

Gender Perception in a Game of Chicken

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Abstract

The tough vs. weak strategy choice in a game of chicken provides the setting to gauge the impact of gender perception on strategic decision-making. Through the use of survey, this study finds that the indicated opponent gender did not have a significant impact on strategy choice, except in the case where male respondents were matched with a male survey. In this situation, male respondents were statistically significantly less likely to choose the more aggressive, competitive strategy. We attribute these results to wide intra-gender variation in strategy choice, as well as the strong dictates of masculinity in society.

Introduction and Significance

Categorization is a basic tenet of human experience. In the early days of human history, categorization was a core thought process: distinguishing between foe and friend was essential for survival. Now, categorization is still a key tool in making sense of the surrounding world. Unfortunately the categories, like gender, that we use are limiting. Kramer (2011) describes the historic ideal man in the United States as “emotionally and economically independent, physically powerful, protective of women and children, and emotionally inexpressive with a strong heterosexual appetite. Traditional visions of femininity prescribed a nurturant, intuitive, vulnerable, asexual, dependent person.” (28) Historic expectations pave the way for gender norms and dictate prescriptions for behavior. Today’s conflict on gender lines often stems from chafing against these expectations.

The path to equality of the sexes eases some of these tensions, while highlighting others. We remain relatively stuck in the classic stereotypes attributed to male or female, and punish crossover. Sensitive family-oriented men are questioned as are more aggressive, career-driven women. Table 1 gives a telling look at the differing standards for male and female behavior.

Table 1

If a Person is	Call Her:	Call Him:
Supportive	Bright	Yes-Man
Intelligent	Helpful	Smart
Innovative	Pushy	Original
Insistent	Hysterical	Persistent
Tough	Impossible	Go-Getter
Cute and Timid	A Sweetheart	A Fairy

Source: Adapted from Media Women – New York. 1970. “How to Name a Baby – A Vocabulary Guide for Working Women” In *The Sociology of Gender*, Laura Kramer. New York: Oxford University Press, 32.

Women are widely expected to have a more communal, social-oriented set of behaviors, while self-interest and personal ambition is promoted in men. Clearly, the words used to describe females focus more on compassion and nurturing attitudes, while giving negative connotations to

the more assertive or masculine adjectives in column 1. Males are penalized in the same way if they act in a manner that appears more sensitive.

Yet, to what actual degree is gender an important factor in decision-making and when does it come into play? A study by the Pew Research Center (Rampell 2013) found that “four in 10 American households with children under age 18 include a mother who is either the sole or primary earner for her family.” However, Rampell explains that about half of Americans think that children are better off if the mother is at home. Only 8% think that children are better off if the father is at home. Horizons are opening up for women, slowly, but little adaptation has taken place in regards to the male sphere of influence. As we celebrate moving closer to equality in the workplace, some lament that “although mimicking men helped women move into workplace and find acceptance there, it also sent an unintended message to women: The traditional male role model was what they should strive for, and the traditional female role should be left at home” (Barnett & Rivers 2004, 9). However, leaving behind that female role has also been found to diminish success in the workplace. Rudman and Glick (2001) explored the backlash effect for women in the job search, where qualified female candidates were penalized for their agentic behavior, like competitiveness and ambition, which violated prescriptive niceness. Their study found that agentic men were believed to have better social skills than agentic women and feminizing job descriptions penalized agentic women even further. Research has shown that successful women are less well-liked than their equally successful male counterparts in traditionally male domains (Heilman, Wallen, Fuchs, & Tamkins 2004). Heilman and Okimoto (2007) built off the conclusion of this study to find that this likeability penalty was likely the results of violating gender norms for women by appearing to lack in communality. Women are punished for the very skills and traits that make them appealing employees: competence and

leadership skills. Men are expected to be self-motivated and ambitious, rather than communal. They have their own set of pitfalls, but fare well in the workplace.

Politics represents a field where societal bias can be particularly visible. Dolan (2014) notes that “If there are biases in the system, either formal or informal, or structural roadblocks that exclude particular groups or individuals, we need to know that” (5) in order to preserve a democratic system that represents all. The inclination towards feminine compassion and care holds through in campaigns. We applaud strong women as role models, but want them to remain nice; campaign strategists typically advise female candidates to avoid attack ads and more negative campaigns as it is incongruous with public beliefs (Trent & Friedenberg 1995, p. 115). Voting is based on the candidate’s impression and evaluation. With the relative scarcity of female candidates to men, gender is pushed to the forefront in the case of female candidates. Jeffrey Koch (2002) found that potential voters used candidate gender to determine candidate beliefs for female candidates, but not male candidates; voters tend to assume that females will be more liberal. Despite efforts to redefine how gender characterizes us, our categorizations do matter at home, in the workplace, and in the headlines.

Literature Review

Modern game theory focuses on strategic decision-making in an ideal environment with perfect players. However, actual decision-making does not behave so neatly. Individual personality traits and characteristics have some degree of impact on how decisions are made. Expectations in regards to gendered behavior may also influence this process.

Gender Perception

A number of explanations have been theorized for gender differences in behavior. In the sociological setting, Kramer (2011) refers to gender as ‘the totality of meanings that are attached

to the sexes within a particular social system.” (2) The context used throughout this paper includes the cultural and social systems of gender in the United States. Studies have posited that women are more socially aware (Eckel & Grossman 1998) and less comfortable in competitive environments (Gneezy, Niederle & Rustichini 2003) than men. These results both support the gender norms of women being more communal.

However, there is debate over how accurate these observed gender differences are and what they arise from. Deaux and Major (1987) wrote:

Those who predict stable sex differences have had trouble accounting for the often limited ability of sex to predict behavior [in the laboratory], and for a variability that sometimes appears random. Those who argue that there are no stable sex differences, on the other hand, have had difficulty explaining widespread male-female differences in the culture at large. (369)

Some theories suggest that observed gender differences are widely based on the power differentials between individuals, and that a patriarchal society leads males to have more power and appear as more competitive or competent. Women may appear to be more yielding not because of gender traits, but because they operate in a society where men hold a majority of powerful positions. Dominant groups maintain control “in part, by creating and perpetuating a set of cultural beliefs and practices that legitimate their power.” (Kramer 2011, 25) Behavior is reinforced by past experience and socialization. Thus, a large degree of gender differences may be due to social conditioning and internalization. Lightdale and Prentice (1994) found that observation had a significant effect on gender differences in aggression in a bomb-dropping simulation game. When participants knew their identity was known and widely broadcasted, males dropped significantly more bombs than females. However, with namelessness, females

dropped at least as many bombs as their male counterparts. When named, women appeared to comply with the gender stereotype of being less aggressive and more compassionate. Yet, deindividuation and freedom from social expectation, and thus retribution, led to comparable rates of bombings across gender lines.

There can also be wide variation in behavior and characteristics of particular women and men. Meier-Pesti and Penz (2008) examined whether the widespread findings of women as being more risk-averse were accurate. They collected information on both subject sex and gender, classifying gender based on association with gender norms of masculine and feminine traits. They found that risk taking in investment behavior was not significantly different between the biological sexes when holding constant the association with masculinity. The key conclusion was that femininity was not equivalent to being risk-averse, but masculinity did support risk-positive behavior. Castillo and Cross (2008) found that on average men were not more aggressive than women, but that this result clouded wide variation in behavior within male subjects, namely a very timid minority of male respondents. Schwartz-Shea (2002) found that high-achieving males and females behave similarly, while lower-achieving males resist their low merit status and lower achieving females accept their lower merit status in a sequential asymmetric game. In total, gender differences are apparent in some studies, but follow-up studies have found that controlling for other characteristics associated with masculinity and femininity can narrow or eliminate the variance between male and female behavior.

Decision-making often relies on expected behavior, rather than actual behavior, so what society expects of males vs. females can be just as significant as any actual differences. Expectation states theory is a key social psychological theory relevant to categorization (Berger, Conner, Fisek 1974). The theory “suggests that gender is one of several ‘diffuse’ (or indirect)

status cues that influence expectations about the knowledge, ability, or influence of a given person.” (Roth, Purvis & Bobko 2012, p. 723) Expectation states surmises that we assume individuals will behave in the same way that an average member of the same category would behave, where categories are formed by cues such as gender, race, age, etc. For example, men and women overestimate risk aversion in others, but males particularly overestimate female strategic behavior in regards to risk (Eckel and Grossman 2002). As a whole, there is an expectation that women would be more risk-averse, unsupported by true behavior. Roth, Purvis, and Bobko’s (2012) meta-analysis of gender difference in job performance revealed that females scored higher than males on average for job performance ratings. However, males received higher promotion potential ratings. They surmised that “promotion decisions, by their nature, often do not allow decision makers maximal access to performance information (because most candidates have not done the job in question), thereby creating more opportunities for increased weight to diffuse cues.” (725) Expectation states theory shows that gender may be an effective ‘diffuse cue’ for behavior. In action, this means that gender is a factor that is “thought to suggest that females are more artistic and literary, kinder, and more patient and understanding, while men are thought to be more scientific, mechanical, and assertive.” (723)

The application of expectation states theory within the context of modern game theory opens the possibility that judging how another might behave, rather than how they have already behaved, leaves more room for the influence of these cues in decision-making. Making a choice in a simultaneous game, where no previous action has been witnessed, would seem to also be open to these cues.

Prisoner’s Dilemma Studies

A prisoner's dilemma game is the classic example for game theory, and is the format where much of the research over gender differences has been conducted. The basic setup for a prisoner's dilemma involves two strategy choices, cooperation or defection. A sample payoff matrix for a symmetric prisoner's dilemma game is shown below.

		Player B	
		Cooperate	Defect
Player A	Cooperate	5 , 5	-10 , 10
	Defect	10 , -10	0 , 0

If player A believes player B will cooperate, then player A would want to defect because 10 is a higher payoff than 5. It also follows that if player A believes that player B will defect, then player A would also want to defect because 0 is a higher payoff than -10. Clearly, defection is a strictly dominant strategy for both players. This is unusual because despite defecting being the dominant strategy, it is not actually always in the player's best interest to defect. With mutual cooperation, both players could receive a payoff of (5,5) which is greater than the payoff for mutual defection. However, the fear that the partner will defect while they cooperate drives both players to defect to avoid receiving the payoff of -10.

Interestingly, studies have found that actual results vary from the predicted Nash equilibrium solution where both parties defect, despite it being the most logical outcome. The work of Butler, Burbank, and Chisholm (2011) found that women have a lesser preference for competitive behavior than men in this type of game. Niederle and Vesterlund (2007) found women opt to participate at piece rate rather than a tournament-style reward system for winning consecutive games more than men. This is also consistent with the idea that women have a lesser preference for competitive behavior, as a piece rate is a reward per game won, while a tournament-style reward only pays out to the ultimate winner of all rounds of games. However,

Ortmann and Tichy (1999) found that cooperation rates only varied between males and females in early rounds of the game. When played repeatedly, the cooperation rates of males and females converged, suggesting that prior experience shapes the decision to cooperate vs. compete. Initial rates might differ because males and females as a collective often have different prior experiences that promote competition or cooperation. Orbell, Dawes, and Schwartz-Shea (1994) found that both males and females expected females to cooperate more, but that there was no relationship between expectation and the actual strategic behavior based on gender.

Game of Chicken Studies

The Prisoner's Dilemma may be classic, but much of this study revolves around the Game of Chicken. An example payoff matrix for Chicken is shown below.

		Player B	
		Cooperate	Defect
Player A	Cooperate	0 , 0	0 , 25
	Defect	25 , 0	-50 , -50

Chicken has a tough strategy choice, defecting, and a weak strategy choice, cooperating. The game also has two Nash equilibrium solutions. If player A believes that player B will cooperate, then player A will want to defect in order to achieve a payoff of 25 compared to a payoff of 0. However, if player A believes that player B will defect, then player A will want to cooperate to avoid the payoff of -50 when both defect, a disastrous outcome. Thus, using this logic from both players' viewpoints leads to two solutions: both situations where one player cooperates and the other defects. However, these solutions don't have equal payoffs. If player A defected while player B cooperated, player A would receive the payoff of 25. Player B would receive the payoff of 0 and be considered the chicken. Thus, a significant amount of tension comes from the question of who will be the chicken.

To apply the idea of Nash equilibriums, players “must have the correct belief about the other’s choice of strategy . . . the concept requires each to be confident about the other’s choice.” (Dixit, Skeath, & Reiley 2009 p.117) Yet, chicken is a simultaneous-decision game and in the real world, players must choose without knowing the others choice. Both players have a significant interest in avoiding mutual defection as it is a catastrophic outcome for both, thus they must navigate their own fear and greed to come to a decision. Therefore, assumptions about the behavior of opponents should play a role in strategy choice. With the prominence of gender stereotypes and issues, we believed that gender perception could be a key piece of information for decision-makers.

The Present Study

Little of the research in game theory has examined the impact of gender on strategy choice in Chicken. The purpose of this study was to gauge if the interaction of respondent and opponent gender was a significant factor in their chosen strategy. Gender stereotypes predict certain dominant characteristics and expectation states theory suggests that we often make judgements about potential actions based on these classifications. Chicken seemed like an ideal set-up to gauge gender perception as the “tough vs. weak” strategy choice aligns with common conceptions of masculinity and femininity. We sought to understand if respondents were actively relying on these stereotypes to guide their decision. Our main goal is not to validate the existence of sex differences, but to see if these stereotypes play a role in the decision-making process.

Experimental Design

Participants and Procedure

Participants (N=373) were recruited from four sections of an introductory economics course. This selection insured that participants were not previously exposed to game theory

concepts. The total sample was 53.6% male and 46.4% female, with gender being self-identified on the first question.

Participants were asked to fill out one of three surveys located in Appendix A. The surveys were distributed randomly to all participants. The difference between the surveys is the highlight of gender in the setup of the ‘Game of Chicken’ in the third question. The question asked of participants is detailed below, with the three possible wordings in parenthesis. ‘Going In’ is the tough strategy and ‘Staying Out’ is the weak strategy.

You’re playing a game of financial “Chicken” against a 20 year old (no qualifier, female, male) college student. You have two strategies to choose from in this game, going in or staying out. If you go in, and (your opponent, she, he) stays out, then you win \$25. If you stay out, and (your opponent, she, he) goes in, then (your opponent, she, he) wins \$25. If you both stay out, neither of you receive any money. However, if you both go in, both of you have to pay \$50. No outside negotiation is possible.

Given the situation described above, what strategy would you choose? (Circle one)

- ☐ Go In
- ☐ Stay Out

Additionally, data was also collected on the reservation price for a lottery ticket. This information was initially collected in order to gauge and control for risk preference as a confounding variable. The information on reservation price was collected using the following question.

In a lottery, there is a 10% chance that you will win \$1000. What is the maximum price that you would pay for a ticket in this lottery?

\$_____ (answer must be between 0 and 1000)

Data

There were a total of 373 observations collected. The data breakdown of strategy choice and gender is summarized in Table 2. In the sample, 173 respondents were female and 200 were male. Of the total respondents, 165 out of 373, or 44.2%, chose the tough strategy. Along gender

lines, 73 out of 173 female respondents, or 54.5%, chose the tough strategy while 92 of 200 male respondents, or 46%, chose the tough strategy. Of the surveys completed, 126 indicated a male opponent, 125 indicated a female gender, and 122 were gender ambiguous. Table 3 contains the summary statistics for the raw reservation price data from the lottery question.

Table 2. Gender Data Summary

Tough Strategy = Go In				
	Opponent Gender			
Subject Gender	Male	Female	Ambiguous	Total
Male	28	32	32	92
Female	23	26	24	73
Total	51	58	56	165

Weak Strategy = Stay Out				
	Opponent Gender			
Subject Gender	Male	Female	Ambiguous	Total
Male	45	31	32	108
Female	30	36	34	100
Total	75	67	66	208

Table 3. Reservation Price Data Summary

Reservation Price	
Minimum	0
First Quartile	5.00
Mean	46.83
Median	10.00
Third Quartile	50.00
Maximum	1000

Results

A logistic regression of the data was conducted to examine the impact of the gender interaction variable on strategy selection. Only one gender interaction term was significant in the model, that of male versus male. The results showed that if a male participant received a survey with a male opponent indicated, they were less likely to choose the aggressive strategy of ‘Going In’ than if they received a survey with ambiguous gender. If the survey gender is male and the respondent gender is male, the expected *log* odds of “going in” decrease by 0.4745. This means that in this scenario, the estimated probability that the respondent will go in is 38.36%. This compares to the overall probability where 44.2% of respondents went in. The other gender

interactions were not statistically significantly different from zero, suggesting that the perception of gender was not a factor in strategy choice.

The coefficients and associated t-values for each gender interaction term are summarized in the table below. The male respondent and unknown opponent gender are excluded as the reference class.

Table 4. Interaction Model with No Intercept or Risk Measurement

Gender Interaction Model			
	Coefficient Estimate	Z value	p-value
Survey Unknown: Respondent Male (Reference Class)	0.00	0.00	1.00
Survey Unknown: Respondent Female	-0.3483	-1.306	0.1914
Survey Female: Respondent Female	-0.3254	-1.264	0.2061
Survey Female: Respondent Male	0.03175	0.126	0.8997
Survey Male: Respondent Female	-0.2657	-0.959	0.3377
Survey Male: Respondent Male	-0.4745	-1.971	0.0487
AIC of Model	520.8		

Discussion

When survey participants were asked about strategy choice in a game of chicken that highlighted opponent gender, the results suggest that gender perception mattered only when male respondents were paired with a male rival. This might be due to the relatively high level of anonymity in the survey format. Behavior prescribed by gender is not as effective when unobserved and distanced from other players since these behaviors are social by nature. The decreased likelihood of choosing the aggressive strategy in the male-male interactions suggests a component of mutual deterrence. If a male subject believes, as conventional masculinity prescribes, that his male opponent is quite likely to choose the aggressive strategy, the subject has a strong interest in avoiding the catastrophic outcome and playing the weaker strategy.

The first question on each respondent's survey asked them to indicate his or her gender. Gender priming in this manner has been shown to be effective in activating gender stereotypical responses (Boschini, Muren & Persson, 2012). The survey began this way to subconsciously place gender perception in respondent's minds. However, in Boschini, Muren, and Persson's study, men were more sensitive to gender priming than women. This could be an alternative explanation for why the male-male interaction term was significant while the others were not.

Another point of concern was whether the opponent labeling in the survey was strong enough to trigger social cues related to gender. However, Cabon-Dhersin and Etchart-Vincent (2012) found that when strategy labeling is changed, it lead to a change in rates of strategy selection. Specifically, a socially-oriented strategy label (like cooperate or do not cooperate) rather than a neutral (Red or Blue) led to slightly higher rates of cooperation for both genders, but significantly higher cooperation rates for women in a game of chicken. The results of the former study indicated that subtle changes in strategy wording could have an observable impact on strategy choice which led us to believe that the gender labeling in our surveys would be sufficient enough to register in participant's minds. This suggests the possibility that the non-significance of gender interaction was not from lack of participant awareness, but from participants not holding opponent gender as an important factor in strategy selection.

Conclusion

Overall, the literature suggests that there are observable gender differences in behavior on average, but that controlling for other gender-related factors can reduce the size of the difference. However, regardless of the actual state of gendered behavior, society has strong expectations along gender lines. Numerous studies found that women were more socially-oriented in decision-making (Eckel & Grossman 1998) and less comfortable in competitive situations (Butler,

Burbank, & Chisholm 2011; Niederle & Vesterlund 2007). However, a number of counter studies were able to negate the differences by de-emphasizing self-awareness (Lightdale & Prentice 1994) or controlling for masculine and feminine trait association rather than just gender identification (Meier-Pesti & Penz 2008). However, despite the conflicting evidence on true gender differences in behavior, previous studies found strong evidence that there are differences in expectation based on gender. Eckel and Grossman (2002) found that men strongly overestimate women's risk aversion and that women are trusted to cooperate more than men by rivals of both gender (Orbell, Dawes & Schwartz-Shea 1994).

The results obtained in this study indicate that gender perception was only influential when male respondents were paired with male surveys. A male-male interaction led to a decreased likelihood that the respondent would select the tough strategy suggesting a component of mutual deterrence. This study could be improved by offering true financial incentives to better gauge behavior closer to a real-world situation. In addition, a more interactive study format might yield stronger results because participant interaction could trigger greater social cues and awareness than the survey format did.

It is easy to find evidences of gender differences in society, looking at concentrations in various careers or the gender makeup of leadership roles in major companies. Expectations about gendered behavior are shaping which fields men and women enter, and how they are promoted and reviewed. Understanding at what level gender perception shapes our decisions is significant because it helps reveal the bias that influences our judgment in decision-making, and if it is justified. The results suggest that the idealized male role, held to be more aggressive, still dominates in the male mind, but that perhaps restrictive gender expectations for females have loosened.

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Appendix

Survey Instrument A

Reminder: Participation in this study is voluntary. Participation will have no impact on your course grade. You can choose to discontinue this survey at any time without penalty.

1. What is your gender? (Circle one)
 - ☐ Male
 - ☐ Female

2. In a lottery, there is a 10% chance that you will win \$1000. What is the maximum price that you would pay for a ticket in this lottery?

\$_____ (answer must be between 0 and 1000)

3. You're playing a game of financial "Chicken" against a 20 year old college student. You have two strategies to choose from in this game, going in or staying out. If you go in, and your opponent stays out, then you win \$25. If you stay out, and your opponent goes in, then your opponent wins \$25. If you both stay out, neither of you receive any money. However, if you both go in, both of you have to pay \$50. No outside negotiation is possible.

Given the situation described above, what strategy would you choose? (Circle one)
 - ☐ Go In
 - ☐ Stay Out

Survey Instrument B

Reminder: Participation in this study is voluntary. Participation will have no impact on your course grade. You can choose to discontinue this survey at any time without penalty.

1. What is your gender? (Circle one)
 - ☐ Male
 - ☐ Female

2. In a lottery, there is a 10% chance that you will win \$1000. What is the maximum price that you would pay for a ticket in this lottery?

\$_____ (answer must be between 0 and 1000)

3. You're playing a game of financial "Chicken" against a 20 year old female college student. You have two strategies to choose from in this game, going in or staying out. If you go in, and she stays out, then you win \$25. If you stay out, and she goes in, then she wins \$25. If you both stay out, neither of you receive any money. However, if you both go in, both of you have to pay \$50. No outside negotiation is possible.

Given the situation described above, what strategy would you choose? (Circle one)
 - ☐ Go In
 - ☐ Stay Out

Survey Instrument C

Reminder: Participation in this study is voluntary. Participation will have no impact on your course grade. You can choose to discontinue this survey at any time without penalty.

1. What is your gender? (Circle one)

- ☐ Male
- ☐ Female

2. In a lottery, there is a 10% chance that you will win \$1000. What is the maximum price that you would pay for a ticket in this lottery?

\$_____ (answer must be between 0 and 1000)

3. You're playing a game of financial "Chicken" against a 20 year old male college student. You have two strategies to choose from in this game, going in or staying out. If you go in, and he stays out, then you win \$25. If you stay out, and he goes in, then he wins \$25. If you both stay out, neither of you receive any money. However, if you both go in, both of you have to pay \$50. No outside negotiation is possible.

Given the situation described above, what strategy would you choose? (Circle one)

- ☐ Go In
- ☐ Stay Out