January 2012

An Examination Of Aggressive Responding To Visual Feedback And Physical Provocation

Virginia Elizabeth Klophaus

AN EXAMINATION OF AGGRESSIVE RESPONDING TO VISUAL FEEDBACK AND PHYSICAL PROVOCATION

by

Virginia E. Klophaus
Bachelor of Arts, Rutgers, The State University, 2009

A Thesis

Submitted to the Graduate Faculty

of the

University of North Dakota

in partial fulfillment of the requirements

for the degree of

Master of Arts

Grand Forks, North Dakota

May

2012

This thesis, submitted by Virginia Klophaus in partial fulfillment of the requirements for the Degree of Master of Arts from the University of North Dakota, has been read by the Faculty Advisory Committee under whom the work has been done and is hereby approved.

Alan King, Ph.D., Chairperson

Heather Terrell, Ph.D.

Joseph Miller, Ph.D.

This thesis is being submitted by the appointed advisory committee as having met all of the requirements of the Graduate School at the University of North Dakota and is hereby approved.

Dr. Wayne Swisher, Dean of the Graduate School

Date

Title An Examination of Aggressive Responding to Visual Feedback and Physical Provocation

Department Psychology

Degree Master of Arts

In presenting this thesis in partial fulfillment of the requirements for a graduate degree from the University of North Dakota, I agree that the library of this University shall make it freely available for inspection. I further agree that permission for extensive copying for scholarly purposes may be granted by the professor who supervised my thesis work or, in his absence, by the Chairperson of the department or the dean of the Graduate School. It is understood that any copying or publication or other use of this thesis or part thereof for financial gain shall not be allowed without my written permission. It is also understood that due recognition shall be given to me and to the University of North Dakota in any scholarly use which may be made of any material in my thesis.

Signature Virginia Klophaus

Date April 17, 2012

TABLE OF CONTENTS

LIST OF FIGURES

LIST OF TABLES

ABSTRACT

The present study used a modified version of the Taylor Aggression Paradigm to test whether a form of visual provocation might be more salient in producing a physically aggressive response than a physical stimulus (i.e., shock). Male and female university undergraduates were recruited to participate, and assigned to one of three conditions: accurate visual feedback (in which feedback reflected accurately the physical shock received), low visual feedback (in which feedback reflected a lower value than the physical shock received), or high visual feedback (in which feedback reflected a higher value than the physical shock received). Aggressive responses were defined by the extent to which participants chose to shock a fictitious opponent without provocation (baseline), as well as under conditions of low and high provocation. A significant main effect of the visual feedback was observed, with the low feedback condition differing significantly from the accurate and high feedback conditions. Contrary to predictions, the interaction between gender and visual feedback condition was non-significant; both males' and females' responses were influenced by the visual feedback. Results are discussed within the context of Social Role Theory and the impact of gender role on gender differences in aggression.

CHAPTER I

INTRODUCTION

The scientific study of human aggression has been explored using many different methodologies, which have generated data in both laboratory-based and naturalistic settings. These data have been of considerable interest in the behavioral sciences and related disciplines including medicine, criminal justice, sociology, law, and others. Within the field of psychology, testing theories of aggression under experimentally controlled conditions is critical to delineating factors which influence this class of behavior to provide a more detailed and comprehensive understanding of the phenomenon. While *aggression* encompasses a broad range of research, Buss (1961) defined the term as the delivery of a painful stimulus within an interpersonal context. He identified two distinct types of behavioral reinforcers that were thought to facilitate aggression: the pain or injury of the victim, and extrinsic rewards. Thus, while aggression may be the result of emotions such as anger, such behavior may also constitute an instrumental response driven by, for example, dominance. This does not exclude the possibility that aggressive behaviors may be instigated by a combination of these two reinforcers.

Two subtypes of aggression commonly identified are direct and indirect aggression. Direct aggression refers to aggressive behaviors targeting a specific individual, without avoiding counterattack (Buss, 1961); indirect aggression may also

target a specific individual, but is expressed in a way that evades retaliation. Understanding the etiology of direct physical aggression is of particular interest, given the potentially serious consequences of such behavior. The present study will examine potential factors that may disinhibit direct physical aggression as it is observed in the laboratory under conditions of provocation.

Laboratory Measurement of Aggressive Acts

The Taylor Aggression Paradigm (TAP; Taylor, 1967) is one experimental task that researchers have used to obtain a measure of direct physical aggression that does not rely on self-reports. The TAP places participants in a competitive situation with a fictitious opponent, with the intention of eliciting a physically aggressive response. Participants are told that the task in which they are competing consists of multiple trials, and that the winner of each trial will select an intensity level of shock to be administered to their opponent. In reality, the number and order of trials the participant will win and lose are preset, as are the shocks administered to the participants when they lose a trial. Aggression is defined operationally by multiple aspects of the shocks selected by participants for their opponent (e.g., first shock intensity, mean shock intensity, first shock duration, mean shock duration, proportion of extreme shocks selected). A baseline level of responding is also obtained by allowing the participant to win the first (one or two) trials. The TAP has been found to be a valid and safe measure of aggressive behavior for both males and females (Anderson & Bushman, 1997; Giancola & Chermak, 1998; Giancola & Parrott, 2008; Giancola & Zeichner, 1995). Furthermore, offering participants the option not to shock their opponent increases the external validity of the paradigm by establishing the use of physical aggression as a

choice, which participants would have in a natural setting (Zeichner, Frey, Parrott, & Butryn, 1999; Zeichner, Parrott, & Frey, 2003).

The TAP has been used to examine aggression exclusively, as well as in conjunction with other variables. To list a few examples, the TAP has demonstrated an influence of alcohol consumption on aggressive behavior (e.g., Giancola, 2002; Giancola, 2003; Giancola, 2004a; Giancola & Parrott, 2005), as well as relationships between aggression and executive function (e.g., Giancola, 2004b; Santor, Ingram, & Kusumakar, 2003), and aggression and anxiety (e.g., Phillips & Giancola, 2008).

One area of study that merits particular attention in the psychopathology and social psychology literatures is the extent to which aggression varies as a function of gender differences. In the past half century, the body of literature addressing gender differences in aggression has advanced considerably. Research has demonstrated consistently that from as young as two years of age, males exhibit higher levels of physically aggressive behavior than females (Archer, 2004; Maccoby & Jacklin, 1974). This difference remains significant into adulthood, with effect sizes ranging from moderate to large (Cohen's d; Hyde, 2005).

Given its setup and procedure, the TAP is able to test for aggressive responses under different levels of provocation. When experiencing a loss in the first half of the trials, participants receive lower intensity shocks; higher intensity shocks are administered after losses during the second half of the trials. These two sets of trials are considered the low and high provocation conditions, respectively, and are administered consecutively. One or two moderate level shocks are sometimes administered between the low and high provocation trial sets to provide a more believable transition.

Provocation has been demonstrated to have a significant impact upon gender differences in physical aggression. In a meta-analysis of aggression studies involving neutral and provocation conditions, Bettencourt and Miller (1996) examined the effect sizes of gender differences in aggressive responses. While males were found to have higher levels of physically aggressive responses overall, under conditions of higher provocation this difference was minimized (and often no longer statistically significant). When taking into account differences in sample sizes, the mean effect size for gender differences under neutral conditions was found to be moderate (d= 0.33; positive in the male direction), while under conditions of provocation the mean effect size was small (d= 0.17; positive in the male direction). More pronounced was the difference in effects sizes when not weighting analyses based on sample sizes. Under neutral conditions the mean effect size was larger but comparable to the weighted analyses (d= 0.43; positive in the male direction); however, in provocation conditions the effect size was not reliably greater than zero (d= .06; 95% confidence interval= -0.10-0.22). Archer (2004) suggests that these effect sizes may be even larger in "real-world" settings. The influence of provocation on a female's likelihood of demonstrating physical aggression is noted frequently in cases of intimate violence (Richardson, 2005).

One additional aspect of a typical TAP setup is the visual display of the shock intensity level "selected" by the fictitious opponent when the participant loses a trial. In addition to the electric shock that the participant receives, a visual confirmation of the shock intensity is provided, either as a number on the computer screen or as a light by the shock number on the TAP apparatus. This feedback is generally intended to

reinforce the physical provocation (electric shock) for both genders equally, and because the feedback is not treated as a separate variable not all studies specify whether it is included. However, interesting bodies of research concerning gender differences in varying social contexts, visual perception, and pain perception suggest that perhaps participants in TAP studies respond to different aspects of the provocation. Currently, there is no research investigating whether the visual feedback of shock intensities may represent a more salient form of provocation than the physical shock.

Gender Differences in Aggressive Proclivities

In the social psychology literature, two popular hypotheses attempting to explain gender differences in aggression are sexual selection theory (SST) and social role theory (SRT; Archer, 2004). SST favors an evolutionary perspective, and suggests that males are generally more aggressive than females due to greater reproductive competition. Conversely, SRT argues that gender differences in aggression arise from socially generated expectations.

There is often disagreement as to whether gender or gender role is a more influential factor in moderating differences in aggression. Research supports the presence of real gender differences independent of gender role. Maccoby and Jacklin (1974) evaluated results from multiple studies examining differences between males and females, many of which involve infants (even newborns) who would not have lived sufficiently long enough to develop a socialized gender role. Others have noted that biological (i.e., hormonal) factors influence aggressive behavior, independent of social roles (e.g., Barfield, 1984). However, research has also determined that gender differences in aggression appear to be influenced by an individual's gender role (e.g.,

Reidy, Sloan, & Zeichner, 2009; Richardson & Hammock, 2007), and that perhaps an individual's gender role contributes more than gender to differences in aggressive behavior. This is strongly suggestive of an underlying sociocultural component to the development of these differences. Therefore, if males are generally more influenced socially and culturally by these concepts of status, dominance, and manhood, and if females do not generally experience the same pressures, then evidence of these shaping factors should be observed in participants' responses in the laboratory.

Gender, Vision, & Pain Sensitivity

Current laboratory methods for measuring aggression in response to provocation raise some initial questions regarding potential differences in pain threshold and tolerance that could conceivably be gender-based. These contemporary methods provoke aggression by inflicting mild shocks on participants while in the lab. Within the body of literature addressing sensory perception, the presence of any gender differences varies considerably depending upon the circumstances; what specific type of perception is being addressed, under what conditions individuals' perception is being evaluated, and the methodology of the assessment are a few of the many factors to consider. Maccoby and Jacklin (1974) reviewed several dozen studies addressing gender differences in visual perception in males and females from birth to adulthood. They found that across these studies, male and female newborns did not differ in their fixation to visual stimuli. During the first year of life, there did not appear to be a gender difference in responsiveness to visual stimuli. This trend was found to continue from infancy into adulthood, with both genders performing equally on multiple measures of visual perception.

Given the context of experimentally induced pain, Riley, Robinson, Wise, Myers, and Fillingim (1998) conducted a meta-analysis of gender differences in pain thresholds and tolerance. In terms of tolerance of electrical stimulation, four studies obtained effect sizes ranging from small to large, with males consistently demonstrating a higher tolerance. Furthermore, three studies were analyzed to examine gender differences in pain threshold with respect to electrical stimuli. The effect sizes found in these studies ranged from medium to large, with women reporting lower pain thresholds. While this research may appear to indicate a gender difference regarding a predisposition to pain sensitivity, such results may be due to sociocultural influences.

Previous research has noted that gender differences in tactile sensitivity and perception are questionable. Maccoby and Jacklin (1974) reviewed studies with newborns addressing potential differences between males and females in tactile sensitivity. They further reviewed articles examining gender differences in tactile perception with individuals ranging in age from 3 to 21 years. They found that while certain studies found females to be more sensitive to tactile stimuli than males, the majority of studies reviewed found no gender differences. It was concluded that further research would be needed to determine whether a real gender difference exists, particularly addressing a wider range of ages, as approximately half of the studies included were conducted with newborns.

Studies of mental chronometry have examined the phenomenon of visual dominance, a bias toward the visual modality over other sensory modalities (e.g., Klein, 1977; Posner, Nissen, & Klein, 1976). Posner and his colleagues (1976) found that the occurrence of visual dominance is contingent upon several factors including the focus

of one's attention on visual stimuli and the perceived reliability of the visual information. It appears that if an individual is focused on perceiving a visual stimulus, such information may be more salient than other sensory information presented. Results suggest that when being presented with both visual and kinesthetic stimuli simultaneously, there is a tendency to attend to vision when visual information is perceived to be adequate. Klein (1977) further addressed this phenomenon in three separate experiments, and concluded that visual dominance in situations where both visual and kinesthetic information are presented is conditional. Visual input dominates attentional focus over kinesthetic input when subjects expect to receive both visual and kinesthetic information simultaneously (bimodal); however, when subjects are presented visual, kinesthetic, and bimodal stimuli randomly there is no bias in attention to vision. These results were presented to support the view that attentional bias toward the visual modality occurs when vision seems to provide sufficient information upon which to base one's response.

Individual differences in the extent to which research participants exhibit visual dominance have not been widely examined. Studies of gender differences in tendencies toward visual dominance could not be found in the experimental literature. The current study did, however, hypothesize that men will be more responsive to visual feedback that either overestimates or underestimates the magnitude of an aversive tactile stimulus. In this study visual feedback will convey additional information about the intentionality of a presumed opponent who inflicts pain through a tactile stimulus of unknown intensity. These visual sensory cues and the interpersonal information

they convey were hypothesized to have greater impact on male as opposed to female participants.

Potential Gender-Based Motives for Aggression

Dominance and competition over social status might be identified as characteristic features of males according to both SST and SRT, as these qualities would increase one's chance for reproductive success, as well as fit the typical male gender role. Maccoby and Jacklin (1974) found that boys were more responsive to competitive situations with respect to achievement motivation than girls. In addition, Wilson and Daly (1985) suggest that status competition and risk-taking in males may contribute considerably to the causes of violent crimes (particularly homicides). They further state that young adult males appear especially inclined to take risks in competitive situations, not necessarily out of survival instincts, but rather as a way of preserving their pride and status of manhood. Additional research supports this perspective. Vandello, Bosson, Cohen, Burnaford, and Weaver (2008) conducted five studies assessing the views of undergraduate males and females regarding the concept of manhood. These researchers concluded that manhood is viewed as a status that one achieves through action (as opposed to, for example, reaching a certain age), and which can easily be lost. Moreover, circumstances that might threaten one's status of manhood would be likely to provoke anxiety. Finally, results indicated the strong possibility that men would use aggression as a means of restoring their manhood status.

Strain Theory

Another interesting area of research concerns strain theory (Agnew, 1985). Resembling the frustration-aggression hypothesis (Dollard et al., 1939), strain theory

describes adolescent delinquency as a way of coping with frustration, or stressors. Liu and Lin (2006) conducted a study with a diverse population of adolescent males and females in China, isolating three specific types of strain: strain due to status achievement, interpersonal strain, and physical strain (related to health and appearances). They found that strain over status achievement was most significant for males, while female's delinquency was significantly related to strain over physical well-being and appearances.

The aforementioned findings suggest that manipulation of the visual feedback provided by the Taylor Aggression Paradigm may affect males and females differently, not necessarily because of any physical differences in visual perception, but due to the social implications that such feedback might suggest. Young adult males appear more concerned with maintaining their status as men, and as such may be more susceptible to focusing their attention on the visual stimulus and responding aggressively to inaccurate visual feedback. Conversely, young adult females do not experience the same pressure to maintain their societal status as women. As the research suggests this concern is not as relevant for females, they may more readily focus on the physical stimulation of the electric shock, rather than attending to the visual feedback. Therefore, the current study will have participants experiencing the same physical provocation of equal shock intensities set by their "opponent;" however, the visual feedback will vary to determine whether feedback may be a more salient form of provocation for males than females.

The Present Study

The goal of the present study was to examine the expression of direct physical aggression in males and females under conditions of low and high provocation, as well as low, accurate, and high visual feedback. In the accurate feedback condition, the numerical values of the shock intensities administered to participants were displayed accurately. In the low and high feedback conditions, the numerical values displayed were either two levels lower or higher than the actual value of the shock intensity. For example, a shock intensity of a 3 was displayed as a 3 in the accurate condition, a 1 in the low feedback condition, and a 5 in the high feedback condition.

In accordance with this objective, it was hypothesized that there would be a main effect of gender such that males would exhibit higher levels of aggressive behavior than females overall. It was further hypothesized that there would be a significant two-way interaction between gender and provocation, in which the gender difference in levels of aggressive behavior would be significantly greater under conditions of low provocation than under conditions of high provocation. Finally, it was hypothesized that there would be a significant three-way interaction between gender, provocation, and feedback, with differences in the interaction between gender and provocation at each level of feedback. In the accurate feedback condition, significant gender differences were predicted at the low level of provocation but not at high provocation. In the low and high feedback conditions, it was hypothesized that males would respond to the visual feedback more than the physical stimulus by aggressing significantly more in response to high feedback and less in response to low

feedback, while females would respond to the physical stimulus and would not exhibit significantly different responses across feedback conditions.

CHAPTER II

METHODS

Participants

A sample of male and female undergraduate students, at least 18 years of age and enrolled in introductory psychology courses, participated in the present study. Participants received course credit as compensation for their time spent.

Measures

Demographics Form. A brief demographics form was administered, including information regarding participants' age, gender, and ethnicity.

Aggression paradigm. A modified version of the Taylor Aggression Paradigm (TAP; Taylor, 1967) was used to provide a measure of aggressive behavior. This version of the TAP consisted of 22 trials. Wins and losses were preset, with the participant winning the first two trials to provide a baseline measurement of aggression. First-trial shock intensity, mean shock intensity, and proportion of extreme (i.e., 10s) shocks selected were assessed using the shock levels which the participants select to administer to their opponent, as measures of general aggression.

Procedure

Upon arrival, participants were seated at a small table facing a computer. The keys at the top the keyboard were marked with the numbers 0 to 10. Labels *no shock*,

low, *medium*, and *high* were placed above the keys marked 0, 1, 5, and 10, respectively. Participants were asked to give their informed consent to their participation. Participants were given a cover story and told that they were competing in a reaction time task with another student (of the same gender as the participant). They were asked to fill out the demographics form and questionnaires. Following the questionnaires participants were given a distracter task that was described as a measure of processing speed as part of the deception. Once these were completed, participants were told that the competitive task they would engage in consisted of multiple trials. For each trial the words "Get Ready" would appear on the computer screen, followed by "Press the Spacebar." Participants were told that as soon as the phrase "Release the spacebar" appeared in red on the screen, they were to quickly release the spacebar (before their opponent). They were informed that as part of creating a competitive atmosphere, the winner of each trial (i.e., whoever was the first to release the spacebar) would have the option to administer a shock to their opponent by choosing a shock intensity level to administer. Participants were told that they had the option not to administer a shock (by selecting zero).

Two electrodes were attached to the first and middle fingers of the participant's non-dominant hand to assess each participant's minimum and maximum thresholds for the shocks. Shocks were administered in a stepwise manner until the participant was able to perceive them to assess the minimum threshold. The same process was used to assess participants' maximum threshold, except participants were asked to stop the shocks once they became painful. They were informed that their opponent was doing the same. Once this was done, the participant began the TAP program. The order in

which participants won/lost was preset, and was the same for all three visual feedback conditions. Participants won 11 of the 22 trials (and so were prompted to shock their opponent 11 times), and also received 11 shocks. Actual shock levels administered to participants ranged from 3 to 8. Shocks 1-10 were assigned 55, 60, 65, 70, 75, 80, 85, 90, 95, and 100% of the value identified as each participant's maximum threshold. Therefore, shocks administered to participants throughout the procedure ranged from 65-90% of the maximum threshold (i.e., shocks were unpleasant but did not reach a "painful" level).

Participants won the first two trials, after each of which the message "You won! You get to give a shock!" appeared. Participants then selected a shock (0-10) to administer. After the shock key was released, "You are done shocking" appeared on the screen, and then the next trial began. On trials in which the participant lost, the words "You lost! You get a shock!" appeared, followed by the preset shock for that trial. In the first 10 trials, participants received shock intensities of 3 and 4 from the opponent (low provocation). Participants lost trials 11 and 12, and received shocks of 5 and 6 respectively, to create a believable transition from low to high provocation. Within trials 13 to 22, participants received shock intensities of 7 and 8 (high provocation). Shock values of 1, 2, 9, and 10 were not administered to participants, so as to maintain the same shock values across feedback conditions. Administration of all 22 trials took approximately 9-10 minutes.

Precautions were programmed into the TAP in the event that a participant did not press or release the spacebar at the appropriate time. If the participant did not press the spacebar when he was expected to, the words "Please press the spacebar" would

appear. If the spacebar were released prematurely, a message would appear stating "You released the spacebar too soon!" The trial would then be repeated.

Once all trials were completed, participants were asked to complete an additional form that served as a manipulation check. IRB approval was obtained to postpone debriefing until the conclusion of data collection. Participants were given the opportunity to provide their names and contact information to be informed of the study's results.

CHAPTER III

RESULTS

Demographics

A total of 80 university undergraduates who received extra credit for their participation took part in the present study. No participants chose to terminate their participation prior to completion. A manipulation check at the end of each experimental session indicated that 9 students did not believe they were competing against another student, and were removed from all subsequent analyses, leaving data for 71 subjects to be analyzed. Participants were assigned to one of six groups based on gender and the three feedback conditions. Table 1 presents the distribution of participants between conditions. Participants' median age was 19 years (M= 20.6, SD = 4.0). There were 36 male participants (50.7%) and 35 female participants (49.3%). Self-reports of ethnicity indicated that participants were 87.3% White (n=62), 2.8% Native American (n=2), 2.8% Black (n=2), 2.8% mixed (n=2), 1.4% Asian (n=1), 1.4% other (n=1), and 1.4% Hispanic (n=1).

ANOVAs

The first set of analyses was conducted to test the main hypothesis that there would be a three-way interaction between feedback condition, provocation, and gender. A 3 (feedback: low vs. accurate vs. high) x 3 (provocation: baseline vs. low vs. high) x

2 (gender: male vs. female) mixed design analysis of variance was conducted using provocation as the within factor and feedback and gender as between factors. In this analysis, the assumption of sphericity was violated, indicating that the variances of the differences between levels of provocation were unequal (Mauchly's test of sphericity significant at $p < .033$). More specifically, Levene's test of homogeneity of variance indicated that groups differed significantly at baseline [$F(5, 65) = 6.34, p < .000$)].

Table 1. Number of Participants by Gender and Condition (Total N=71).

Feedback Condition	Males	Females
Accurate	11	12
Low	13	11
High	12	12

Contrary to the original hypothesis, the three-way interaction of provocation x feedback condition x gender was non-significant [$F(4, 130) = 0.52, p < .718$]; see Figure 1. The two-way interaction between feedback condition and gender was also non-significant [$F(2, 65) = 1.68, p < .194$], indicating that males and females did not differ significantly in aggression by feedback condition. The two-way interaction between provocation and gender was non-significant [$F(2, 130) = 2.03, p < .140$] as predicted, indicating that under high provocation males and females responded similarly (i.e., more aggressively). The two-way interaction between provocation and feedback condition was significant [$F(4, 130) = 4.64, p < .002$], which is likely due to

the differences between groups at baseline. In terms of simple main effects, the main effect of provocation was significant [$F(2, 130) = 42.10, p < .000$] as predicted. The main effect of gender was significant [$F(1, 65) = 5.55, p < .022$]. However, the main effect of feedback condition was non-significant [$F(2, 65) = 2.24, p < .115$]. Table 2 lists the means and standard deviations of aggressive responses by gender, feedback condition, and level of provocation.

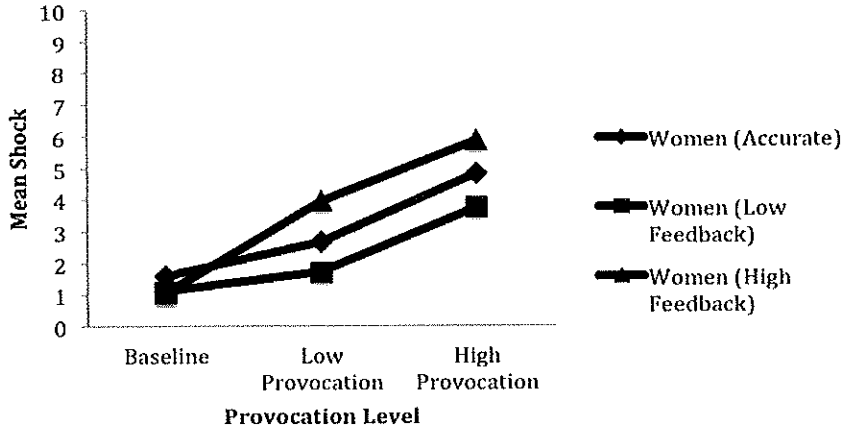

Figure 1a. Provocation x Feedback Condition for Males; DV = Mean Shock.

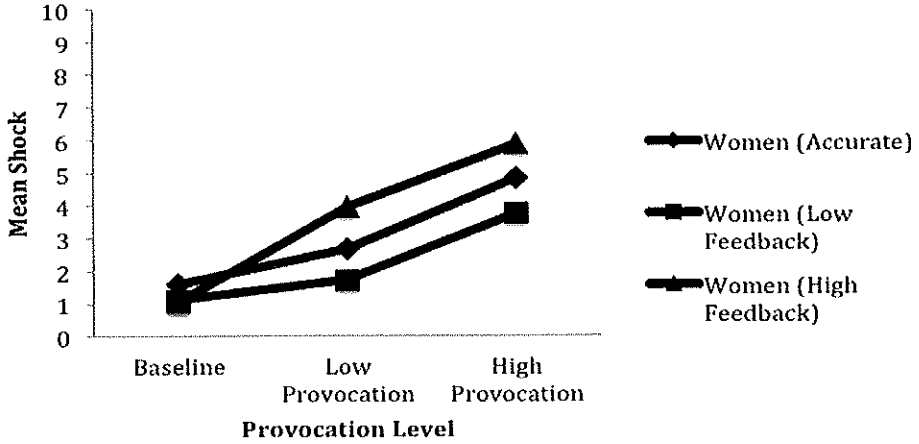

Figure 1b. Provocation x Feedback Condition for Females; DV= Mean Shock.

Table 2. Means and (Standard Deviations) by Dependent Variable.

DV: Baseline

	Accurate Feedback	Low Feedback	High Feedback	Total
Male	4.23 (3.10)	3.73 (3.59)	1.25 (1.22)	3.06 (3.06)
Female	1.58 (1.43)	1.09 (1.43)	1.04 (1.16)	1.24 (1.32)
Total	2.85 (2.69)	2.52 (3.07)	1.15 (1.17)	2.16 (2.52)

DV: Low Provocation

	Accurate Feedback	Low Feedback	High Feedback	Total
Male	4.66 (2.52)	2.88 (1.94)	3.65 (2.20)	3.68 (2.27)
Female	2.67 (1.42)	1.70 (1.95)	3.94 (1.91)	2.80 (1.95)
Total	3.62 (2.22)	2.34 (1.99)	3.79 (2.02)	3.25 (2.15)

DV: High Provocation

	Accurate Feedback	Low Feedback	High Feedback	Total
Male	6.30 (2.69)	3.88 (3.27)	5.81 (3.09)	5.26 (3.14)
Female	4.83 (2.94)	3.73 (2.53)	5.85 (2.78)	4.84 (2.82)
Total	5.53 (2.86)	3.81 (2.89)	5.83 (2.88)	5.05 (2.97)

A second analysis of variance was conducted using a 3 (feedback: low vs. accurate vs. high) x 2 (provocation: low vs. high) x 2 (gender: male vs. female) mixed design with baseline aggression as a covariate, to control for the unequal variances between groups at baseline. Baseline aggression was a significant covariate [$F(1, 64) =$

18.78, $p < .000$]. In this analysis, the assumption of sphericity was met. The three-way interaction of provocation x feedback condition x gender was still non-significant [$F(2, 64) = 1.10, p < .338$]. This time, the two-way interaction between provocation and feedback condition was non-significant [$F(2, 64) = 0.84, p < .436$]. The two-way interaction between provocation and gender was non-significant [$F(1, 64) = 2.34, p < .131$]. The two-way interaction between feedback condition and gender was also non-significant [$F(2, 64) = 0.42, p < .658$]. As for the simple main effects, the main effect of provocation was significant [$F(1, 64) = 14.96, p < .000$]. The main effect of gender was non-significant [$F(1, 64) = 0.07, p < .788$]. The main effect of feedback condition was significant [$F(2, 64) = 8.03, p < .001$]. An examination of pairwise comparisons for the different levels of feedback condition indicated that the low feedback condition differed significantly from both the accurate and high feedback conditions. There was no significant difference between the accurate and high feedback conditions.

A third analysis of variance was conducted on the between-subject factors of feedback condition and gender using a difference score calculated by subtracting the average shock during baseline from the highest shock value administered under provocation (either low or high). In this analysis, the main effect of feedback condition remained significant [$F(2, 65) = 7.25, p < .001$], indicating that groups responded differently based on the visual feedback they received. The main effect of gender was non-significant [$F(1, 65) = 0.69, p < .409$], indicating that overall males and females both exhibited similarly aggressive responses. The two-way interaction between feedback condition and gender was non-significant [$F(2, 65) = 0.28, p < .759$]; males and females both responded aggressively based on feedback condition (see Figure 2).

An examination of pairwise comparisons using Tukey's HSD indicated a significant difference between the low feedback and high feedback conditions ($p < .001$). Means and standard deviations of aggression scores are presented in Table 3 by gender and feedback condition. Inter-correlations are provided in Table 4 for the total sample, and in Table 5 by gender.

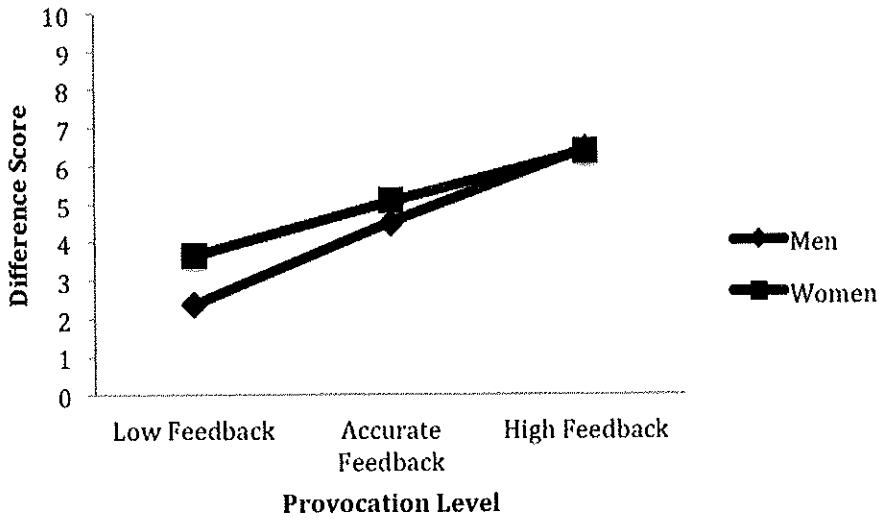

Figure 2. Gender x Feedback Condition; DV = Difference Score.

Table 3. Means and (Standard Deviations) by Dependent Variable.

	DV: Difference Score			
	Accurate Feedback	Low Feedback	High Feedback	Total
Male	4.50 (3.33)	2.35 (3.25)	6.42 (3.44)	4.36 (3.67)
Female	5.08 (2.95)	3.64 (2.61)	6.38 (2.88)	5.07 (2.96)
Total	4.80 (3.08)	2.94 (2.98)	6.40 (3.10)	4.71 (3.33)

Table 4. Means, Standard Deviations, and Inter-correlations between Dependent Measures for Total Sample.

	1	2	3	4	5	6	7	8	9	10	11
1. Baseline Agg.		-									
2. Low Prov.	.41**	-									
3. High Prov.	.37**	.71**	-								
4. Phys. Agg	.20	.15	.18	-							
5. Verbal Agg.	.14	.04	.02	.49**	-						
6. Anger	.14	.03	-.02	.42**	.45**	-					
7. Hostility	.28*	.18	.22	.33**	.29*	.42**	-				
8. Femininity	-.08	-.22	-.20	-.22	-.04	.01	-.17	-			
9. Masculinity	.09	.06	.01	.22	.16	-.15	-.24*	.25	-		
10. Narcissism	-.10	-.12	-.10	-.41**	-.42**	-.15	-.25*	-.07	-.37**	-	
11. Self-Monitor.	.03	-.00	-.08	.25*	.23	.23*	.34**	-.03	.16	-.38**	-
Mean	2.16	3.25	5.05	19.67	13.87	14.44	15.72	23.54	21.34	42.87	12.83
SD	2.52	2.15	2.97	7.31	3.07	4.29	5.67	4.05	4.40	4.34	3.38

Note. Baseline Agg. = Aggression at baseline; Low Prov. = Aggression under low provocation; High Prov. = Aggression under high provocation; Phys. Agg. = The Aggression Questionnaire (Physical Aggression); Verbal Agg. = The Aggression Questionnaire (Verbal Aggression); Anger = The Aggression Questionnaire (Anger); Hostility = The Aggression Questionnaire (Hostility); Femininity = Personal Attributes Questionnaire (Femininity); Masculinity = Personal Attributes Questionnaire (Masculinity); Narcissism = Narcissistic Personality Inventory; Self-Monitor. = Self-Monitoring of Expressive Behavior

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

Table 5. Means, Standard Deviations, and Inter-correlations between Dependent Measures for Males (above) and Females (below).

1.	Baseline Agg.	-	.33	.35*	.03	-.02	.13	.18	.13	.26	-.06	-.10
2.	Low Prov.	.54**	-	.63**	-.03	-.19	-.04	.03	-.27	-.00	.05	-.20
3.	High Prov.	.48**	.82**	-	.07	-.24	-.12	.11	-.18	-.05	.06	-.27
4.	Phys. Agg.	.09	.22	.32	-	.43**	.46**	.18	-.01	.40*	-.40*	.18
5.	Verbal Agg.	.29	.21	.29	.47**	-	.48**	.08	.07	.52**	-.42*	.19
6.	Anger	.03	.03	.07	.31	.39*	-	.39*	.08	.20	-.34*	.46**
7.	Hostility	.37*	.28	.31	.39*	.43**	.40*	-	.03	-.19	-.24	.20
8.	Femininity	-.32	-.05	-.21	-.29	-.05	.03	-.30	-	.36*	-.22	.23
9.	Masculinity	-.06	.19	.10	.17	-.14	-.46**	-.25	.09	-	-.39*	.17
10.	Narcissism	-.06	-.30	-.30	-.41*	-.40*	.10	-.24	.05	-.41*	-	-.38
11.	Self-Monitor	.26	.19	.19	.31	.26	-.00	.46**	-.30	.17	-.36*	-
Mean (males)		3.06	3.68	5.26	22.86	14.53	15.14	16.83	22.56	20.83	42.39	13.06
SD (males)		3.06	2.27	3.14	6.94	3.06	4.20	5.34	4.23	4.25	4.71	3.36
Mean (females)		1.24	2.80	4.84	16.29	13.20	13.71	14.57	24.54	21.88	43.37	12.60
SD (females)		1.32	1.95	2.82	6.16	2.98	4.31	5.84	3.65	4.56	3.93	3.43

Note. Baseline Agg. = Aggression at baseline; Low Prov. = Aggression under low provocation; High Prov. = Aggression under high provocation; Phys. Agg. = The Aggression Questionnaire (Physical Aggression); Verbal Agg. = The Aggression Questionnaire (Verbal Aggression); Anger = The Aggression Questionnaire (Anger); Hostility = The Aggression Questionnaire (Hostility); Femininity = Personal Attributes Questionnaire (Femininity); Masculinity = Personal Attributes Questionnaire (Masculinity); Narcissism = Narcissistic Personality Inventory; Self-Monitor. = Self-Monitoring of Expressive Behavior

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

CHAPTER IV

DISCUSSION

Contrary to the original hypotheses, the three-way interaction between gender, provocation level, and feedback condition was non-significant. Consistent with predictions, a significant interaction between gender and provocation level was found when baseline aggression was included in the analyses. When controlling for the variance between groups at baseline, this interaction was no longer significant, indicating that the simple effect of gender did not vary between low and high provocation levels. Also consistent with hypotheses was the finding of a significant main effect of gender when baseline aggression was included; when baseline was used as a covariate, the gender difference was no longer significant.

In the first analysis of variance the main effect of feedback condition was non-significant; however, this result appeared to be influenced by the inequality between groups at baseline. Controlling for unequal variances at baseline resulted in a significant effect of feedback condition, with the low feedback being significantly different from both the accurate and high feedback conditions. It was originally hypothesized that there would be a significant interaction between feedback and gender, with males predicted to respond differently to the three levels of visual feedback condition, and females predicted to react only to the physical shock (and therefore to respond similarly across feedback conditions). While the interaction

between feedback condition and gender was non-significant, the significant main effect of feedback indicates that aggressive responding in both males and females was influenced by feedback condition.

The significance of manipulating the visual feedback prompts the question of why. One possible explanation of the present findings is that social status did play an important role. Given the lack of a gender difference in the effect of the visual feedback, this explanation would appear to favors Social Role Theory (SRT) over Sexual Selection Theory (SST). In other words, results do not appear to support the theory that males tend to respond more aggressively due to greater competition over resources. Rather, results favor SRT in that the similar aggressive responses in males and females may be better explained by social norms and expectations. In line with this theory, concerns of preserving one's social status may have led to the greater salience of the visual feedback as opposed to the physical provocation of the shock; instead of reacting to the discomfort of the shock, participants responded differently based on the perceived threat to their social status from an imaginary peer.

While SRT helps to explain the research findings, it conflicts with the present results in that there was no observed gender difference in response to visual feedback. However, the lack of a gender difference may be explained by the importance of gender role over biological gender. On a measure of conformity to traditional masculine and feminine gender roles, males and females endorsed similar levels of both gender roles, but particularly masculinity. Therefore gender role may account for the absence of a gender difference in the present study, and perhaps individuals who identify more strongly with either a traditionally masculine or traditionally feminine gender role (but

not both) may have been more likely to respond differently to the visual feedback versus the physical shock. Future research should examine this possibility by including a broader sample so that individuals who exhibit greater extremes on these variables may be further studied. As additional data are obtained to further examine this effect, one goal of future research should be to consider clinical applications of these research findings. For instance, understanding the factors that instigate direct physical aggression toward another individual may be used to devise more effective psychotherapeutic strategies for intervention.

Several limitations of the present study must be considered. This was the first study to examine the effects of manipulating the presentation of the visual feedback provided in the Taylor Aggression Paradigm. Therefore, these results must be replicated before they may be considered a reliable effect. Additionally, participants consisted of university students with a median age of 19, which limits the generalizability of results. Not only should this study be replicated, it should include a more diverse sample. A further concern regarding external validity is that of sample size. While post-hoc power analyses demonstrated adequate power for the present study, cell sizes were still relatively small which may further limit generalizability. The mean cell size was 11.83, while approximately twice as many participants per cell would be preferable for research in the behavioral sciences. Although a significant effect of feedback condition was observed, the effect size was small, bringing into question the substantiality of the research results. While the future implications of this finding may relate to improvements to psychotherapy (e.g., treatment of anger problems), maintaining a certain amount of skepticism is warranted particularly since

these results have yet to be replicated. At the same time, if a small effect was found with a small sample size, it is possible that using a larger samples size to replicate the present results may find the effect to be more robust.

REFERENCES

Agnew, R. (1985). A revised strain theory of delinquency. *Social Forces, 64* (1), 151-167.

Anderson, C. A., Bushman, B. J. (1997). External validity of "trivial" experiments: The case of laboratory aggression. *Review of General Psychology, 1* (1), 19-41.

Archer, J. (2004). Sex differences in aggression in real-world settings: A meta-analytic review. *Review of General Psychology, 8* (4) 291-322.

Barfield, R. J. (1984). *Reproductive hormones and aggressive behavior* A. R. Liss, (Ed.). New York, NY: Alan R. Liss Inc.

Bettencourt, B. A. & Miller, N. (1996). Gender differences in aggression as a function of provocation: A meta-analysis. *Psychological Bulletin, 119* (3) 422-447.

Buss, A. H. (1961). *The psychology of aggression.* New York, NY: John Wiley and Sons, Inc.

Buss, A. H., Perry, M. (1992). The aggression questionnaire. *Journal of Personality and Social Psychology, 63* (3) 452-459.

Dollard, J., Miller, N.E., Doob, L. W., Mowrer, O. H., & Sears, R. R. (1939). *Frustration and aggression.* New Haven, CT: Yale University Press.

Giancola, P. R. (2002). Irritability, acute alcohol consumption and aggressive behavior in men and women. *Drug and Alcohol Dependence, 68*, 263-274.

Giancola, P. R. (2003). The moderating effects of dispositional empathy on alcohol-related aggression in men and women. *Journal of Abnormal Psychology, 112* (2) 275-281.

Giancola, P. R. (2004a). Difficult temperament, acute alcohol intoxication, and aggressive behavior. *Drug and Alcohol Dependence, 74*, 135-145.

Giancola, P. R. (2004b). Executive functioning and alcohol-related aggression. *Journal of Abnormal Psychology, 113* (4) 541-555.

Giancola, P. R., Chermak, S. T. (1998). Construct validity of laboratory aggression paradigms: A response to Tedeschi and Quigley (1996). *Aggression and Violent Behavior, 3*, 237-253.

Giancola, P. R., Parrott, D. J. (2005). Differential effects of past-year stimulant and sedative drug use on alcohol-related aggression. *Addictive Behaviors, 30*, 1535-1554.

Giancola, P. R., Parrott, D. J. (2008). Further evidence for the validity of the Taylor Aggression Paradigm. *Aggressive Behavior, 34*, 214-229.

Giancola, P. R., and Zeichner, A. (1995). Construct validity of a competitive reaction-time aggression paradigm. *Aggressive Behavior, 21*, 199-204.

Hoaken, P. N. S., Shaughnessy, V. K., & Pihl, R. O. (2003). Executive cognitive functioning and aggression: Is it an issue of compulsivity? *Aggressive Behavior, 29*, 15-30.

Hyde, J. S. (2005). The gender similarities hypothesis. *American Psychologist, 60* (6), 581-592.

Klein, R. M. (1977). Attention and visual dominance: A chronometric analysis. *Journal of Experimental Psychology: Human Perception and Performance, 3* (3), 365-378.

Liu, R. X., Lin, W. (2006). Delinquency among Chinese adolescents: Modeling sources of frustration and gender differences. *Deviant Behavior, 28*, 409-432.

Maccoby, E. E., Jacklin, C. N. (1974). *The psychology of sex differences*. Stanford, CA: Stanford University Press.

Phillips, J. P. & Giancola, P. R. (2008). Experimentally induced anxiety attenuates alcohol-related aggression in men. *Experimental and Clinical Psychopharmacology, 16* (1) 43-56.

Posner, M. I., Nissen, M. J., Klein, R. M. (1976). Visual dominance: An information-processing account of its origins and significance. *Psychological Review, 83* (2), 157-171.

Raskin, R., Terry, H. (1988). A principle-components analysis of the Narcissistic Personality Inventory and further evidence of its construct validity. *Journal of Personality and Social Psychology, 54* (5), 890-902.

Reidy, D. E., Sloan, C. A., & Zeichner, A. (2009). Gender role conformity and aggression: Influence of perpetrator and victim conformity on direct physical aggression in women. *Personality and Individual Differences, 46*, 231-235.

Richardson, D. S. (2005). The myth of female passivity: thirty years of revelations about female aggression. *Psychology of Women Quarterly, 29*, 238-247.

Richardson, D. S., Hammock, G. S. (2007). Social context of human aggression: Are we paying too much attention to gender? *Aggression and Violent Behavior, 12*, 417-426.

Riley, J. L., Robinson, M. E., Wise, E. A., Myers, C. D., & Fillingim, R. B. (1998). Sex differences in the perception of noxious experimental stimuli: A meta-analysis. *Pain, 74*, 181-187.

Santor, D. A., Ingram, A., Kusumakar, V. (2003). Influence of executive functioning difficulties on verbal aggression in adolescents: Moderating effects of winning and losing and increasing and decreasing levels of provocation. *Aggressive Behavior, 29*, 475-488.

Snyder, M. (1974). Self-monitoring of expressive behavior. Journal *of Personality and Social Psychology, 30* (4), 526-537.

Spence, J. T., Helmreich, R., & Stapp, J. (1975). Ratings of self and peers on sex role attributes and their relation to self-esteem and conceptions of masculinity and femininity. *Journal of Personality and Social Psychology, 32* (1) 29-39.

Taylor, S. P. (1967). Aggressive behavior and physiological arousal as a function of provocation and the tendency to inhibit aggression. *Journal of Personality, 35*, 297-310.

Vandello, J. A., Bosson, J. K., Cohen, D., Burnaford, R. M., & Weaver, J. R. (2008). Precarious manhood. *Journal of Personality and Social Psychology, 95* (6), 1325-1339.

Wilson, M., Daly, M. (1985). Competitiveness, risk taking, and violence: The young male syndrome. *Ethology and Sociobiology, 6*, 59-73.

Zeichner, A., Frey, F. C., Parrott, D. J., and Butryn, M. F. (1999). Measurement of laboratory aggression: A new response-choice paradigm. *Psychological Reports, 85*, 1229-1237.

Zeichner, A., Parrott, D. J., and Frey, F. C. (2003). Gender differences in laboratory aggression under response choice conditions. *Aggressive Behavior, 29*, 95-106.