the pattern of stereotypic gender behavior runs the risk of being ostracized. The dilemma here is part of what constitutes stereotype threat, which is the threat of having one's performance or personal value judged based on a negative stereotype (or, in this case, the threat of being devalued due to failure to conform to a stereotype commonly held as ideal for a particular gender).

### *Stereotype Threat*

The phenomenon of stereotype threat was first labeled by Steele and Aronson (1995) during their findings of underperformance by Blacks on quantitative tests. Their studies compared verbal test scores of African-Americans to Caucasians. When Blacks were told that their test would be diagnostic of their ability, they were more likely to underperform in comparison to Whites. Lower levels of performance also occurred to some extent when they were told the results would not be diagnostic of their ability. In

this case, the operating stereotype was the belief that Blacks were intellectually inferior to Whites.

According to Steele and Aronson (1995), stereotype threat is “being at risk of confirming, as self-characteristic, a negative stereotype about one's group” (p. 797). People who perform at a lower level than they would normally due to the influence of a negative group stereotype are victims of this phenomenon. The response of underachievement is attributed to conscious and subconscious distress when people are aware of the negative stereotype and are afraid of being judged by it. Even if members of a group do not believe in the stereotype themselves, they may still be affected by it if they believe that other people believe it.

As explained by Spencer et al. (1999), knowledge of stereotypes exists in every corner of society, even among those who do not believe them. Because of this, those targeted by the stereotypes are also likely to be aware of them. The threat facing such individuals is that in any situation relevant to the stereotype, any characteristic or behavior they exhibit that matches the stereotype will make it more plausible that their evaluation will be judged according to the stereotype.

Stereotype threat is not isolated to conventional tests of knowledge, but has been found to occur even in tests of physical prowess. Commonly held negative stereotypes in athletics can prove detrimental to athletes' performance when they feel at risk of confirming a relevant stereotype. Some of these negative stereotypes are “White men can't jump”, “African Americans are not athletically intelligent,” “Whites are not

naturally athletic”, and “women are not fast, strong, or athletic” (Beilock & McConnell, 2004). Stone, Lynch, Sjomeling, and Darley (1999) found that White participants performed worse than Black participants on a golf putting task when they were told that they were taking a test of “natural athletic ability.” Conversely, Blacks performed worse than Whites on the task when they were told they were taking a test of “sports intelligence”. This demonstrates that members of a negatively stereotyped group suffer in performance when a test is framed as diagnostic of an attribute in which they are considered stereotypically weak.

The idea of stereotype threat is related to the concepts of evaluation apprehension, test anxiety, self-fulfilling prophecy, and negative thinking. In evaluation apprehension, performance can be shaped for better or worse by one’s perception of being evaluated by someone whose approval is desired. Spencer et al., (1999) call it “a performance-interfering anxiety and distraction that is aroused by an evaluative audience, real or imagined” (p. 14). Stereotype threat operates similar to evaluation apprehension, and may even be considered by some a form of it, considering only the negative effects of feeling judged. Stereotype threat, however, remains potent even in situations in which one is not being observed (Inzlicht & Ben-Zeev, 2003).

In test anxiety, a person experiences physiological over-arousal, worry, and dread related to formal evaluation (Bruno, 2012). Expectations of underachievement can erode self-confidence and add to the considerable stress a student feels in taking a test. In self-fulfilling prophecy, people’s erroneous belief about something can cause it to occur. The

perception of a thing as reality causes it to have real effects, and those who react in error can cause what they fear will happen to actually occur, especially in the context of success or failure in a given enterprise. While positive effects are possible, the self-fulfilling prophecy is customarily examined for its undermining impact on performance.

Negative thinking also appears to be a major component of stereotype threat (Cadinu, Maass, Rosabianca & Kiesner, 2005). Worry and cognitive interference, and not emotionality, have been shown to be strong predictors of performance deficits. A thought-listing experiment showed that women under stereotype threat listed more troubled thoughts than women not in such a condition. The thoughts tended to be domain-specific and not general. While an immediate difference between the two groups was found regarding quantity and frequency of negative thought-listing, performance was not affected until half-way through the task. This indicates that negative thoughts have a cumulative effect, and that it is the negative thinking that causes the underperformance and not the reverse, although the two may be mutually reinforcing.

The unifying theme of these concepts is that a belief that people will perform poorly can impact their thoughts, feelings, and actions, interfering with their cognition, eroding their self-confidence, and damaging their performance. In stereotype threat, this can occur in any person who belongs to a group about which a negative stereotype exists, whether the group be based in ethnicity, gender, religion, sexual preference, or anything else.

The following example of stereotype threat will help illustrate the idea. Amy is a woman who excels at math. She is aware that a negative stereotype exists in which women are believed to be worse at math than men. Amy takes a math test alongside men. She suffers anxiety about how well she will score compared to them, and becomes preoccupied with her desire to not be judged inferior simply because she is a woman. Her cognitive abilities are now hampered by her concerns, and she ends up scoring lower than she normally would have. Amy's performance deficits are due to stereotype threat.

Women are the largest group that falls victim to the effects of stereotype threat. A study of sex-trait stereotypes found that women, especially in Western society, were thought to be weaker, less active, and to possess attributes generally thought of as less socially desirable than men (Best et al., 1980). Although many women are happy to be thought of as nurturing, sympathetic, and unambitious, there are numerous others who resent being pigeonholed. Narrowly-defined sex categories hamper the ability of women to excel in ways that may have once been thought inappropriate, and by many are still considered unconventional, such in the areas of mathematics, science, sports, business, and any profession involving physical danger, like firefighting, police work, or the military. The more pressure women have exerted by others against their efforts toward such goals, the more they are forced to endure unequal treatment because of their sex and become the participants of gender discrimination.

*Studies Involving Math, Chess, Negotiation, and Entrepreneurial Intentions*

Some of the situations in which the operation of stereotype threat on women has been studied are math, chess, entrepreneurial careers, and negotiating. One study verified the occurrence of women performing at the same level as men on mathematical tests considered easy, but at an inferior level on difficult tests (Spencer et al., 1999). The follow-up studies demonstrated that women performed more poorly than men when they were told beforehand that gender differences had been previously shown on the test they would take, or if there was no mention of gender differences with regard to performance. Those who were told explicitly that no gender difference had ever been demonstrated performed at the same level as the men (Spencer et al., 1999).

In another study, women scored significantly lower than men on word problems, but when the same questions were given in their mathematical equivalent, women scored at the same level as men (Quinn & Spencer, 2001). It is thought that this can be explained by women's difficulty in coming up with viable strategies to transform word problems into solvable format. When stereotype threat is high, anxiety and diminished cognitive capacity seem to interfere with the ability to formulate effective math strategies. When subjects vocalized their process, stating what they were doing while solving a problem and afterward explaining why they used those methods, it was found that under stereotype threat conditions, women performed more poorly than men and were unable to formulate strategies as often as men; in the gender-fair condition, women were able to form strategies as often as men and performed equally well.

In a study by Maass et al. (2008), participants played several games of chess online. Women who were aware that they played against men dropped in performance. Women who were falsely informed that their male opponent was a woman showed no deficit in performance. In chess, women are not only at a disadvantage in terms of their fear of being accused of inferior play because of their gender, but are also afraid that if they do well, they may be considered less feminine. Interestingly, chat-line comments of male participants tended to support this idea, as in the case of one participant who stated that a particular female opponent was easy to beat, but his second opponent (allegedly a male, but actually the same woman) was a much more difficult opponent.

When entrepreneurship, traditionally a masculine pursuit, was explicitly linked to masculine characteristics by researchers, the intentions of women to enter such a career were strengthened (Gupta et al., 2008). Under the same conditions, the entrepreneurial intentions of men were weakened. The fact that the gender associations were made explicit rather than implicit altered the effect of stereotype threat. Conversely, men reported greater entrepreneurial intentions when exposed to material implicitly favoring masculine characteristics, and women reported lesser intentions under such conditions, as would be expected.

In a study testing gender differences in negotiation performance, the mode of stereotype activation was shown to affect individual reactions (Kray et al., 2001). Women told in a subtle manner that people of their gender were worse at negotiating tended to conform to the stereotype. Women told explicitly that they would do worse



because of their gender showed improved performance. When the gender advantage of men was made explicit, men's success in negotiating dropped. The explicit mention of gender differences on how well participants would perform was the unusual feature in this study. Men may have performed worse because of increased pressure created by high expectations, and women may have performed better solely from a desire to prove the naysayers wrong. They may also have decided to consciously apply more masculine tactics, concluding that being feminine would be a hindrance to their performance.

Stereotype threat has been demonstrated in numerous settings and with a variety of groups. It occurs when people are in a position where they risk confirming a negative stereotype about a group they belong to, and it results in diminished performance due to cognitive interference, and often unwilling conformity to the stereotype, as if carrying out a self-fulfilling prophecy. Performance decrements on intellectual and physical tasks due to stereotype threat have been noted (Steele & Aronson, 1995; Stone et al., 1999). According to Quinn and Spencer (2001), stereotypes are activated at an unconscious level during high-threat conditions, and attempts to suppress them take up cognitive resources that result in underperformance during testing.

Women, the largest minority group in the world, have been shown to suffer from stereotype threat in regard to math, chess, entrepreneurial intentions, and negotiation (Gupta et al., 2008; Kray et al., 2001; Maass et al., 2008; Spencer et al., 1999). Stereotypes about academic skills are generated by the culture transmitted through peers,

media, family, and education programs (Quinn & Spencer, 2001). Gender differences regarding math are promulgated through parents' and teachers' expectations.

### *Stereotype Activation Theory and Gender Identification*

As above mentioned, the study of stereotype threat on entrepreneurial intent (Gupta et al., 2008) revealed that people respond differently to explicit versus implicit exposure to expectations based on stereotype. Stereotype activation theory states that people will behave in a manner that contradicts a defining stereotype when it is stated explicitly, and will act in a manner consistent with the stereotype when it is implied (Gupta et al., 2008). The stereotype functions as a comparison standard that arouses psychological discomfort.

When people are blatantly made aware of low expectations others hold of them, they strongly react against the negative stereotype to prove that the stereotype is untrue (stereotype reactance). Conversely, when people are explicitly made aware that others hold high group-based expectations for their behavior, they are likely to feel apprehensive about meeting those high standards and experience an increase in psychological pressure that causes them to choke and perform poorly (Gupta et al., 2008).

Another factor that influences the effects of stereotype threat has to do with how much people identify with their gender. The degree to which they conform to stereotype under threat condition is dependent on their degree of gender identification. In a study by Schmader (2002), women with higher levels of gender identification suffered greater performance decrements on a math test during stereotype threat than men or women who

identified less with their gender. Women for whom gender was a less important part of their self-concept scored equal to men on the math test. Men performed at the same level (or slightly better) when they identified more strongly with being male than when they did not. Men and women performed equally, regardless of their degree of gender identification, when not under stereotype threat conditions.

When a specific social identity is an important part of people's self-definition, and they are part of a negatively-stereotyped group under scrutiny in an area in which the group is considered less able than another, they will perform worse when they believe that their identity is relevant to their performance than when they do not. Both the importance placed on domain and the importance placed on group membership significantly moderate the effects of stereotype threat.

Performance differences may be part of a general automatic behavior effect of primed stereotypes rather than a fear response related to stereotype threat (Schmader, 2002). This means that stereotype activation may result in conformity behavior as well as having performance-hindering effects. The priming of stereotypes in a setting examining more than simply performance on a task may reveal behavior conforming to stereotypic gender traits. The impact of gender identification on the severity of the effects of stereotype threat may carry over to gender conformity, as well. In other words, as a woman is found to identify more strongly with being feminine, the more she will be found to exhibit behavior that conforms to her gender stereotype when it is activated. In a situation in which her gender suddenly becomes a relevant issue (such as during a game

customarily considered to be in the domain of men), her behavior may increasingly match what would be expected from a woman who is classically feminine (or who exemplifies the feminine stereotype).

### *Gender Traits According to Stereotype*

In the implicit condition for the study conducted by Kray et al. (2001), the terms used to describe successful negotiators were: rational, assertive, and demonstrate a regard for their own interests throughout the negotiation. Gupta et al. (2008) refer to similar traits: aggressive, risk-taking, and autonomous. These are qualities commonly attributed to men. The terms used to describe those who fared poorly in negotiation and entrepreneurship were: emotional, passive, overly accommodating, caring, love to network, and humble. These are qualities customarily attributed to women. Best et al., (1980) found analogous traits in their analysis of male and female stereotypes; men were believed to be in possession of a higher degree of such qualities as autonomy, aggression, dominance, and exhibition, whereas the female stereotype was higher in deference, abasement, succorance (being helped or protected by others), and nurturance (taking care of others).

### *Gender and Games*

The aforementioned studies demonstrated that there are definite stereotypical traits linked to masculinity and femininity. These stereotypes, and individuals' perceptions of them, influence performance in numerous activities, including playing board games. Among those who play competitive interactive board games, there is a

common belief that women play such games less often, enjoy them less, and are worse at them than men. While no formal research has been done on the subject, anyone with significant experience can state that women are observed in far smaller numbers at game conferences, game clubs, game tournaments, and at regular gaming groups.

The reason that this is a predominantly male activity may be due to the influence of stereotypical gender-based traits. Because women are perceived as being weaker in the areas associated with playing these games successfully (such as aggressiveness and risk-taking), they may be deterred from participating. Women may be discouraged by men because men think they will be too emotional (something men may be uncomfortable with) and overly accommodating, which could unbalance a competitive game and make it, in their opinion, not worth playing. Women may be discouraged by other women who want to preserve their company for themselves and protect their feelings (which could get hurt during a serious, aggressive game) and femininity (they do not believe women should involve themselves in something that is considered part of the domain of men).

#### *Gender Differences in Online Role-playing Games*

Although there may be a paucity of data on gender differences in table-top games, there is some research on video games that have similar themes. Playing computer games is a stereotypically masculine pursuit, yet women currently make up 40% of players (Williams et al., 2009). MMOs (massively multiplayer online games) are a place where people seek belonging and interaction, not just individual entertainment, as

demonstrated by the high frequency of the message “LFG” (looking for group) sent by new players stating their desire to find and join a group. Women were found to be more motivated by social factors (starting and fostering relationships) than men were overall, but men who played with their romantic partner had a far greater social motivation than men who did not.

In the study by Williams et al. (2009), while men showed more physical and verbal aggression than women, men were also less committed and quit more often during conflicts. There were more “intense” and “hardcore” players among women than men. Although women actually played more often than men, the amount by which they under-reported hours played was three times greater than the amount men did, presumably in an effort to avoid a stigma of social deviance. It is likely that despite the commonly held gender stereotype that men are better at competitive games than women, women are actually capable of performing at an equal level and hide their abilities from others for social reasons.

#### *Gender Differences in Social Games*

Several psychological studies have used simple social, or behavioral economic, games. These are rooted in game theory, which is the study of strategic decision making among rational individuals who are faced with cooperative and competitive choices. Many of these are zero-sum games, in which one player’s loss is balanced by another player’s gain. These games have been run in an experimental setting investigating such topics as social exclusion (Kerr et al., 2009; Parks & Stone, 2010), pro-social behavior

(Dana, Cain & Dawes, 2006), decision-making processes (Sanfrey, 2007), and interpersonal bargaining (Monterosso, Ainslie, Mullen & Gault, 2002).

A meta-analysis of studies using social dilemma games found that women behaved more cooperatively than men in mixed-sex groups, and men were more cooperative than women in same-sex groups (Balliet et al., 2011). Overall levels of cooperation between men and women did not differ significantly in the studies, demonstrating that despite their stereotype, women are not more cooperative than men. Mixed-sex interactions are shown to activate stereotypic behavior, indicating that no other factor need be involved for stereotype threat to occur in a test of ability related to stereotypic attributes.

One of the limitations of the study by Balliet et al. (2011) is that social dilemmas only reveal information about cooperation and non-cooperation, or defection—which can manifest through a competitive motivation, but is more often motivated by concern for self-interest. Cooperative behavior is only one half of the gender stereotype (the part linked to women), the other being aggression (linked to men), often measured through competitiveness. Because of this, social dilemma scenarios are inadequate tools for the investigation of gender differences in behavior during a game.

Generally, the more members of a group are expected to cooperate, the more cooperative each member will be (Kerr et al., 2009). Social sanctions (like social exclusion) only improve cooperative behavior if uncooperative individuals believe that the group has the means and willingness to impose them, and if they are costly enough to

the targets. In experiment 1 of the study by Kerr et al. (2009), participants provided with previous examples of game play in a social dilemma game who were in a high-threat condition (vulnerable to exclusion) did not lower their degree of cooperation significantly until the majority of the example group consisted of 3 “bad apples” (participants who had contributed nothing yet still took from the community pot); as long as there were 2 or less defectors, subjects were sufficiently deterred from defecting by the threat of social exclusion.

In experiment 2 (Kerr et al., 2009), participants who were part of an 8-person group contributed less than those in a 4-person group (even though the larger group’s public contributions were multiplied by 4 and distributed evenly, while the smaller group only had them multiplied by 2). Perceived risk of exclusion diminishes as group size increases, due to several likely factors: increased anonymity, diffusion of responsibility, subgroup formation, and lessened identification with the group. As applied to gender conformity, a smaller group of women playing with men may be more likely to conform to gender stereotype, whereas in a larger group of women, each person may feel less pressure to represent their gender (especially in the absence of men), resulting in less stereotypical behavior.

One of the ways in which women may be pressured to conform to the norms of their gender is through ostracism. Parks and Stone (2010) provide timely data on the lengths to which people will go to correct or punish behavior that is considered inappropriate, even when it benefits the group. They found that in a public goods game,



regarding the use of a public good and contribution toward providing it, group members are likely to target for expulsion anyone who violates group norms. Those who give little but take little are considered less reprehensible than those who are exploitative: heavy consumers who contribute little or nothing. In addition, those who contribute much but use little of the public good are also considered undesirable, and may be equally targeted for expulsion from the group.

One reason for the desire to expel benevolent group members is that when contributions are revealed, an involuntary social comparison is created that makes members of the group who are contributing an average and fair amount look bad. If a member can remove the one setting the inappropriately high standard, then they need not change their behavior and contribute more to regain status in the group as a significant contributor. Another reason is that the unselfish individual is simply not adhering to group norms. They are viewed as a rule-breaker who is behaving in a way that is contrary to fair and equitable action in the group, and they are thus targeted for exclusion to preserve societal norms (Parks & Stone, 2010).

#### *Gender Stereotype Conformity and Game Theory*

Regarding social regulation, there are numerous ways in which stereotype conformity can be seen as beneficial. The foremost of these include distribution of labor, mate selection, and reproductive success. For example, failure to conform to gender roles regarding parenting can result in inadequate resources or protection for children, resulting in a decline in population. Because adherence to gender-based norms can be critical for

the survival and advancement of the species, men and women may habitually conform to gender roles, regardless of circumstance. Such conformity allows each gender to develop expectations of the other, and to create strategies that will provide the best outcome possible within the context of the society.

The Nash equilibrium is a well-known concept in game theory, and has been used in explaining social behavior within the previously mentioned areas of social regulation. It is the idea that in a group, each person will conform to a particular strategy that will maximize their own payoff in response to the strategy anticipated by one's opponent, where deviation from this strategy by a single individual will result in a less desirable outcome.

Table 1.

		Player 2	
		Hawk	Dove
Player 1	Hawk	-1, -1	1, 0
	Dove	0, 1	.5, .5
Scores:		(Player 1, Player 2)	

For example, consider a two-player game in which each person is striving to obtain a particular good, and only two options for each conflict exist: cooperation or domination (see Table 1 above). If I know my opponent is going to use an aggressive strategy, and that we will both suffer losses if I do likewise, I will be more likely to use a conciliatory strategy that will restrict my losses. If he ends up being conciliatory as well,

we can both benefit. Conversely, if I suspect my opponent will be submissive, I may employ an aggressive strategy to take as much as I can. If, however, there is any indication that my opponent may become aggressive, then continuing to be aggressive will only hurt me. If the strategy I am using is the best response to my opponent's strategy, and his strategy is likewise made in consideration of my own, then the game is in Nash equilibrium (Sugden, 1989).

The correlated equilibrium is a similar concept, but in this there exists some mediating device that indicates which action should be performed by each group member for each to benefit as much as possible (Cartwright & Wooders, 2010). In the above example, imagine that before taking any action, a bottle is spun, with the expectation that whoever the bottle faces will take a conciliatory action, and the other an aggressive one. As long as each player abides by this convention, they will both be able to profit with equal probability.

It is important to note that an interaction in equilibrium does not mean that each party is benefitting equally. While that may sometimes be the case, there are other instances in which one becomes stuck in a position of preventing losses or taking small gains while one's opponent takes larger gains, and as long as one's opponent continues to employ such a strategy, any change one makes will be detrimental. For example, if my opponent continually uses an aggressive strategy no matter what I do, then the only way I will be able to prevent further loss is to always play a conciliatory strategy, even though

it benefits me little. Sugden (1989) uses the game of Hawk and Dove as his example of this concept, with values shown in the chart above.

To further demonstrate these concepts, consider the following hypothetical situation. Two men end up stranded on an island. They are from warring factions, so the men set up camp near streams on opposite ends of the island. In the center of the island is a bush that produces fruit every day, but only enough for one man to eat his fill. If not eaten in the same day, the fruit falls off and rots during the night. The fruit tree is several miles away from each man's camp. If each of the men hike to the fruit tree on random days, there will inevitably be some days in which there are undesirable results. They may arrive together and have conflict, since there is not enough fruit for both. One may arrive after the other, and find the fruit all eaten and his effort to reach the tree wasted. Neither may visit the tree, and the fruit may be wasted. The Nash equilibrium here would be for each man to visit the tree every other day, which may be arrived at after some conflicts have arisen and the men are able to determine the best course of action.

Aside from arriving at a viable course of action from trial and error, a third party may indicate the best course to take. A correlated equilibrium would involve intervention of another factor to indicate when each man should visit the tree. For example, the island may have a sounder of boars that alternates daily on which side of the island they search for food. Since each man wishes to avoid a dangerous encounter, each would elect to stay concealed and safe when the boars are on his side of the island, and visit the tree only when the boars are on the opposite side of the island. This would create a system in

which each man could eat his fill from the tree's fruit every other day without harm. This correlated equilibrium would be naturally occurring, though others may involve a deliberately selected intervening factor or third party mediator.

According to Cartwright and Wooders (2010), one such external mediating device may be gender. They posit that men and women may have preferences that are similar to others of their own sex during a game. While gender may be an attribute independent of their game-play ability, it may serve as a signal as to which actions a player should take. They present an example of gender roles in daily life in which such roles assist in dividing household chores equitably, such as following a household norm in which women cook dinner and men wash the dishes. Although such a scenario may be seen to demonstrate cooperation within a group, it also shows how each person may conform to a particular action to get what they want (a home-cooked meal for the man, and clean dishes for the woman).

More competitive situations may involve similar functions. For example, a man and a woman who are interviewing for the same job may use different tactics related to each person's gender. During the man's interview, he may be highly assertive and self-promotional, pointing out his exceptional qualifications for the job and his ability to demonstrate initiative. During the woman's interview, she may be modest and submissive, following the lead of the interviewer, seeking to establish a relationship based on commonalities, and emphasizing her ability to take orders. These approaches would be in harmony with gender stereotypes, and each strategy may give each candidate

a better chance of acceptance than others. A man who is too submissive or a woman who is too aggressive may oftentimes lose points with an interviewer for failing to present themselves as expected by socially accepted gender roles.

In addition, a woman using a presentation strategy that is more masculine puts herself directly in competition with the men; in other words, she will be judged based on male criteria. Conversely, using a feminine strategy, she avoids lining up her abilities with the same ones emphasized by the men, and instead offers different ones. An interviewer who tends to favor the stereotypically feminine qualities she advertises will choose her over the male applicants, whereas a different presentation could result in her being turned down. Also, in the event that the interviewer prefers strengths that are stereotypically masculine for the opening in question, the interviewer may have another position to fill for which he believes a woman with strengths that are stereotypically feminine would be better suited than a man, allowing her an opportunity she would not be granted otherwise. This demonstrates some of the advantages of using a different strategy, one that is socially-acceptable according to gender role expectancies, and some of the disadvantages of nonconformity.

Sugden (1989) refers to a custom regulating ownership rights of driftwood in the absence of explicitly stated laws or rules. The established norm was that, following a storm, the first person on the beach could create a pile of driftwood above the high-tide line and place two stones on it, and it would remain unmolested for the next two high-

tides, giving him time to gather the wood; after the second high-tide, the wood could be taken by someone else.

This system provided a gatherer with a reasonable amount of time to remove the wood from the beach, and eliminated the worry of preventing others from stealing it. It had a cooperative function in that no other gatherer would interfere with their right to the pile until the allowed time had elapsed. This prevented a “free-for-all” scenario in which labor was expended unnecessarily by numerous individuals rushing to collect the wood, each failing to obtain any useful amount because of the intense competition and chaos. It also had a competitive function, rewarding whoever was first on the beach after the storm. This custom prevented a disproportionate number of conflicts from arising, allowing people equal opportunities according to their initiative and industry. In addition, Sugden refers to the “first-on” rule as a “deadweight loss” (Sugden, 1989). This indicates that despite the possibility of more efficient rules for distribution of resources existing in this scenario, this rule proved desirable because it effectively excluded those individuals who were least industrious, thus permitting those investing more time and energy to obtain a greater payout.

Sugden (1989) points out that numerous other rules for distributing the wood could have been created, but that the extant one was fairly labor-efficient and mutually beneficial at a group level, despite its informal development. It could have been even more efficient, but only at the cost of reducing the reward given to the most ambitious. In his words, “rules regulating human action can evolve without conscious human design,

and can maintain themselves without there being any formal machinery for enforcing them” (p. 86).

The same principle may be at work among the social mores of gender interactions. Men and women may have developed different strategies over time as a method of increasing efficiency (distribution of labor), benefitting the group as a whole (survival and advancement of the species), and rewarding those who best exemplified their gender role. These strategies may have developed spontaneously, without any deliberate forethought or planning, in response to environmental and social pressures.

Conventions that create order in society are the product of moral beliefs, and such beliefs serve to preserve the conventions. In most societies, a system of inequality exists that values men over women. This is rooted in the belief that a man and woman are integrally different in personality and intellect. Such a belief can provide grounds for attributing different values to each gender, and thus perpetuate the system of inequality. A belief that women should be nurturing and men should be forceful supports the convention of treating men and women differently.

### *Hypotheses*

There were two main hypotheses. First, it was believed that women playing against only other women would take more stereotypically masculine actions than women playing in a mixed-sex group. Second, women who took more stereotypically feminine actions in either group were expected to have higher scores of femininity on the PAQ (number of femininely-stereotyped actions and PAQ femininity scores will be positively correlated).



This study aimed to demonstrate that stereotype threat manifests in areas other than tests of performance, and that it consists of more than the interfering effects of anxiety and thought intrusion. One mysterious component of stereotype threat that is even more insidious causes unconscious conformity behavior that confirms the feared stereotype. In addition, the actual sentiment about the stereotype is customarily ambivalence, and most people both fear and desire the stereotypic traits to manifest in them. The root of this desire may partly lie in the human needs for identity and belonging, and partly in issues related to social regulation. Because of this, even in situations not aimed at performance testing, people will often conform to traits stereotypic of their gender.

Studies have shown that even when men and women are accorded equal formal status, men will be more influential than women, and women will be more easily influenced than men (Eagly, 1983). This effect is thought to stem from the development of gender-based expectancies in a hierarchical system in which men tend to have higher social status than women. Long-term exposure to common gender roles in society establishes in people's minds an idea of appropriate gender-related behavior. Thus, even in a setting which seeks to keep outside influences at bay, normative behavior will be exhibited by members of each gender that confirm expectancies, men taking on a more directive role and women taking on a more receptive role during interaction between sexes.

This study investigated gender-based stereotype threat as it relates to performance and gender-stereotyped strategy patterns in a competitive, interactive, resource-based board game in which successful strategies may be employed ranging from little to no cooperation and high aggression, to high cooperation and little to no aggression. Women were expected to take less actions that were stereotypically masculine when they played in mixed-sex groups as opposed to same-sex groups due to the effects of stereotype threat and gender conformity. According to prevailing gender stereotypes, masculine actions include aggression (hurting another player) and risk-taking behavior, and feminine actions include cooperation, nurture (benefitting another player), and succorance/support-seeking (asking for help).

During a competitive, interactive game, men may take more actions that hurt other players and women may take more actions that improve their own position without hurting others, or which benefit another player, as well (attack vs. growth). If all parties attack or focus on growth exclusively, the game becomes unbalanced. Too much growth may mean that none of the players are trying to achieve victory over the others, which is one of the purposes of the game. Too much conflict means that players are continually tearing each other down, and the victory of one party over the rest may be delayed longer than the game designer intended, due to each being in a weakened state.

In addition, an overly competitive game can elicit anger and result in bruised egos. Investing oneself in the game is good, as long as players do not become so focused on winning that they forget to enjoy themselves and ruin the enjoyment of others. An overly cooperative game may be passed without irritation or hurt feelings, but if the

players are so hospitable to one another that they continually avoid conflict, then there is little progress made, which may result in a much longer game than usual. In a scenario in which players are expected to enter and resolve conflicts, but in which they are too accommodating—either avoiding conflicts completely or else resolving them in a fashion not intended by the game designer—the end of the game may come without any real meaning, since the final score will fail to reflect any accurate measurement of performance.

Having a more passive strategy is not necessarily a bad thing (as long as there are other players who use a different strategy). Although it may seem surprising, passive gameplay is often a viable strategy when applied correctly, especially against highly aggressive players or when employed by a female. Because male players see female players as merely adhering to the values of their gender, women's lack of aggressive behavior will appear normal to male players, and usually go unnoticed; men who exhibit the same behavior may be suspected of having ulterior motives, or may be perceived as easy targets and attacked early. While the more aggressive male players are battling for supremacy, such as during a game of Risk, female players may be able to quietly stock cards and armies in a less desirable area of the board. Once the males have seriously weakened one another, females can then wipe up the mess and take over without any real resistance.

There are very few games of this type that have been used in psychological research. One of the reasons for the paucity of this type of game is likely due to the

complexity of the game itself. Researchers tend to use simple games in order to streamline their experiments and avoid extraneous variables that may weaken their results. While simple games may be a useful tool to allow researchers to better understand the basic principles of decision-making processes in economic and other settings, the games used in their experiments are not real games; in other words, they are not games played for fun by a large number of individuals throughout the population. They are, for lack of a better term, “lab games”, and do not serve much purpose outside of research and educational settings.

Since the area investigated in this case was behavior during a real board game, complexity was a necessary element. To remove this would have reduced the game to something less enjoyable by the players and elicited responses uncharacteristic of actual play in a natural setting. This approach was fairly innovative, inviting participants to immerse themselves in an interactive recreational activity while their actions during the game were recorded. While there are a number of factors that could have elicited aggressive or passive choices during the game (such as moods of the players, turn order, luck, seeking retribution for actual or perceived wrongs, etc.), it was anticipated that the overall degree of aggression and risk-taking during the game would be demonstrated to have a basis primarily in the gender of each participant and their opponents.

To determine the presence of stereotype threat during a game, it was important to avoid stereotype reactance. Therefore, during the experiment, there was no mention of gender differences with regard to aptitude or performance on the game. If the belief that

competitive strategy games are primarily a masculine pursuit was part of a generally held stereotype, then women who were aware of such a belief should have experienced some of the deleterious effects of stereotype threat.

As with other studies that have examined the performance of individuals in stereotype threat conditions, this study had the additional aim of examining the degree of gender role conformity. If pressure to conform to gender roles existed in a mixed-gender group playing a game typically viewed as favoring men, then women would behave in ways that were more stereotypically feminine, and men in ways that were more masculine, when they played together rather than with their own gender (although in this study, groups composed entirely of men were not examined).

While overall performance of each participant was noted, particular interest lied in the ratio of masculine to total stereotyped actions taken by each subject during the game. Women who took less masculine actions compared to total stereotyped actions during a game played against men than women who played against other women were seen to have conformed their behavior to what was considered acceptable for their gender. This conformity was viewed as a response to the stereotype threat condition inherent in the situation. In addition to underperforming as a result of stereotype threat, women may have chosen to conform out of a desire to be like other women, to protect their feminine image, or to bring attention to their difference as women from the players who were men. It is anticipated that for many women, submissive behavior during the

game was associated with both the fear of being negatively judged, as well as the desire to demonstrate acceptable traits of their gender.

It was also expected that women who conformed to their stereotype in this way would also show performance deficits due to their reluctance to utilize actions that could help them during the game but which would be considered masculine in nature. In addition, concern over their possible inability to perform at a level comparable to the men against whom they competed could have undermined their ability to choose actions of greatest benefit to them, thereby resulting in a lower score than when they played against other women only.

In a mixed-sex game, as long as women performed at approximately the same level as the men, the average scores of both genders were expected to be equivalent. If, however, women were being impeded in their gameplay due to stereotype threat, this would manifest in their scores, causing the average score of women in such a game to be significantly lower than the average score of men.

It was believed that the PAQ scores of each participant would show a strong correlation to the type of action taken during the game. Women's femininity scores on the PAQ were expected to predict the number of stereotypically feminine actions they performed during the game: the higher the femininity score, the more stereotypical feminine actions taken. Women who scored higher on masculinity were thought likely demonstrate more masculine and fewer feminine actions than those who scored lower on masculinity.

Hypothesis 1: The ratio of masculine actions to total stereotyped actions taken by women during the game was expected to vary depending on the presence of men in their group. Women in groups without men present were expected to take a significantly greater number of masculine actions compared to total stereotyped actions than women in groups with men.

Hypothesis 2: The ratio of feminine to total stereotyped actions taken by women was expected to change depending on whether men were part of the group. Women in groups without men present were expected to take a significantly fewer number of feminine actions compared to total stereotyped actions than women in groups with men.

Hypothesis 3: Women's femininity scores on the PAQ were expected to predict their feminine action ratios. Women with higher femininity scores were expected to perform more feminine actions compared to total stereotyped actions than women with lower femininity scores.

Hypothesis 4: Women's masculinity scores on the PAQ were expected to predict their masculine action ratios. Women with higher masculinity scores were expected to perform more masculine actions compared to total stereotyped actions than women with lower masculinity scores.

Hypothesis 5: In mixed-sex groups, women were expected to perform worse than men. The scores of women in mixed-sex groups were expected to be significantly lower than the scores of men.

Hypothesis 6: Women's masculine action ratios were expected to predict their game scores. Women who took more masculine actions compared to total stereotyped actions were expected to perform better than women who took less.

Hypothesis 7: In mixed-sex games, men were expected to win significantly more often than women.

Hypothesis 8: In mixed-sex games, the scores of men were expected to be significantly higher than the scores of women.



## METHOD

### *Participants*

Participants included 78 adult students from Fort Hays State University ( $n = 23$  men,  $n = 55$  women). Both undergraduates and graduate students were sampled ( $n = 58$  undergraduate students,  $n = 20$  graduate students). Of the women, who were of particular interest to this study, 28 were assigned to the same-sex group condition, and 27 to mixed-sex groups. The youngest participant was 18, and the oldest was 31, with the mean age being 20.81 years ( $SD = 3.24$ ). Most of the participants were White, with about 11% from other ethnic groups. Participants had diverse majors. About 77% of the participants majored in psychology, biology, English, education, nursing, radiology, or athletic training; around 14% had other majors and 9% were undecided.

In examining gender roles according to the PAQ, it was found that among women, about 49% were feminine, 6% masculine, 18% androgynous, and 27% undifferentiated. Among men, about 17% were feminine, 22% masculine, 30% androgynous, and 30% undifferentiated. Compared to gender roles found in other studies, this study found somewhat more feminine females and considerably less masculine females than average (Schneidhofer, Schiffinger, Mayrhofer, 2010; Stoltzfus, Nibbelink, Vredenburg, & Thyrum, 2011). Proportions of other gender roles of females and of the gender roles of males were found to be comparable to those found in other studies (see Appendix B).

In addition to participants, there were 14 substitutes who assisted the experimenter, 7 men and 7 women. Four of them (women) played in the same-sex condition, and 10 (3 women and 7 men) played in the mixed-sex condition. The use of substitutes allowed groups to assemble when insufficient participants were present. They consisted of individuals who had previously participated or who were not qualified to participate. Most of those who were unqualified were individuals who had stated that they had “a lot of experience” with the original game (Settlers of Catan) that the experimental game was created from, or who had stated that they had “a moderate amount of experience” and had played “within the last year”. The researcher kept these individuals separate in the data from regular participants in an attempt to control for unwanted variables.

Substitutes were told to play normally, but with some exceptions: they were to take a greater variety of action types than they might otherwise take in order to both model the actions and prevent bias toward a particular action type. They were also told not to play overly aggressively (using sabotage actions too often), and to focus less on winning and more on their role as substitute, providing a setting in which the other players could perform naturally.

Those younger than 18 and older than 65 were excluded. In addition, anyone who reported being “Very experienced” at the game, Settlers of Catan, or who reported being “Moderately experienced” and had played it within the last year, were excluded (see Appendix C: Screening Questions). Participants were recruited through the invitation of

students by the experimenter or their instructor in psychology and English classes, and each completed the Informed Consent Form (see Appendix D) prior to participation. Many students were offered extra credit by their instructors as an incentive to volunteer for the study, whereas others participated as partial fulfillment of curriculum requirements for their class.

### *Materials and Apparatus*

Before taking part in the experiment, prospective participants filled out the Screening Questions. Those who were sufficiently unfamiliar with the original Settler of Catan game, upon which the experimental game was based, were accepted as participants and allowed to proceed; those who were too experienced with the game were debriefed and dismissed. In this way each player could participate on roughly equal ground, and the introduction of extraneous variables could be avoided. Participants who qualified also filled out a Demographics Questionnaire before proceeding (see Appendix E). The games were played in-person and on-campus in a private room. Prior to playing the game, participants had the rules and mechanics of Frontier Town explained to them by the primary researcher (see Appendix F). Each player was handed a copy of the Individual Player Rules Sheet for Frontier Town (see Appendix G) as a convenient reference during the game.

As part of the game, on each of their turns, the participants took a Special Action. Each Special Action correlated with stereotypic feminine or masculine traits or was gender-neutral. The Special Actions of the players were recorded on a worksheet by a

researcher sitting nearby. Following each game, participants were given a copy of the Personal Attributes Questionnaire (Spence, Helmreich & Stapp, 1973; Spence & Helmreich, 1978; see Appendix A). After completing the PAQ, each participant was given a Debriefing Form (see Appendix H) and invited to ask questions about the study.

### *Instruments*

The game used in the experiment, Frontier Town (see Appendix F), is a variation of the board game Settlers of Catan, by Klaus Teuber. Permission to use this variation of the game for personal and educational purposes was granted by his son, Guido Teuber, managing director of Catan GmbH/LLC. It is a simplified version of the game adapted to fit the purposes of the experiment, with modified rules and Special Actions added. The primary purpose of the game is to provide an atmosphere similar to that usually found playing competitive interactive board games while enabling the experimenter to measure the number of feminine and masculine-typed actions taken by players during the game. The special actions are classified as feminine, masculine, or gender-neutral, depending on the traits associated with the action. Feminine actions are those with the associated traits of cooperation, nurture (helping), or succorance (asking for help)—which will be referred to as support-seeking; masculine actions are those with the associated traits of aggression (hurting another player) or risk-taking behavior (Best et al., 1980; Gupta et al., 2008; Kray et al., 2001).

Following the game, participants were asked to take the Personal Attributes Questionnaire (PAQ), designed by Spence, Helmreich and Stapp (1973; Spence &

Helmreich, 1978; see Appendix A). This survey measures stereotypical masculinity and femininity based on individual adherence to traits. In the PAQ, participants are asked to describe how strongly they identify with different adjectives by circling a number (1 through 5) along a continuum. Masculinity in the PAQ is defined as being self-assertive or instrumental, and femininity as being expressive or interpersonal. The PAQ contains only 3 factors, one for each scale—M, F, and M-F (masculine, feminine, and androgynous).

As is customary, the androgyny subscale was not scored; it is considered the least reliable of the scales. The M and F scales have shown to be acceptable in reliability. In a study by Helmreich, Spence and Wilhelm (1981), Cronbach alphas above .70 were found for the two scales when the PAQ was administered to adults (parents and college students); the lowest alpha found was .67 for male high school students on the M scale. In a study of various sex role instruments, the PAQ was among those found to have high reliability and homogeneity (Wilson & Cook, 1984). In factor analysis of these instruments, the largest factors found were expressivity and instrumentality, which are explicitly represented in the PAQ and are considered core components of masculinity and femininity in other measures (Wilson & Cook, 1984).

Before the game, participants took a brief Demographics Questionnaire (see Appendix E). This was to collect general information about each participant, and also served to subtly prime participants for stereotype threat by reminding them of their sex. Before this, each participant also answered the Screening Questions; any who did not

qualify were removed from the experiment. The Screening Questions determined a person's eligibility to participate in the study. Those who played too recently or who were too experienced in Settlers of Catan were excluded in order to avoid significant disparity in skill level among participants and to reduce the impact of extraneous variables. Those who marked in the Screening Questions that they had a lot of experience with Settlers of Catan, or who marked that they had a moderate amount of experience and had played within the last year, were excluded from proceeding further in the study.

### *Pilot Test*

A pilot test was run prior to experimentation in order to be sure that the game functioned smoothly and as intended. Participants were selected by the researcher and completed the Informed Consent Form for Pilot Study (see Appendix I). Two independent observers took note of each of the Special Actions taken by each player, rating the degree to which they considered the action in its context as aggressive and/or risk-taking, and therefore stereotypically masculine, or nurturing, cooperative, and/or support-seeking, and therefore feminine, or whether they considered it none of the above, and therefore neutral. Several games were run and any necessary adjustments made to correct problems and establish interrater agreement.

In the final test for validity and interrater reliability in the measure Frontier Town, two researchers observed a game and recorded whether they believed a Special Action was feminine, masculine, or gender-neutral. The primary researcher was well acquainted with the measure; the second researcher was instructed beforehand on how each

stereotyped action was connected to stereotypic attributes of masculinity or femininity. During the assessment, each time a player took a Special Action, each researcher would record whether such an action appeared to be aggressive or risk taking (and hence masculine); cooperative, nurturing, or support-seeking (and therefore feminine); or for general self-improvement (and therefore gender-neutral). Cohen's Kappa was 1.00, as the researchers were in agreement 100% of the time. Therefore, according to the results of this test of interobserver reliability, the measure was found to be perfectly reliable and valid.

### *Procedure*

In order to avoid explicit stereotype activation, participants were not told beforehand that the purpose of the study was to examine gender-based stereotype threat. They were told only that the study examined possible relationships between personal attributes and game play behavior. However, in order to subtly prime subjects to think in terms of their gender, and thus make stereotype threat easier to see, participants were asked to complete a brief demographics questionnaire immediately prior to playing, which required them to state their biological sex.

Participants were pre-assigned by the researcher to either a same-sex group of four women or a mixed-sex group with two men and two women. Each participant was informed by email regarding the time they would meet to participate in the experiment, based on their pre-stated availability. When participants met to participate, each read and signed the Informed Consent Form, which was placed by the researcher in an envelope.

Participants drew an ID # to use instead of their name on the remaining forms. They filled out the Screening Questions. Those who did not qualify were handed a Debriefing form and dismissed. If more than the necessary number remained who were qualified, those who would play were determined by ID # (lowest numbers chosen to participate first) and the others were debriefed and dismissed. Participants completed the Demographics Questionnaire and had the game described to them by the researcher. Each participant was given a copy of the Individual Player Rules Sheet for Frontier Town (see Appendix G). A researcher was nearby for further guidance throughout the course of the game.

During the game, the researcher watched from a chair nearby, observing and recording each of the special actions taken by each player. Some actions were designed to reflect a gender-based trait, such as risk-taking, aggression, helpfulness, cooperation, or submission; other actions were considered gender-neutral. Following the game, participants completed the Personal Attributes Questionnaire (see Appendix A). After this, they were given a Debriefing form (see Appendix H) and invited to ask questions about the study.



## RESULTS

Data was collected by the researcher on the number of masculine-typed actions, feminine-typed actions, and gender-neutral actions taken by each player during each game. Other factors were also recorded, such as total number of actions, score, placement, and trends observed during the study. Every time a player took a Special Action, the observing researcher marked a tally in the appropriate box. Table 2 below shows the sheet that was used to record each player's actions. 1M, 1F, 2M, and 2F are all players in this example. Actions marked (F) are feminine, (M) are masculine, and (N) are neutral. This is an example of how each player may have spent their Special Actions over the course of twelve full rounds of play.

Table 2.

	<i>Player ID</i>			
<i>Action</i>	1M	1F	2M	2F
Request (F)				
Gamble (M)				
Forage (N)				
Donation (F)				
Sabotage (M)				
Purchase (N)				
Total Actions	12	12	12	12

The experiment investigated numerous variables, primarily targeting women. The first two hypotheses were tied together, and actually formed the basis of the first fundamental hypothesis: the expectation that women in mixed-sex groups would, due to stereotype threat, perform fewer masculine-typed actions and more feminine-typed actions than their counterparts (women in same-sex groups), and that conversely, women

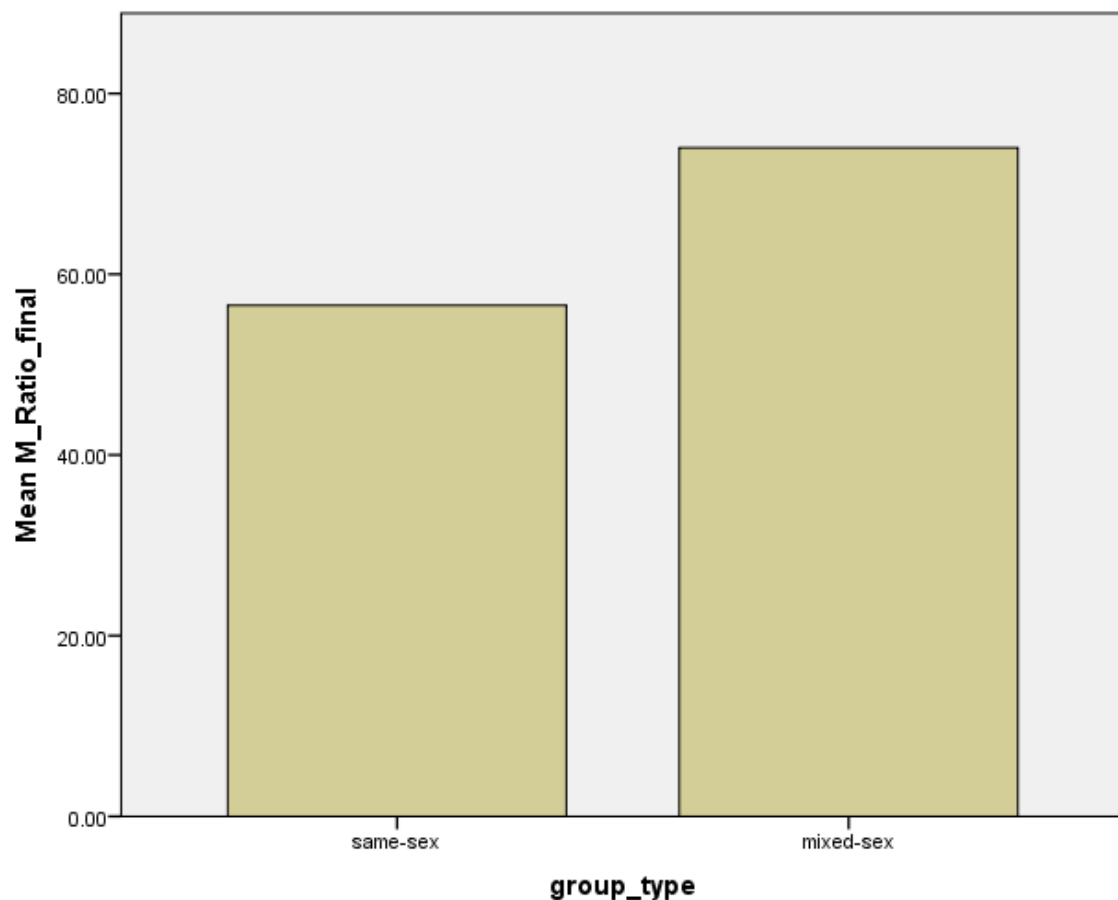
in same-sex groups would perform more masculine-typed actions and fewer feminine-typed actions comparatively. This was expected to occur because of gender-conformity pressures, which would be heightened by stereotype threat.

The first hypothesis was that women in groups without men would take a significantly greater number of masculine actions compared to the total number of stereotyped actions (both masculine and feminine together) than women in groups with men present. The independent variable was whether a participant was assigned to play as part of a mixed-sex or same-sex group. The dependent variable was the masculine action ratio, which was ratio of the number of masculine actions divided by the number of total stereotyped actions (masculine actions + feminine actions) multiplied by 100. In order to test hypothesis 1, an independent samples *t*-test was conducted to determine if mean masculine action ratios taken by women in same-sex groups ( $n = 28$ ) were significantly higher than those taken by women in mixed-sex groups ( $n = 26$ ).

One of the women in the mixed-sex condition was excluded from analyses examining masculine and feminine action ratios due to high play abnormality (failing to take any stereotyped actions). Levene's test indicated that variances were not equal,  $F(52) = 5.87, p < .05$ . Women in same-sex groups were not found to have significantly higher masculine action ratios than women in mixed-sex groups,  $t(48.82) = -1.99, p = .97$ , one-tailed. Masculine action ratios of women in same-sex groups ( $M = 56.55, SD = 37.39$ ) were lower by 17.50 than masculine action ratios of women in mixed-sex groups ( $M = 74.00, SD = 26.63$ ).

If this test had been two-tailed, the difference would have been very close to significance ( $p = .05$ ). After making this observation, a follow-up test was performed. A one-tailed independent samples  $t$ -test examined whether masculine action ratios taken by women in mixed-sex groups ( $n = 26$ ) were significantly higher than those taken by women in same-sex groups ( $n = 28$ ). Levene's test indicated that variances were not equal,  $F(52) = 5.87, p < .05$ . Women in mixed-sex groups had significantly higher masculine action ratios than women in same-sex groups,  $t(48.82) = 1.99, p < .05$ , one-tailed. Masculine action ratios for women in mixed-sex groups ( $M = 74.00, SD = 26.63$ ) were higher by 17.50 than those of women in same-sex groups ( $M = 56.55, SD = 37.39$ ). This demonstrates that women in mixed-sex groups were actually more likely to take masculine-typed actions relative to total stereotyped actions than women in same-sex groups. Figure 1 below shows the difference between the groups.

Figure 1.

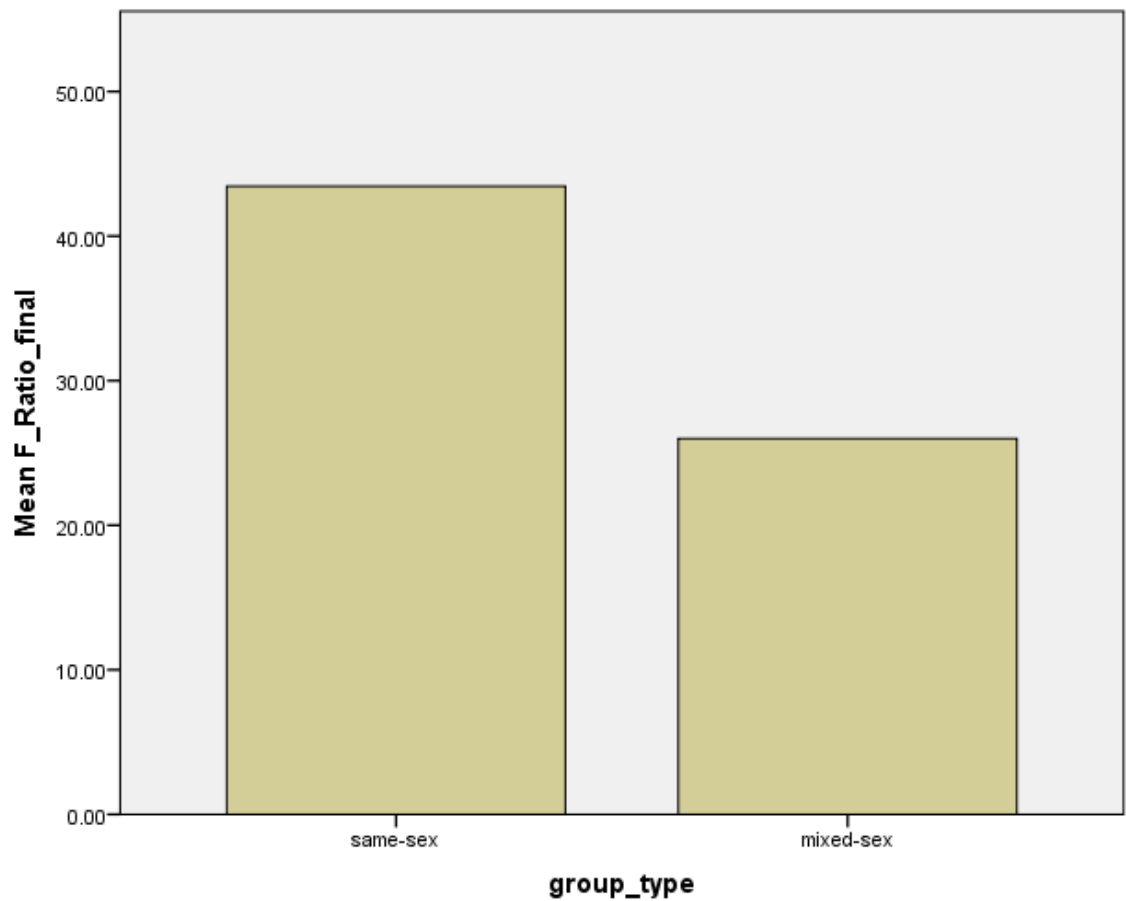


The second hypothesis was that women in groups without men present would take a significantly fewer number of feminine actions compared to the total number of stereotyped actions than women in groups with men. The independent variable was playing as part of a mixed-sex or same-sex group. The dependent variable was the feminine action ratio, which was the number of feminine actions divided by the number of total stereotyped actions x100.

To test this, an independent samples *t*-test sought to determine whether feminine action ratios of women in same-sex groups ( $n = 28$ ) were significantly lower than those of women in mixed-sex groups ( $n = 26$ ). Levene's test indicated that variances were not equal,  $F(52) = 5.87, p < .05$ . Results showed that women in same-sex groups did not have significantly lower feminine action ratios compared to women in mixed-sex groups,  $t(48.82) = -1.99, p = .97$ , one-tailed. Feminine action ratios of women in same-sex groups ( $M = 43.54, SD = 37.39$ ) were higher by 17.50 than feminine action ratios of women in mixed-sex groups ( $M = 25.00, SD = 26.63$ ).

A two-tailed test would have been borderline significant in this case, as well ( $p = .05$ ). Another one-tailed independent samples *t*-test served as a follow-up for hypothesis 2. It tested whether feminine action ratios of women in same-sex groups ( $n = 28$ ) were significantly higher than those of women in mixed-sex groups ( $n = 26$ ). Levene's test indicated that variances were not equal,  $F(52) = 5.87, p < .05$ . Results showed that women in same-sex groups did have significantly higher feminine action ratios compared to women in mixed-sex groups,  $t(48.82) = 1.99, p < .05$ , one-tailed. Means of feminine action ratios of women in same-sex groups ( $M = 43.54, SD = 37.39$ ) were higher by 17.50 than means of feminine action ratios of women in mixed-sex groups ( $M = 25.00, SD = 26.63$ ). This demonstrates that women in same-sex groups were actually more likely to take feminine-typed actions relative to total stereotyped actions than women in mixed-sex groups. Figure 2 below shows the difference between the groups.

Figure 2.

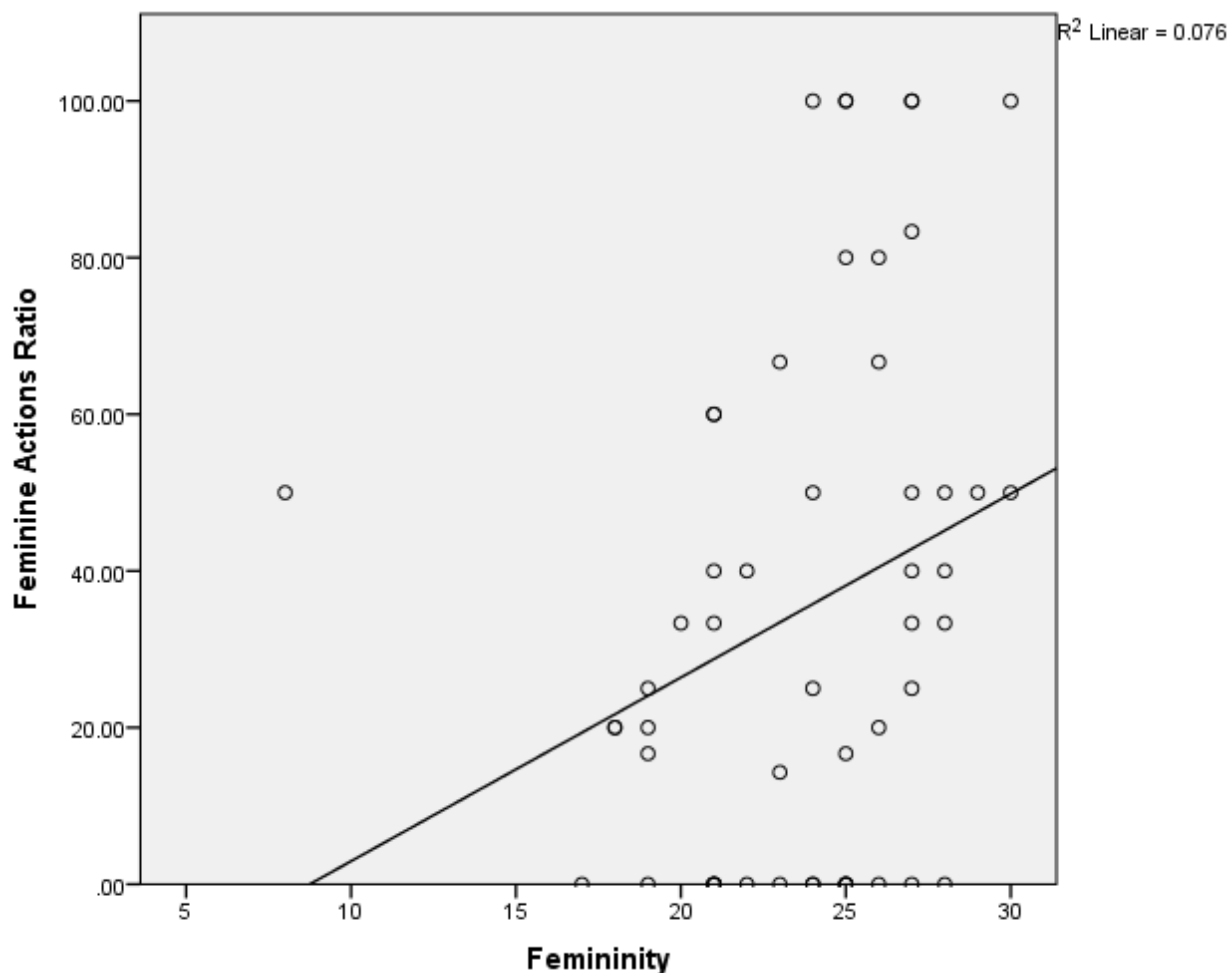


The third and fourth hypotheses represented the second fundamental hypothesis: that femininity and masculinity as measured by the PAQ would indicate the ratios of feminine and masculine actions taken during the game. More feminine women would take more feminine actions compared to the total number of stereotyped actions, and more masculine women would take more masculine actions comparatively.

In evaluating the third hypothesis, to determine whether female participants' ( $n = 55$ ) femininity scores ( $M = 23.60$ ,  $SD = 3.97$ ) from the PAQ predicted their feminine

action ratios ( $M = 35.05$ ,  $SD = 33.53$ ), a bivariate regression was conducted. It was anticipated that scores in X (femininity) would predict scores in Y (feminine action ratio). A scatterplot analysis was performed, showing a positive linear relationship between X and Y with one outlier,  $R^2 = .08$  (see Figure 3 below). Correlation of the variables was significant, Adjusted  $R^2 = .06$ ,  $r(54) = .28$ ,  $p < .05$ . The ANOVA that was run showed that the regression equation was significant,  $F(1, 52) = 4.30$ ,  $p < .05$ ,  $R^2 = .08$ , Adjusted  $R^2 = .06$ . The regression equation predicting female participants' feminine action ratio from femininity was  $Y' = -20.51 + 2.35 X$ . For every 1 increase in X (femininity), there was a corresponding increase in Y (feminine action ratio) by 2.35.

Figure 3.



In assessing the fourth hypothesis, to find out if female participants' ( $n = 55$ ) masculinity scores ( $M = 20.00$ ,  $SD = 4.42$ ) from the PAQ predicted their masculine action ratios ( $M = 64.95$ ,  $SD = 33.53$ ), a bivariate regression was conducted. It was anticipated that scores in X (masculinity) would predict scores in Y (masculine action ratio). A scatterplot analysis was performed, showing no significant linear relationship between X and Y ( $R^2 = .00$ ). Correlation of the variables was not significant ( $r(54) = .00$ ,  $p > .05$ ).



The ANOVA that was run showed that the regression equation was not significant ( $F(1, 52) = .02, p > .05$ ). Masculinity scores of women did not predict masculine action ratios.

The fifth hypothesis was that women who played against men would perform significantly worse (have lower scores) than women who played only against other women. The independent variable was whether women played a mixed-sex or same-sex game. The dependent variable was the score at the end of the game. This hypothesis was also supposed to be a measure of stereotype threat, demonstrating that overall, women who played against other men suffered in performance. An independent samples *t*-test was conducted to determine if female participants in the mixed-sex group ( $n = 27$ ) had significantly lower scores than female participants from the same-sex group ( $n = 28$ ). Mean scores of women in the mixed-sex condition ( $M = 7.74, SD = 1.68$ ) were not found to be significantly lower than mean scores of women in the same-sex condition ( $M = 8.07, SD = 1.61$ ),  $t(53) = .75, p = .23$ , one-tailed.

The sixth hypothesis was that women who took more masculine actions compared to total stereotyped actions would perform better than women who took less. This hypothesis was meant to link the first two hypotheses with the fifth. If stereotype threat occurred, women playing men should have lower scores; in addition, they should demonstrate gender-role conformity (by comparatively performing more actions of their own gender-type), falling into a stereotypical feminine role in order to be viewed positively and avoid negative evaluation.

To find out if a female participant's ( $n = 55$ ) masculine action ratio ( $M = 64.95$ ,  $SD = 33.53$ ) predicted their game score ( $M = 7.91$ ,  $SD = 1.64$ ), a bivariate regression was conducted. It was anticipated that scores in X (masculine action ratio) would predict scores in Y (game score). A scatterplot analysis was performed, showing no significant linear relationship between X and Y ( $R^2 = .05$ ). Correlation of the variables was not significant ( $r(54) = .05$ ,  $p > .05$ ). The ANOVA that was run showed that the regression equation was not significant ( $F(1, 52) = .12$ ,  $p > .05$ ). No relationship appeared to exist between women's masculine action ratio and game score.

The final two hypotheses were the only ones that took into account the performance of the males in the study. They represent the fundamental hypothesis that men, who were expected to have higher masculinity scores than women on the PAQ and to perform more masculine-typed actions during the game, would score higher overall, and win more often than women in mixed-sex groups.

The seventh hypothesis was that in mixed-sex games, men would win significantly more often than women. A chi-squared test was run to see if males ( $n = 23$ ) won more often than female participants ( $n = 27$ ) from mixed-sex groups. Of those who did not win, 21 (57%) were women, and 16 (43%) were men. Among the winners, 6 (46%) were women, and 7 (54%) were men. Six out of 27 women won (22%), while 7 out of 23 men did (30%). Men were not found to win significantly more often than women,  $\chi^2(1, n = 50) = .44$ ,  $p = .25$ , one-tailed.

The eighth hypothesis was that the scores of men would be significantly higher than the scores of women. An independent samples *t*-test compared scores of male participants ( $n = 23$ ,  $M = 7.61$ ,  $SD = 1.97$ ) with scores of female participants ( $n = 27$ ,  $M = 7.74$ ,  $SD = 1.68$ ). Men were not found to have significantly higher scores than women,  $t(48) = .13$ ,  $p = .75$ , one-tailed.

#### *Results of Supplemental Tests*

Since women in mixed-sex groups were found to perform more masculine actions than expected, an independent samples *t*-test was run for participants in the mixed-sex condition to conclude whether women ( $n = 26$ ) had higher masculine action ratios than men ( $n = 23$ ). Women ( $M = 74.00$ ,  $SD = 26.63$ ) were not found to have significantly higher masculine action ratios than men ( $M = 63.08$ ,  $SD = 34.56$ ),  $t(47) = 1.25$ ,  $p = .11$ , one-tailed.

Another independent-samples *t*-test was run to see if men ( $n = 23$ ) had higher feminine action ratios than women ( $n = 26$ ). Men ( $M = 36.92$ ,  $SD = 34.56$ ) were not found to have significantly higher feminine action ratios than women ( $M = 26.00$ ,  $SD = 26.63$ ),  $t(47) = 1.25$ ,  $p = .11$ , one-tailed.

In connection with tests run for the third hypothesis, a correlation was run for feminine action ratios and femininity of females in the same-sex condition ( $n = 28$ ). A moderate correlation was found, but was not determined to be significant,  $r(27) = .31$ ,  $p = .11$ .

Another correlation was run for feminine action ratios and femininity of females in the mixed-sex condition ( $n = 27$ ). Once again, a moderate correlation was found that was not determined to be significant,  $r(26) = .32, p = .12$ .

A correlation was calculated for PAQ femininity and game score of women in the mixed-sex condition ( $n = 27$ ). No significant correlation was found,  $r(26) = .04, p = .85$ .

A correlation was also calculated for PAQ femininity and game score of women in the same-sex condition ( $n = 28$ ). No significant correlation was found,  $r(27) = .09, p = .65$ .

An independent samples  $t$ -test was run comparing the PAQ femininity scores of women in same-sex groups with those of women in mixed-sex groups. No significant difference was found,  $t(53) = -.39, p > .05$ , two-tailed. Women in same-sex groups ( $M = 23.39, SD = 4.43$ ) did not have significantly different scores from women in mixed-sex groups ( $M = 23.81, SD = 3.50$ ).

In order to see if any significant difference existed between the scores of male participants ( $n = 23$ ) and females from the same-sex groups ( $n = 28$ ), an independent samples  $t$ -test was run. The results did not show a significant difference,  $t(49) = .92, p > .05$ , two-tailed. Males ( $M = 7.61, SD = 1.97$ ) did not score significantly differently than females from the same-sex condition ( $M = 8.07, SD = 1.61$ ).

An independent samples  $t$ -test was also conducted to see if any difference existed between the scores of males ( $n = 23$ ) and females in the mixed-sex condition ( $n = 27$ ).

Once again, no significant difference was found,  $t(48) = .26, p > .05$ , two tailed. Scores of males ( $M = 7.61, SD = 1.97$ ) did not differ significantly from scores of females in mixed-sex groups ( $M = 7.74, SD = 1.68$ ).

Males who won ( $n = 7$ ) were expected to have higher masculine action ratios than males who did not win ( $n = 16$ ), and an independent samples  $t$ -test was performed to determine if this was the case. Levene's test was significant ( $F = 5.28, p < .05$ ). Males who won ( $M = 79.27, SD = 20.51$ ) were shown to have significantly higher masculine action ratios than males who did not win ( $M = 55.99, SD = 37.51$ ),  $t(21) = -1.91, p < .05$ , one-tailed.

A second  $t$ -test of this type was performed including substitutes. Masculine action ratios of males who won ( $n = 9$ ) were compared with those of males who did not win ( $n = 21$ ). The difference found was very near significance,  $t(28) = -1.70, p = .05$ , one-tailed. Males who won ( $M = 78.32, SD = 17.86$ ) had near significantly higher masculine action ratios than males who did not win ( $M = 58.28, SD = 33.15$ ).

To determine whether a difference existed between masculine action ratios of women who won ( $n = 14$ ) and women who did not win ( $n = 40$ ), another independent samples  $t$ -test was performed. There was no significant difference,  $t(52) = -.21, p > .05$ . Masculine action ratios of women who won ( $M = 66.55, SD = 29.97$ ) did not vary significantly from those of women who did not win ( $M = 64.39, SD = 35.03$ ).

An independent samples  $t$ -test was run to see if women who won in mixed-sex groups ( $n = 6$ ) had higher masculine action ratios than women who won in same-sex

groups ( $n = 8$ ). Women who won in mixed-sex groups ( $M = 77.50$ ,  $SD = 20.43$ ) were not found to have significantly higher masculine action ratios than women who won in same-sex groups ( $M = 58.33$ ,  $SD = 34.50$ ),  $t(12) = 1.30$ ,  $p = .12$ , one-tailed.

A correlation was calculated for score and masculine action ratio of women in mixed-sex groups ( $n = 26$ ). A moderate correlation was found, but it was not determined to be significant,  $r(25) = .24$ ,  $p = .12$ , one-tailed. When a partial correlation was run for score and masculine action ratio of women in mixed-sex groups ( $n = 26$ ) accounting for winners, an even higher moderate correlation was found that was closer to being significant,  $r(23) = .27$ ,  $p < .10$ , one-tailed.

A correlation was run for score and masculine action ratio of men in mixed-sex groups ( $n = 23$ ). A moderate correlation was found that was very nearly determined to be significant,  $r(22) = .34$ ,  $p = .05$ , one-tailed.

Another correlation was run for score and masculine action ratio of women in same-sex groups ( $n = 28$ ). No correlation was found,  $r(27) = -.03$ ,  $p > .05$ . The correlation for score and feminine action ratio was likewise not significant,  $r(27) = .03$ ,  $p > .05$ .

Male winners ( $n = 7$ ) were expected to have higher masculine action ratios than female winners ( $n = 14$ ), and were compared using an independent samples  $t$ -test. Male winners ( $M = 79.27$ ,  $SD = 20.51$ ) did not have significantly higher masculine action ratios than female winners ( $M = 66.55$ ,  $SD = 29.97$ ),  $t(19) = 1.01$ ,  $p = .16$ , one-tailed.

An independent samples *t*-test was done to compare masculine action ratios of all winners, including substitutes ( $n = 23$ ) with those of all non-winners ( $n = 68$ ). No significance was found,  $t(89) = -1.13, p = .26$ . Those who won ( $M = 71.16, SD = 26.10$ ) did not show significantly higher masculine action ratios than non-winners ( $M = 62.61, SD = 32.92$ ).

In connection with the seventh hypothesis, a chi-squared test was run to see if a significant difference existed between males ( $n = 30$ ) and females ( $n = 30$ ) from mixed-sex groups, including substitutes, in terms of win frequency. Of those who did not win, 24 (53%) were women, and 21 (47%) were men. Among the winners, 6 (40%) were women, and 9 (60%) were men. 6 out of 30 women won (20%), while 9 out of 30 men won (30%). While men did win more often proportionally, these results were not found to be significant,  $\chi^2(1, n = 60) = .80, p = .37$ .

To discover the presence of significant factors that may have been associated with the scores of male participants ( $n = 23$ ), correlations were run between the scores of men and other items from the study. Only 2 items were found to be significant. A fairly strong correlation was found between score and PAQ item 13 (approval-seeking) which was determined to be significant,  $r(22) = .49, p < .05$ . Additionally, a significant moderate correlation was found between score and PAQ item 24 (handling pressure),  $r(22) = .42, p < .05$ .

In searching for variables that may have been associated with the score of female participants ( $n = 55$ ), correlations were run between women's scores and other items from

the study. A significant moderate correlation was found between score and age,  $r(54) = .30, p < .05$ . A significant moderate correlation was also found between score and PAQ item 18 (ease of crying),  $r(54) = .29, p < .05$ . Another correlation of note was between score and PAQ item 22 (relational warmth) which was very near significance,  $r(54) = .26, p = .06$ . Finally, a notable correlation was found between score and PAQ item 3 (emotionality) which was not significant,  $r(54) = .20, p = .15$ .

A one-way MANOVA was run to determine significant differences for women's PAQ Item Scores, comparing scores for each item of women in mixed-sex groups ( $n = 27$ ) with scores of women in same-sex groups ( $n = 28$ ). No significant difference was found overall,  $Wilks' \Lambda = .51, F(24, 30) = 1.22, p > .05$ .

However, two items of note were identified, and independent samples  $t$ -tests were conducted comparing the values of PAQ items 11 and 23 reported by women from the mixed-sex groups ( $n = 27$ ) with the values of such items reported by women in the same-sex groups ( $n = 28$ ). For PAQ item 11 (worldliness), a significant difference was found,  $t(53) = 3.09, p < .01$ . Women in the mixed-sex condition ( $M = 1.19, SD = 1.04$ ) reported values for PAQ item 11 that were significantly different from those reported by women in the same-sex condition ( $M = 2.07, SD = 1.09$ ).

For PAQ item 23 (need for security), no significant difference was found,  $t(53) = -1.76, p = .08$ . Women in the mixed-sex condition ( $M = 2.56, SD = .93$ ) did not report significantly different values for PAQ item 23 than did women in the same-sex condition



( $M = 2.11$ ,  $SD = .96$ ). However, the difference found for item 23 was close enough to statistical significance to merit mention and provide structure for discussion.

The researcher posited that a negative correlation would be found between game score and balanced actions ratio (the absolute value of masculine action ratio minus fifty). It was believed that players who used a more balanced strategy in terms of choosing a relatively equal number of masculine and feminine-typed actions would score higher. The correlation run for all participants ( $n = 78$ ) showed this not to be the case,  $r(77) = .01$ ,  $p > .05$ , one-tailed.

Correlation of these variables were run for women in mixed-sex groups alone ( $n = 27$ ), with no significant correlation found,  $r(26) = -.09$ ,  $p > .05$ , one-tailed. No significant correlation was found for women in same-sex groups ( $n = 28$ ), either,  $r(27) = -.05$ ,  $p > .05$ , one-tailed. Men in mixed-sex groups ( $n = 23$ ) also were found to have no significant correlation,  $r(22) = .19$ ,  $p > .05$ , one-tailed.

Men in mixed-sex groups ( $n = 23$ ) were actually found to have a notable correlation in the opposite direction of that expected, although it, too, was not significant,  $r(22) = .19$ ,  $p = .20$ , one-tailed. With more men as participants, this may have been demonstrated to be a significant correlation.

An independent samples  $t$ -test compared winners ( $n = 21$ ) with non-winners ( $n = 56$ ) to see if winners had lower balanced actions ratios. Winners ( $M = 28.73$ ,  $SD = 18.31$ ) were not found to have significantly lower balanced actions ratios than non-winners ( $M = 32.81$ ,  $SD = 17.85$ ),  $t(75) = .89$ ,  $p = .19$ , one-tailed.

## DISCUSSION

The purpose of this study was to discover whether stereotype threat occurred during competitive interactive board games (such as Settlers of Catan), and whether actions taken during the game were consistent with gender stereotypes and self-perception. It was believed that if stereotype threat did occur, women would be less likely to take actions that were stereotypically masculine during a mixed-sex game than they would during a same-sex game. The presence of men, as well as the brief demographics questionnaire, were expected to have a subtle stereotype activation effect, influencing women to conform to a role that matched the feminine stereotype.

In addition, femininity scores on the PAQ were expected to correlate positively with the number of feminine actions taken during the game (relative to the total number of feminine and masculine actions taken). The degree to which women chose feminine-typed actions over actions that were masculine-typed was expected to be a reflection of how much women perceived themselves as exhibiting stereotypically feminine qualities.

### *Attribute Differences*

The MANOVA that was run for the demographics questionnaire and the PAQ did not find women in mixed-sex groups to be significantly different from women in same-sex groups overall. Women in both groups were found to have approximately equal femininity scores. Women in mixed-sex groups did not have significantly lower game scores than women in same-sex groups, though there was a downward tendency. The

game scores of women in mixed-sex groups also did not vary significantly from the scores of the men they played against.

For PAQ item 11, a highly significant difference was found between women in mixed-sex groups and those in same-sex groups. Women in the mixed-sex condition reported being more “home oriented” than women in the same-sex condition, and women in same-sex groups reported being more “worldly” compared to women in mixed-sex groups (though both reported values below the midpoint, closer to “very home oriented”). The presence of men may have made women in mixed-sex groups more aware of their gender, influencing them to report a more extreme answer favoring feminine stereotype than women in same-sex groups. The same may have been true of PAQ item 23 (“need for security”), in which a nearly significant difference was found between women in the mixed-sex condition and those in the same-sex condition, with women from mixed-sex groups reporting that they had a stronger need for security than those in same-sex groups.

#### *Group Differences in Gender-typed Actions*

Testing demonstrated that women in same-sex groups did not take more masculine-typed actions relative to total stereotyped actions than did women in mixed-sex groups. In fact, the complete opposite was found to occur (see Figure 1). Women in mixed-sex groups had higher masculine action ratios than women in same-sex groups. This means that women playing in groups with men were actually more aggressive and risk taking than women who did not play against men.

Likewise, women in same-sex groups were not found to take fewer feminine-typed actions comparatively than women in mixed-sex groups. Once again, the reverse was found (see Figure 2). Women who only played against other women took significantly more feminine-typed actions comparatively than women who played against men. This means that women in groups where men were absent were more cooperative, nurturing, and support-seeking than women in mixed-sex groups.

Regarding women in mixed-sex groups, rather than conforming to feminine gender stereotype, as expected, they seemed to try to blend in more with the men. Likewise, women in same-sex groups, rather than feeling freer to express a variety of actions without men around, appeared to conform more rigidly to feminine stereotype. Indeed, there appears to have been some type of gender conformity occurring during these games; but rather than conform to their own gender, the players seemed to conform to the behavior of their fellow players.

Unfortunately, because this study did not include all-male groups, it is impossible to say whether the behavior of men was changed due to the presence of women. Men were not the targeted participants of this study, and there were more women to draw participants from than men. Despite the lack of data from all-male groups, there are some things that do imply that men had more impact on women than the reverse. For example, the researcher noted on more than one occasion that men were slightly more likely than women to take aggressive and risk-taking actions first (before a player of the

other gender did), and doing so seemed to encourage the other players, including women, to take such actions.

Men were also seen to take feminine-typed actions earlier than women, and they were equally likely to select feminine-typed actions throughout the game as women they played against were (in fact, with a larger sample, men may have been shown to take significantly more feminine actions comparatively than the women they played against). Women were more likely to choose gender-neutral actions first (such as Forage and Purchase). Because of these things, it appears that women were following men rather than men following women. Previous research has demonstrated that even in situations of equal status and power, women tend to be more influenced by men than men are by women (Eagly, 1983).

Strangely, when males chose a feminine-typed action, females did not seem more likely to choose such actions thereafter. Women may have been following the men to some extent, but beyond that, women were adhering to the masculine stereotype, perhaps even overcompensating to such a degree that they played more masculinely than their male opponents did (testing showed that in mixed-sex groups, women had higher masculine action ratios than men, but having too few participants prevented significant results; nevertheless, the results approached significance).

Masculine action ratios were not correlated with PAQ masculinity at all. This means that the increased number of masculine actions taken by women in the mixed-sex condition must have been related to something other than masculinity.

Perhaps women in mixed-sex groups chose to follow men because they saw men as the dominant gender, or because they believed that the men were the superior players and would beat them unless they played in a similar way to men. If this were the case, then stereotype threat could not have been responsible, since it is mostly an unconscious process and would have had the opposite effect; women experiencing stereotype threat tend to conform to the feared stereotype (Quinn & Spencer, 2001). With many competitive games, women tend to perform more poorly due to a lack of experience (Blumberg & Sokol, 2004). Women may have simply recognized that they were less experienced at playing complex board games than men, and attempted to play like men in order to make up the difference. Assuming that the game was geared toward men, and that the men would be more familiar with this type of game, following the men may have seemed the best approach for the women.

It is also possible that women simply took an increasing variety of actions as new actions were demonstrated, and since men tended to be more likely than women to initiate the aggressive and risk-taking actions, the fact that the women were following the men was circumstantial. If this were the case, then women may have felt some discomfort or uncertainty that contributed to their tentative game-playing. They may have been afraid to be the first one to take an action that helped or hindered an opponent, or they may simply have not understood the gender-typed actions as well as the neutral ones. Stereotype threat may not have taken place, but perhaps something akin to it did, something that inhibited the actions of women such that they only felt sure, initially, about taking simple actions that did not cause them to interact with other players.

Whatever the case, it appears that taking more masculine actions was a wise move on the part of women. Women who took more masculine actions generally scored higher. A moderate correlation of  $r = .45$  was calculated for score and masculine action ratios of women in mixed-sex groups; this was not determined to be significant, but it seems likely that an increase in sample size would have gained significant results.

The small samples were the biggest limitation of this study, but were difficult to avoid due to the lack of willing and qualifying participants and challenges due to the design of the study, such as arranging meeting times of over an hour for 4 participants. Further investigation with much larger samples would serve to demonstrate conclusively whether, in a mixed-sex group, women's performance increases as their relative number of masculine-typed actions increases.

When examining all of the women in the study, no correlation was found between masculine action ratio and game score. This is because the inclusion of women from the all-female groups neutralized the results. Although women in same-sex groups performed significantly less masculine actions than women in mixed-sex groups, their game scores did not suffer. Choosing masculine actions seems to have played a role in a player's success in mixed-sex games, but appears to have not been a factor in games consisting solely of women.

### *Game Scores and Winning*

Women in mixed-sex groups were not found to have significantly lower game scores than women in same-sex groups. There was, however, a small downward

tendency, with women in mixed-sex groups having scores that were 1/3 of a point lower than women in same-sex groups. It is likely that a larger study would have shown these results to be significant. If something similar to stereotype threat did occur, then it may have been responsible for this slight suffering in score.

Since winning players ended the game at the end of their turn, and thus, at times, prevented other players from reaching the score they would have obtained had players taken an equal number of turns, a partial correlation was run for score and masculine action ratio of women in mixed-sex groups accounting for winners. A moderate correlation of .27 was found that was significant at the  $p < .10$  level. This indicates that performing masculine actions was almost certainly a factor for women in mixed-sex groups achieving higher scores.

Looking further at winners, women who won in mixed-sex groups had higher masculine action ratios (a ratio of 3:1) than women who won in same-sex groups (a ratio of about 1 ½:1); the difference was not shown to be significant, but was definitely noteworthy. Again, this is a problem of sample size, and larger numbers of participants would probably make the difference. Both means were over 50, which is the level at which an equal number of masculine actions relative to feminine actions were taken (a 1:1 ratio).

This implies that the higher number of masculine actions performed by women in mixed-sex groups contributed to their success, while the success of women who won in same-sex groups did not depend on performing masculine actions. In corroboration of



this, the correlation of game score and masculine action ratio for women in the same-sex condition was nowhere near significance.

For men, performing masculine actions was even more integral to their success. Male winners' ratio of masculine to feminine actions was 3:1, which was substantially higher than the same ratio of female winners, which was 2:1; this difference was not determined to be significant, but there was definitely an upward tendency for the males.

The chi-squared test run for hypothesis 7 to see if men won more often than women from mixed-sex groups found no significant lead, but did show that 54% of the winners were men and 46 % were women. This statistic can be misleading, since it includes all of the women winners but fails to include two of the men. This is because two of the men who won were not normal participants, but substitutes, and none of the substitutes who were women ever won a game.

A second chi-squared test, including substitutes, showed that of the winners, 60% were men and 40% were women. This difference was still not significant, but was close enough to imply that given more participants, the results would likely have proven significant. Removing 2 of the winners from calculations, as was done in the first chi-squared test, threw off the results. Including the substitutes in this calculation does not seem inappropriate. Most of the substitutes were as clueless about the operations of the experimental game, Frontier Town, as the regular participants were. Even though many of them had familiarity with Settlers of Catan (the game from which the measure was constructed), Frontier Town was different enough to offset any advantages their extra

experience may have given them. The researcher attempted to amend any additional imbalance by giving special instructions to the substitutes in private previous to playing, encouraging them to take more of a variety of special actions than they might otherwise take, and discouraging them from overly aggressive game play. The substitutes did not appear to have any edge over the normal participants, as seems apparent from the fact that out of the 14 substitutes used, only 2 of them won.

It seems clear that a trend existed in men winning mixed-sex games more often than women did. It is unclear as to whether underperformance on the part of women was connected with stereotype threat, though it is the researcher's opinion that stereotype threat did not occur—at least, not in the conventional sense. As stated earlier, women in mixed-sex games seemed to be hesitant and inhibited, though any discomfort they may have experienced did not drive them to conforming to gender stereotype. What women experienced may have been evaluation apprehension. If they were concerned about appearing weak, stupid, or inexperienced to the men, they may have modified their behavior to try to appear more competent and assertive.

It is also possible that a different stereotype was primed, one that targeted “nerds” or “geeks.” It is far more acceptable for men to be interested in nerdy things than women, and women may have been afraid of revealing the fact that they were “game board geeks” to men. If this were the case, then women who saw themselves as being nerds may have underperformed due to the fear of negative evaluation by the men.

Even though women who took more masculine actions in mixed-sex games had higher game scores than those who took less, they still failed to rise above the scores of men, as well as the scores of women in same-sex groups. Performing more masculine actions only enabled the women in mixed-sex groups to be on-par with the men, and did not give them any edge. So what did contribute to higher scores?

Significant moderate correlations were found between game score and age and between score and PAQ item 18 (ease of crying). Another correlation of note was between score and PAQ item 22 (relational warmth), which was very near significance. A notable correlation was found between score and PAQ item 3 (emotionality) which approached significance.

Women who were older had higher scores than those who were younger. This may be because older women were more likely to have played complex board games in the past. In addition, women who reported higher values on items 3, 18, and 22, and thus perceived themselves as more emotional and warm, scored higher than those who reported lower values. All of these attributes are strongly associated with feminine stereotype. This supports the idea that women in same-sex groups excelled relative to how feminine they were.

For male participants, only 2 items were found to have significant correlations with game score: PAQ item 13 (approval-seeking) and PAQ item 24 (handling pressure), both fairly strong correlations. It is easy to see how the latter could have contributed to success on a competitive board game, but it is hard to say how approval-seeking fits in.

Perhaps men who were more successful were also good at maintaining rapport with the other players through gaining their approval in some way, and thus minimized their chances of being targeted by aggressive actions.

### *PAQ Femininity and Feminine-typed Actions*

Women who identified more strongly with their gender were expected to be more susceptible to stereotype threat, and to therefore have higher feminine action ratios. As anticipated, a significant correlation was found between PAQ femininity score and feminine action ratios (see Figure 3). Women who took comparatively more feminine actions scored higher on femininity than women who took less. This correlation demonstrates compatibility between the PAQ and the design of the stereotyped actions used in Frontier Town.

The question remains as to whether there is any causal relationship. The researcher viewed PAQ femininity as a consistent attribute, and assumed that a woman who had a higher feminine action ratio would also be shown to have higher femininity when she took the PAQ after playing the game. The order of things was so set to prevent PAQ responses from influencing game play. However, it is possible that the taking of feminine-typed actions increased women's adherence to their gender identity, thus raising their PAQ score for femininity. It seems more likely that women who took more feminine-typed actions also had higher scores on PAQ femininity because they identified more strongly personally with feminine stereotype.

Due to the fact that, in stereotype threat conditions, women are affected more profoundly when they identify more with their gender (Schmader, 2002), women in mixed-sex groups who had higher femininity scores were expected to show greater performance decrements than women who scored lower on femininity. Game score was expected to correlate negatively with PAQ femininity, but this was found not to be the case.

It is interesting to note that the correlation between game score and femininity for women in same-sex groups was more than twice as great as that for women in mixed-sex groups, although neither had a significant correlation. The correlation for score and feminine action ratio of women in same-sex groups was not found to be significant, but was slightly higher than the correlation found between score and masculine action ratio. These support the idea that femininity was more important in same-sex games, and more feminine players were marginally more likely to do well.

#### *Balanced Actions Ratio*

The researcher surmised that among all the participants, those who had the highest scores would also be those who had incorporated a balance of both feminine and masculine stereotyped actions into their strategy. In examining this relationship for all participants, no significant correlation was found. This demonstrates that using a balance of both masculine and feminine actions was not a viable strategy for success in Frontier Town. By extension, mixed-gender-typed strategies may be less effective in other

complex board games than strategies that focus more on one type of gender-stereotyped actions.

Men in mixed-sex groups were actually found to have a notable correlation in the opposite direction of that expected, although it, too, was not significant. With more men as participants, this may have been demonstrated to be a significant correlation. Winners in general also appeared to have lower balanced actions ratios than non-winners, though this difference was not shown to be significant. A larger sample was really needed. Nevertheless, there is enough evidence to imply that men who were more aggressive and risk-taking were probably more likely to win.

### *Bringing Women to the Table*

Since gender remains constant throughout every situation, it is more than simply a role (West & Zimmerman, 1987). Children take up new gender identities as they grow, becoming “boys” and “girls” and learning to behave in ways that reinforce that conception. Gender does not exist in a vacuum, and is not innate; it is situated in the interactions of human beings, especially in expressing oneself as “feminine” or “masculine”. Men who are not dominant enough, and women who are not submissive enough, may each suffer some degree of social alienation, and be thought of as inappropriate models of their sex. To vary from gender-stereotyped behavior is to risk being perceived as failing to exhibit one’s “essential nature” (West & Zimmerman, 1987).

Women can be exposed at an early age to competitive games, and encouraged to play them as much as boys are. If women can be trained to no longer see playing a complex board game as part of being a “boy”, then they will be more likely to participate in such games and enjoy them. When the risk of violating one’s essential nature is eliminated, then one can freely partake without stigmatization, regardless of gender.

People are aware that their behavior will be judged as masculine or feminine, and act in a way that will reinforce their own identity (Deutsch, 2007). “Women act like women because the positions they occupy require feminine behavior. Men act like men because the social positions they occupy require competence, leadership, physical strength, and autonomy. Presumably, then, change that results in more gender similarity in social location should reduce gender difference and the perception of difference” (Deutsch, 2007, pg. 114).

Gender differences can exist in gaming strategies without one gender’s style being considered superior. Women who played mixed-sex games did better when they applied a more masculine strategy, but such a strategy proved ineffective for women in same-sex games. This shows that the setting in which a game is played can significantly influence whether a masculine or a feminine strategy will be more effective. A feminine-typed strategy can be even more effective than a masculine-typed one, given the right situation.

One of the ways in which complex games can become friendlier to women is through simple changes in phraseology. For example, in many games, the rules use the

term “he” when speaking of a player generically; this assumes that all, or most, players will be male. Language matters. The pervasive use of “he” in game rules is likely to do what it has done in others areas of society: render women invisible (Deutsch, 2007). Admittedly, using “he/she” can be awkward, and strict adherence to grammar prohibits the use of the gender-neutral term “they” when speaking about an individual (although such a practice is normal in spoken English throughout the U.S., it can cause some confusion). There are other techniques that authors could use. One approach to the problem that is becoming more common involves alternating the use of “he” and “she” for each paragraph or example throughout the document.

In the researcher’s opinion, the biggest obstacle in more women joining men in complex board games is the men themselves. Many men seem put-out by having to play with a woman. Perhaps they do not want to deal with an inexperienced player, or to have to worry about hurting the feelings of a more emotionally sensitive person (as women are generally viewed to be), and thus be seen as a jerk by the woman and the other male players. Whatever the case, if men will learn to put aside their fears and biases, and be more welcoming to female players, the gaming world will change significantly. Having women be a part of these activities can only make things better. After all, how can a man think he’s “king of the hill” if he never lets a woman take a shot at him? Male players who really want to test their expertise will be eager to invite women challengers to the table who can provide them with more variation in game play and thus enhance the overall experience.



### *The Question of Stereotype Threat*

Stereotype threat does not appear to have occurred during this study. This may have been because the negative stereotype was not sufficiently intense to cause women to respond to it, or because they did not believe that the negative stereotype applied to their particular situation (Steele & Aronson, 1995). Also, the use of the demographics questionnaire before the game to remind the participants of their gender and the mere presence of men in the game may have been inadequate primers for stereotype threat. But the primary reasons that stereotype threat may not have occurred are that the participants were not under pressure (i.e., they did not feel that what they were doing was any significant measure of their ability), and were not all interested or fully engaged in the activity (Quinn & Spencer, 2001).

Conditions of stereotype threat are described as requiring a subject to be tested “at the edge” of their ability; tests that are too easy leave little room for doubt (an essential ingredient for negative cognition), and tests that are too difficult discourage the subject from trying very hard. The subject also must find the material they are tested on important to them; if they do not care about their performance on a board game, then stereotype threat is unlikely to occur (Quinn & Spencer, 2001).

The fact that participants were inexperienced with the game, or any games of that type, was a problem. Chess players are well-aware of the gender-bias that exists for their sport, and a woman cannot play a game without the awareness that she may be judged based on the negative gender stereotype (Maass et al., 2008). For women who had never

played a complex board game, and were certainly never exposed to the larger gaming culture, they may have been unaware of the existence of the negative stereotype. The failure of women to react according to stereotype threat theory indicates that either the game itself did not possess the qualities necessary to trigger the effect, or the stereotype of men outperforming women on complex competitive board games was not widespread. If women were ignorant of the stereotype, then they could blissfully escape the detrimental effects of stereotype threat. The worst that may have occurred was a mild apprehension stemming from their own inexperience and the possible belief that men are more proficient at competitive games.

The perfect study would have used participants gathered at a large board gaming convention, where players would be more likely to be aware of the stereotypes. It would have involved all-male groups, and would have included larger samples, preferably  $n = 100$  for men and women in both groups types, adding up to a total of 400 participants. Nevertheless, even such a study would have its limitations, since there are still far fewer women who attend such conventions compared to men, and many of the attendees would be too busy with their own activities to spare time for an experiment. In addition, results would not be readily generalizable to the general populace, but would apply primarily to those who are part of the sub-culture of board gamers. Nevertheless, such a setting would be optimal for recruiting participants who were well-aware of the gender stereotypes in gaming. Women from game culture would be the most likely ones to suffer from stereotype threat in a mixed-sex game, since gaming in general would be

important to them, and their performance on a particular board game, and how well they did (especially in relation to the men) would matter to them.

Women may have felt that the situation was not one in which their gender was relevant. People are not constantly judging based on gender criteria; attention, self-interest, exposure to counter-stereotypical thoughts, and efforts to avoid prejudice all influence whether gender stereotyped judgments will be made (Blair & Banaji, 1996; Macrae & Bodenhausen, 2000). Being cognitively active can also decrease the likelihood of one's mind accessing the idea of stereotypes and assessing their performance through that lens (Gilbert & Hixon, 1991).

In addition, context can have a tremendous impact on the types of stereotypes that are accessed. When multiple categorizations are available, people tend to unconsciously choose the most salient stereotype to represent what they see (Macrae, Bodenhausen & Milne, 1995). In a study by Blair (2002), participants accessed stereotypic traits for femininity faster than traits for Chinese stereotype when they viewed a picture of a Chinese woman using makeup; but when they saw a picture of the same Chinese woman with chopsticks, they were quicker to access traits of Chinese stereotype than they were to access traits of femininity.

Women in mixed-sex groups may have seen their male opponents not so much as specimens of masculinity but more as fellow students and peers. The academic lens, and not the lens of gender differences, may have been what they were looking through. If that is the case, then they are to be applauded for their ability to engage in activities with

the opposite sex without sexism becoming an issue, because sadly, doing so does not come easily to many people.

### *Limitations and Further Study*

As previously stated, the biggest limitation of this study was the small sample size. The researcher had difficulty in recruiting participants due to a number of likely reasons. One major reason may have been the length of the time needed for a student to complete their participation in the study, which was about an hour and 15 minutes. Another factor may have been study competition. Students usually participated in order to fulfill class requirements or earn extra credit. When a student had the option of getting the same amount of credit for participating in a study that required much less than an hour, they may have been reluctant to opt for the more time-consuming option. Additionally, although 78 students participated, the division into three groups decreased the  $n$  of each group, providing less power for determining significant results. This was unavoidable, as the design of the study required several groups.

The second big limitation was the relative lack of awareness of gender-based stereotypes in competitive board games by the participants. The isolated nature of the study site appears to have made it a poor choice for this particular study, since few of the participants had any exposure to complex board games. A better choice may have been a large city with greater diversity.

Regarding game theory, it should be noted that Settlers of Catan, and the version used in this study, Frontier Town, are not zero-sum games. Because of this, concepts

such as the Nash equilibrium do not apply as stringently. However, the related idea of an external mediating device is still relevant regarding the distribution of power between genders. For example, during Frontier Town, players who consistently chose Gamble (a masculine-typed action) would usually see a considerable payout, whereas a change to feminine-typed actions may prevent them from realizing as great a payout (based on probability). At the same time, players who chose Request (a feminine-typed action) regularly would build rapport with other players throughout the game and be able to trade resources more effectively, whereas a shift toward masculine-typed actions may hurt their rapport and diminish their trading power. Therefore, even in a non-zero-sum game, the idea of adhering to a gender-based strategy to achieve success in response to an external mediating device, such as personal gender, is applicable.

It is difficult to say how well the players actually understood the game, and whether there was any difference in understanding based on gender or group type. A simple measure of understanding employed after the game may have been profitable. Game familiarity did not appear to be a factor, since many times, players with some experience with Settlers of Catan would score very low; nevertheless, this element was not examined closely during this study.

Participants may have selected actions based on actions taken by previous players. There was no way to tell if a player's action was followed by other players or responded to in some other way. It is possible that some participants played "follow the leader" to some extent, taking actions they had seen previous players take instead of performing an

as-yet-unchosen action, or instead of selecting a Special Action based solely upon their own circumstances or strategy. It may be useful to track how one player's action affects the actions chosen by subsequent players. Using a confederate who starts the game, and varies their action each turn, might help show whether players are following the starting player. Having players of both genders act as starting players in different games may also show whether there is any difference in how much a leader of a particular sex is followed.

One of the reasons that women may have won less often relative to men in mixed-sex games is that the goals of each gender were different. Most men may have been primarily focused on winning, but most women may have had another goal in mind. Women may have invested more energy than men in being liked by the other players, not doing anything mean to them, and not being embarrassed. These things could have prevented them from achieving victory. Ascertaining players' goals would serve to understand elements that may detract from pursuing a winning score.

Another possible limitation has to do with the overall value of each of the Special Actions. The Sabotage action that affected all other players may have had a hidden cost: earning animosity from the other players. This could have resulted in an exchange of hostility, as well as increased reluctance on the part of other players to conduct trade via the Request action with the player who performed Sabotage. Players who realized this may have avoided this action. The friendlier feminine-typed actions may have been the surer road to victory for many players.

There are numerous differences examined in this study that could be considerably benefited by further research, especially research involving more participants than were obtained in this study, and gathering participants in an area where gender-based stereotypes are more ubiquitous. Some potential outcomes of further research are verifying the role played by taking masculine-typed actions in a mixed-sex game, and determining the occurrence and the cause of men scoring higher and winning more often than the women they play against.

There were signs that some type of gender-based interference occurred during the games, but there was no evidence of stereotype threat. The nature of this interference would be useful to know (whether it is actually evaluation apprehension or something gender-related) as would the conditions necessary for stereotype threat to actually occur in competitive interactive games.

It is hoped, despite the failure of this study to demonstrate stereotype threat during a board game, that those interested in reducing gender bias will take note of what this study implies: harmful gender stereotypes can be found in many areas of life, even places where people are meant to have fun and where competition is supposed to encourage enjoyment, not discrimination. As steps are made toward making the playing of complex board games an activity devoid of gender favoritism, more women will feel welcome to explore a rich new world of intellectual activity and growth. Even the men will benefit, because they will finally have the chance to spend time with women who understand the

games they love the most, and they will finally be able to see how well they fare against both genders instead of just one.



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APPENDIX A

Personal Attributes Questionnaire

## APPENDIX A

**Personal Attributes Questionnaire** (Spence, Helmreich & Stapp, 1973)

## Instructions:

The items below inquire about what kind of person you think you are. Each item consists of a PAIR of characteristics, with the letters A-E in between. For example,

Not at all artistic                      A.....B.....C.....D.....E                      Very artistic

Each pair describes contradictory characteristics - that is, you cannot be both at the same time, such as very artistic and not at all artistic.

The letters form a scale between the two extremes. You are to choose a letter which describes where YOU fall on the scale. For example, if you think that you have no artistic ability, you would choose A. If you think that you are pretty good, you might choose D. If you are only medium, you might choose C, and so forth.

Circle the letter of your response for each item. Are you:

- |     |  |                           |   |
|-----|--|---------------------------|---|
| 1.  | Not at all aggressive                                  | A.....B.....C.....D.....E | Very aggressive                             |
| 2.  | Not at all independent                                 | A.....B.....C.....D.....E | Very independent                            |
| 3.  | Not at all emotional                                   | A.....B.....C.....D.....E | Very emotional                              |
| 4.  | Very submissive  | A.....B.....C.....D.....E | Very dominant                               |
| 5.  | Not at all excitable in a<br>major crisis              | A.....B.....C.....D.....E | Very excitable in a<br>major crisis         |
| 6.  | Very passive   | A.....B.....C.....D.....E | Very active                                 |
| 7.  | Not at all able to devote self<br>completely to others | A.....B.....C.....D.....E | Able to devote self<br>completely to others |
| 8.  | Very rough   | A.....B.....C.....D.....E | Very gentle                                 |
| 9.  | Not at all helpful to others                           | A.....B.....C.....D.....E | Very helpful to others                      |
| 10. | Not at all competitive                                 | A.....B.....C.....D.....E | Very competitive                            |
| 11. | Very home oriented                                     | A.....B.....C.....D.....E | Very worldly                                |
| 12. | Not at all kind  | A.....B.....C.....D.....E | Very kind                                   |



- |  |                           |                                    |
|--|---------------------------|------------------------------------|
| 13. Indifferent to others approval         | A.....B.....C.....D.....E | Highly needful of others' approval |
| 14. Feelings not easily hurt               | A.....B.....C.....D.....E | Feelings easily hurt               |
| 15. Not at all aware of feelings of others | A.....B.....C.....D.....E | Very aware of feelings of others   |
| 16. Can make decisions easily              | A.....B.....C.....D.....E | Has difficulty making decisions    |
| 17. Gives up very easily                   | A.....B.....C.....D.....E | Never gives up easily              |
| 18. Never cries                            | A.....B.....C.....D.....E | Cries very easily                  |
| 19. Not at all self-confident              | A.....B.....C.....D.....E | Very self-confident                |
| 20. Feels very inferior                    | A.....B.....C.....D.....E | Feels very superior                |
| 21. Not at all understanding of others     | A.....B.....C.....D.....E | Very understanding of others       |
| 22. Very cold in relations with others     | A.....B.....C.....D.....E | Very warm in relations with others |
| 23. Very little need for security          | A.....B.....C.....D.....E | Very strong need for security      |
| 24. Goes to pieces under pressure          | A.....B.....C.....D.....E | Stands up well under pressure      |

APPENDIX B

PAQ Gender Roles Study Comparison Table

## APPENDIX B

<b>Gender Role</b>	<b>Robbins Study</b>	<b>Stoltzfus Study</b>	<b>Schneidhofer, 1st Cohort</b>	<b>Schneidhofer, 2nd Cohort</b>
<b><i>Females</i></b>	%	%	%	%
Feminine	49%	39%	31%	33%
Masculine	6%	20%	17%	23%
Androgynous	18%	25%	26%	22%
Undifferentiated	27%	15%	26%	22%
<b><i>Males</i></b>				
Feminine	17%	26%	17%	18%
Masculine	22%	32%	28%	23%
Androgynous	30%	30%	25%	32%
Undifferentiated	30%	12%	30%	27%

## APPENDIX C

### Screening Questions

## APPENDIX C

## Screening Questions

Please circle your answer for the following questions:

1. Have you ever played the board game Settlers of Catan?

Yes      No      Not sure

If yes:

2. How much experience would you say that you have at the game?

A lot      A moderate amount      A little      Almost none

3. How recently have you played it?

Within the last:

Year      More than 1 year

APPENDIX D

Informed Consent Form

## APPENDIX D

**CONSENT TO PARTICIPATE IN RESEARCH***Department of Psychology, Fort Hays State University*

<p>This form has been approved by the Fort Hays State University IRB for use between 4/18/13 and 4/17/14. Questions? Contact 785.628.4349</p>
---

**Study title:** Gender-based Stereotype Threat and Competitive Interactive Games*Name of Researcher:* Phillip Paul Robbins*Contact Information:* 785-639-3945, pprobbins@mail.fhsu.edu*Name of Faculty Supervisor & Contact Information:* Dr. Carol Patrick 785-628-4406, cpatrick@fhsu.edu**You are being asked to participate in a research study. It is your choice whether or not to participate.**

Your decision whether or not to participate will have no effect on your academic standing. Please ask questions if there is anything you do not understand.

**What is the purpose of this study ?**

The purpose of the study is to examine relationships between personal attributes and behavior exhibited during a game.

**What does this study involve ?**

You will be given an identification number. You will then complete the screening questions for the study, writing your ID number and not your name on the form. If you do not qualify, you will be separated from the other participants, debriefed, and your participation will be ended. If you qualify, you will complete a brief demographics questionnaire (on which you will again write your ID) and be assigned to a group. With other members of the group, you will be taught the rules of a board game. You will then play a game lasting 20-30 minutes. Games will be supervised and data will be collected during them. Following the game, you will be given a short questionnaire asking about your personal attributes, on which you will write your ID. You will then be given a debriefing statement and invited to ask questions.

**If you decide to participate in this research study, you will be asked to sign this consent form after you have had all your questions answered and understand what will happen to you. The length of time of your participation in this study is estimated to be 40-60 minutes. Approximately 100 participants will be in this study.**

**Are there any benefits from participating in this study ?**

Benefits to you, should you decide to participate in this study, may include increasing knowledge about yourself and about behavior related to group interactions. Hopefully, you will also be able to enjoy playing the game that is the central feature of the study. If you are invited to take part in this study by your instructor, you will receive extra credit for participating; if you do not wish to participate, other options for extra credit will be offered.

**Will you be paid or receive anything to participate in this study ?**

The only compensation you will receive from this study is extra credit in class (according to the curriculum of your instructor).

**What about the costs of this study ?**

The only cost for this study is your participation time.

**What are the risks involved with being enrolled in this study ?**

It is unlikely that participation in this project will result in harm to participants. There may be naturally occurring negative emotions during and following the study, such as confusion, frustration, irritation, disappointment, etc., particularly in response to the game portion of the study, although positive emotions, such as excitement, satisfaction, elation, and amusement, are also expected to occur to counterbalance the negatives.

**How will your privacy be protected?**

The signed consent form will be collected separate from other materials and be placed in a manila envelope immediately. Participants will be given a number to use to identify their questionnaires, and which the researcher will write above their action column on the Action Tally Sheet for collecting game data. Nothing will be able to identify questionnaires or individual game data with names of individuals. Information will be accessed only by the researchers and will be kept locked up. The information collected for this study will be used only for the purposes of conducting this study. What we find from this study may be presented at meetings or published in papers, but your name will not ever be used in these presentations or papers, nor anything else that could uniquely identify you separate from aggregate data.

**Other important items you should know:**



- **Withdrawal from the study:** You may choose to stop your participation in this study at any time. Your decision to stop your participation will have no effect on your academic standing.
- **Funding:** There is no outside funding for this research project.

Whom should you call with questions about this study ?

Questions about this study may be directed to:

Paul Robbins, Research Supervisor—pprobbins@mail.fhsu.edu

Dr. Carol Patrick, Faculty Research Advisor—cpatrick@fhsu.edu

Dr. Janett Naylor, Ethics Chairperson in Psychology—jnnaylor@fhsu.edu.

If you have questions, concerns, or suggestions about human research at FHSU, you may call the Office of Scholarship and Sponsored Projects at FHSU (785) 628-4349 during normal business hours.

CONSENT

I have read the above information about Gender-based Stereotype Threat and Competitive Interactive Games and have been given an opportunity to ask questions. By signing this I agree to participate in this study and I have been given a copy of this signed consent document for my own records. I understand that I can change my mind and withdraw my consent at any time. By signing this consent form I understand that I am not giving up any legal rights. I am 18 years or older.

---

Participant's Signature and Date

APPENDIX E

Demographics Questionnaire

## APPENDIX E

## Demographics Questionnaire

Please answer all of the following questions fully. Your answers are completely confidential. The information you provide here will be linked to further information associated with you gathered during this study, but there will be nothing connecting you personally to the data. Information you provide that is presented to others in research papers, conference presentations, or research publications will be made available in aggregate form only. Your individual information will not be shared with anyone other than the researchers, and will only be used for the purpose of research.

Your participation in this study is completely voluntary. You may choose not to participate, or discontinue participating at any time, without penalty. You must be at least 18 years of age to participate in this study. If you have questions about this project, you may contact the primary investigator, Paul Robbins, at pprobbins@mail.fhsu.edu, or Dr. Carol Patrick of the FHSU Psychology Department, who is supervising this research, at (785) 628-4406 or cpatrick@fhsu.edu.

1. What is your age? \_\_\_\_\_
2. What is your biological sex? Please circle one:      Female      Male
3. What is your ethnicity? Please circle one:  
Asian      White      Black      Latino      Native American

Pacific Islander      Other (please  
specify):\_\_\_\_\_

4. Are you currently enrolled at FHSU? Please circle one:      Yes      No

5. What is your major/graduate program? Please  
specify:\_\_\_\_\_

APPENDIX F

Frontier Town Game/Instrument

## APPENDIX F

## Frontier Town

*Game Description*

This is a competitive strategy board game designed to measure the number of actions taken by a player that are stereotypically considered masculine, feminine, or gender neutral during game play. The researcher supervising each game will record the relevant action chosen by each player during their turn. This is done simply by marking a tally in the appropriate box (see sample sheet below). This is an example of how actions would be recorded for 12 rounds of play.

	<u>Player ID</u>			
<u>Action</u>	1M	1F	2M	2F
Request (F)				
Gamble (M)				
Forage (N)				
Donation (F)				
Sabotage (M)				
Purchase (N)				
Total Actions	12	12	12	12

Each board will be set up the same way, with city pieces already placed on the board in such a manner as to give each player a relatively equal advantage.

During the experimental set-up, players are seated so that following one player's turn the next player will be of the opposite sex. Each player rolls a die, re-rolling ties for highest. The player who rolled the highest number goes first, and will use the blue pieces. The other player of the same gender will be the third player, and will use the white pieces. The two players of opposite gender to the winner must roll again. The highest of them goes second, using the red pieces, and the other goes fourth, using the green pieces.

During the control set-up, players are seated according to how high their first roll is, with highest going first (tied players must re-roll against each other). The first player is blue, the second red, the third white, and the fourth green.

Starting cards will consist of one card of each resource type that corresponds to the hexes that the player's starting city is adjacent to. A forage pile will be available, which consists of five cards of each resource shuffled together and placed in a pile face down. A new one will be made if it is ever exhausted.

During the game, each player is trying to earn 10 points to win. This is done by constructing settlements on the board and upgrading them to cities. The small building pieces are settlements, and each one is worth 1 point. Each large building piece, or city, is worth 2. In order to win the game, all of a player's building pieces must be connected to the others by roads during their turn, and they must have reached 10 points.

At the beginning of the game, each player has one city already on the board. Each player may place one road for free in any direction next to their city. A building piece can only be

placed on a vertex of a hex tile (the point), and a road can only be built along an edge of a hex (the side).

At the start of their turn, a player rolls the dice. If a 7 is rolled, any player who has more than 7 gold must return one of them to the bank; the dice are then rolled until a number other than 7 comes up, and production occurs normally.

When any other number is rolled, any hex with a number chit that is the same as the number rolled produces the resource card of its type for all players who have an adjacent building piece. Resource cards are taken from the bank, which consists of two piles of cards of each resource type in the center of the table. As long as a building is standing normally, it produces normally; if it is sabotaged and ends up on its side, it does not produce anything. When one of the numbers is rolled of a hex you have built on, each settlement produces one resource (brick, wood, ore, sheep, or wheat); each city produces one resource, plus one gold. Only cities allow the production of gold. Any building pieces not standing upright do not count toward production. At any time, a player may return one of their buildings to an upright position at a cost of one sheep per settlement and one ore per city. Also, at the end of their turn, a player may return one of their buildings to an upright position for free.

For an example of resource production, in the situation below, assume that a 5 was rolled. The green player would produce one ore and one gold, and the white player would produce one brick and one gold. This is due to the position of their cities, which are adjacent to mountains (which produce ore) and hills (which produce brick). Red and blue would produce nothing, since



they are not yet built adjacent to a “5”.



This shows the locations of starting cities with possible road positions.

A player’s hand may not have more than 10 cards in it when their turn ends. If a player has more than 10 cards at the end of their turn, they must discard cards until they have no more than 10. Gold is not part of a player’s hand, and cannot be stolen (however, as mentioned earlier, a player loses half of their gold if they have 8 or more and a 7 is rolled). Gold cannot be traded (such as during the Request action).

During their turn, a player may return 3 of the same card type to the bank and take from the bank any 1 resource card of another type. They may do this as many times as they wish during a single turn.

Immediately following production, a player must perform a special action. Some actions require gold while others do not. Gold is paid back to the bank.

One of the actions, Request, allows a player to gain a card from another player or trade cards with a player. They do this by requesting a specific resource card from the other players. They may also offer their own unwanted card in exchange to sweeten the deal. They may offer or receive multiple cards in a trade, but may only make one trade with one other player. If the other player does not take any cards in the trade, that player receives one gold from the bank for their willingness to give.

Here is an example of trade dialogue (all other players may only address player 1, the active player):

Player 1 (active player): “Is anyone willing to give me a sheep?”

Player 2: “I have a sheep, but do you have anything to trade me?”

Player 1: “I can offer you a wood.”

Player 2: “I don’t really want wood. How about brick?”

Player 1: “Sorry, I need my brick.”

Player 3: “I’ll give you a sheep for one ore AND one wood.”

Player 1: “That’s asking a lot.”

Player 4: “Here’s a sheep. I’ll take your wood.”

Player 1: “Okay. Thanks.”

Player 1 then takes a sheep from Player 2 and gives her a wood.

Following their special action, a player may also build any number of things that they have enough resources for. Resources are returned to the bank.

Costs are as follows:

Road = 1 wood, 1 brick

Settlement = 1 wood, 1 brick, 1 wheat, 1 sheep

City = 2 wheat, 3 ore

A settlement is upgraded to a city, and the city replaces it. A settlement must be built first before it can be upgraded to a city. A new settlement need be only one road away from any other building piece, but a player may build numerous roads before building a settlement, if they are trying to reach a further location.

Special Actions:

0 gold:

Request—Ask the other players for a specific resource card. If more than one player offers it to you, you may choose which to take from (they may offer additional cards, if they wish; you can also ask for more, especially if multiple players are competing for the offer). A player willing to give you what you ask for may also request a card from you in trade (you don't have to, but if you don't, they may not give you what you want). **The player you take the card(s) from receives one gold from the bank if they do not take any cards from you.** You may

only select one player's offer. *If no player is able and willing to offer you the card you ask for, take one gold from the bank.* (Gold cannot be traded.) (support-seeking, cooperation)

Gamble—Roll a die. 1: you receive nothing. 2 or 3: steal a card at random from a player of your choice. 4 or 5: take one resource of your choice from the bank. 6: take three resources of your choice from the bank. (risk-taking, aggression)

Forage—Draw a random resource from the forage pile. (general self-improvement)

1 gold:

Donation—Give a card to the player with the least points (other than you). If players are tied for lowest score, choose one. Take a card of your choice from the bank. (The gold you pay in goes to the bank, not the player.) (nurture, cooperation)

Sabotage (targeted)—Choose a player. That player must remove one of their roads OR turn one of their building pieces on its side (their choice). (aggression)

2 gold:

Sabotage (widespread)—Each other player must remove one of their roads OR turn one of their building pieces on its side (their choice). (aggression)

3 gold:

Purchase—Take one resource of your choice from the bank. (general self-improvement)

APPENDIX G

Individual Player Rules Sheet for Frontier Town

## APPENDIX G

## Frontier Town

Game Rules1 Roll the Dice

The respective terrain hexes produce resources. If a 7 is rolled, each player with more than 7 gold must return half of their gold to the bank (rounded down); the dice are then rolled until a number other than 7 comes up, and production occurs normally.

2 Special Action

0 gold:

**Request**—Ask the other players for a specific resource card. If more than one player offers it to you, you may choose which to take from (they may offer additional cards, if they wish; you can also ask for more, especially if multiple players are competing for the offer). A player willing to give you what you ask for may also request a card from you in trade (you don't have to, but if you don't, they may not give you what you want). **The player you take the card(s) from receives one gold from the bank if they do not take any cards from you.** You may only select one player's offer. *If no player is able and willing to offer you the card you ask for, take one gold from the bank.* (Gold cannot be traded.)

**Gamble**—Roll a die. 1: you receive nothing. 2 or 3: steal a card at random from a player of your choice. 4 or 5: take one resource of your choice from the bank. 6: take three resources of your choice from the bank.

**Forage**—Draw a random resource from the forage pile.

1 gold:

**Donation**—Give a card to the player with the least points (other than you). If players are tied for lowest score, choose one. Take a card of your choice from the bank. (The gold you pay in goes to the bank, not the player.)

**Sabotage (targeted)**—Choose a player. That player must remove one of their roads OR turn one of their building pieces on its side (their choice).

2 gold:

Sabotage (widespread)—Each other player must remove one of their roads OR turn one of their building pieces on its side (their choice).

3 gold:

Purchase—Take one resource of your choice from the bank.

### 3 Building

Road (0 points) = 1 wood, 1 brick

Settlement (1 point) = 1 wood, 1 brick, 1 wheat, 1 sheep

City (2 points) = 2 wheat, 3 ore (turns a settlement into a city)

A new settlement need be only one road away from any other building piece, but a player may build numerous roads before building a settlement, if they are trying to reach a further location. When placing a new settlement or road, each must be connected to other pieces on the board that belong to that player.

### 4 Free Recovery

If you have any sideways buildings, you may return one of them to an upright position. It produces once more.

### Additional Rules of Note

Non-Production—Any building pieces not standing upright (due to sabotage) do not count toward production.

Building Recovery—At the start of any player's turn, **before the dice are rolled**, a player may return one of their buildings to an upright position at a cost of one sheep per settlement and one ore per city.

Building Recovery At Start of Any Turn:

Settlement = 1 sheep

City = 1 ore

Hand Limit—A player's hand may not have more than 10 cards in it when their turn ends. If a player has more than 10 cards at the end of their turn, they must discard cards until they have no more than 10. Gold is not part of a player's hand, and cannot be stolen.

**Maritime Trade**—During a player's turn, the player may return 3 of the same card type to the bank and take from the bank any 1 resource card of another type. The player may do this any number of times during a single turn.

**To Win**—The game ends when one player reaches 10 points, with each of that player's settlements and cities connected by roads. The winning player's buildings need not be upright to count as points. Ranking is determined according to each player's score at game end.



APPENDIX H

Debriefing Form

## APPENDIX H

## Debriefing Form

## Gender-based Stereotype Threat and Competitive Interactive Games

The purpose of this study is to ascertain the effects of stereotype threat during competitive games. Stereotype threat is the risk of being rated based on a stereotype (usually negative), and often results in diminished performance. For example, in a study by Maass, D'Ettole, & Cadinu (2008), participants played several games of chess online. Women who were aware that they played against men dropped in performance. Women who were falsely informed that their male opponent was a woman showed no deficit in performance.

It is believed that women will perform less actions perceived as aggressive, dominating, or risk-taking (stereotypically masculine qualities) during a game with men than they will during a game with other women only. It is also believed that this effect will be pronounced in women who score higher on femininity in the PAQ.

Thank you for your participation.

If you have any question about this study, feel free to ask. You may contact any of the individuals listed below.

Paul Robbins

Supervising Researcher

pprobbins@mail.fhsu.edu

Dr. Carol Patrick

Faculty Research Advisor

cpatrick@fhsu.edu

785-628-4406

Dr. Janett Naylor

Ethics Chair in Psychology

jmnaylor@fhsu.edu

785-628-5857

APPENDIX I

Informed Consent Form for Pilot Study

## APPENDIX I

**CONSENT TO PARTICIPATE IN RESEARCH***Department of Psychology, Fort Hays State University*

<p>This form has been approved by the Fort Hays State University IRB for use between 4/18/13 and 4/17/14. Questions? Contact 785.628.4349</p>
---

***Study title:*** Gender-based Stereotype Threat and Competitive Interactive Games—Pilot Study

***Name of Researcher:*** Phillip Paul Robbins

***Contact Information:*** 785-639-3945, pprobbins@mail.fhsu.edu

***Name of Faculty Supervisor & Contact Information:*** Dr. Carol Patrick 785-628-4406, cpatrick@fhsu.edu

**You are being asked to participate in a research study. It is your choice whether or not to participate.**

Please ask questions if there is anything you do not understand.

**What is the purpose of this study ?**

The purpose of this pilot study is to validate the measure Frontier Town and prepare it for the full study.

**What does this study involve ?**

You will play an interactive board game with three other players. You will then be given a debriefing statement and invited to ask questions.

**If you decide to participate in this research study, you will be asked to sign this consent form after you have had all your questions answered and understand what will happen to you. The length of time of your participation in this study is estimated to be 30-40 minutes. There will be 4 participants in this study.**

**Are there any benefits from participating in this study ?**

Benefits to you, should you decide to participate in this study, may include increasing knowledge about yourself and about behavior related to group interactions. Hopefully, you will also be able to enjoy playing the game that is the central feature of the study.

**Will you be paid or receive anything to participate in this study ?**

There will be no payment for participation in this study.

What about the costs of this study ?

The only cost for this study is your participation time.

What are the risks involved with being enrolled in this study ?

It is unlikely that participation in this project will result in harm to participants. There may be naturally occurring negative emotions during and following the study, such as confusion, frustration, irritation, disappointment, etc., although positive emotions, such as excitement, satisfaction, elation, and amusement, are also expected to occur to counterbalance the negatives.

How will your privacy be protected?

The signed consent form will be collected separate from other materials and be placed in a manila envelope immediately. Participants will be given a number to be used by the researcher while collecting data during the game. Nothing will be able to identify surveys or individual game data with names of individuals. Information will be accessed only by the researchers and will be kept locked up. The information collected for this study will be used only for the purposes of conducting this study. What we find from this study may be presented at meetings or published in papers, but your name will not ever be used in these presentations or papers, nor anything else that could uniquely identify you separate from aggregate data.

Other important items you should know:

- **Withdrawal from the study:** You may choose to stop your participation in this study at any time. Your decision to stop your participation will have no negative repercussions.
- **Funding:** There is no outside funding for this research project.

Whom should you call with questions about this study ?

Questions about this study may be directed to:

Paul Robbins, Research Supervisor—pprobbs@mail.fhsu.edu

Dr. Carol Patrick, Faculty Research Advisor—cpatrick@fhsu.edu

Dr. Janett Naylor, Ethics Chairperson in Psychology—jmnaylor@fhsu.edu.

If you have questions, concerns, or suggestions about human research at FHSU, you may call the Office of Scholarship and Sponsored Projects at FHSU (785) 628-4349 during normal business hours.

CONSENT

I have read the above information about Gender-based Stereotype Threat and Competitive Interactive Games—Pilot Study and have been given an opportunity to ask questions. By signing this I agree to participate in this study and I have been given a copy of this signed consent document for my own records. I understand that I can change my mind and withdraw my consent at any time. By signing this consent form I understand that I am not giving up any legal rights. I am 18 years or older.

---

Participant's Signature and Date

APPENDIX J

IRB Approval Letter

## APPENDIX J


**FORT HAYS STATE  
UNIVERSITY**
*Forward thinking. World ready.*


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**OFFICE OF SCHOLARSHIP AND SPONSORED PROJECTS**

DATE: April 19, 2013

TO: Phillip Robbins, BS  
FROM: Fort Hays State University IRB

STUDY TITLE: [428280-1] Gender-based Stereotype Threat and Competitive Interactive Games

IRB REFERENCE #: 13-104  
SUBMISSION TYPE: New Project

ACTION: APPROVED  
APPROVAL DATE: April 18, 2013  
EXPIRATION DATE: April 17, 2014  
REVIEW TYPE: Full Committee Review

Thank you for your submission of New Project materials for this research study. Fort Hays State University IRB has APPROVED your submission. This approval is based on an appropriate risk/benefit ratio and a study design wherein the risks have been minimized. All research must be conducted in accordance with this approved submission.

This submission has received Full Committee Review based on the applicable federal regulation.

Please remember that informed consent is a process beginning with a description of the study and insurance of participant understanding followed by a signed consent form unless documentation of consent has been waived by the IRB. Informed consent must continue throughout the study via a dialogue between the researcher and research participant. Federal regulations require each participant receive a copy of the signed consent document. The IRB-approved consent document must be used.

Please note that any revision to previously approved materials must be approved by this office prior to initiation. Please use the appropriate revision forms for this procedure.

All SERIOUS and UNEXPECTED adverse events must be reported to this office. Please use the appropriate adverse event forms for this procedure. All FDA and sponsor reporting requirements should also be followed.

Please report all NON-COMPLIANCE issues or COMPLAINTS regarding this study to this office.

Please note that all research records must be retained for a minimum of three years.

Based on the risks, this project requires Continuing Review by this office on an annual basis. Please use the appropriate renewal forms for this procedure.



If you have any questions, please contact Leslie Paige at 785-628-4349 or [lp Paige@fhsu.edu](mailto:lp Paige@fhsu.edu). Please include your study title and reference number in all correspondence with this office.