THE RELATIONSHIP BETWEEN TEAM-LEVEL AGGRESSION AND BASKETBALL PERFORMANCE

A Thesis
Presented to
The Academic Faculty

By

Mary Ann Wright

In Partial Fulfillment
Of the Requirements for the Degree
Master of Science in the
School of Psychology

The Georgia Institute of Technology

December, 2009

The relationship between team-level aggression and basketball performance

Approved by:

Dr. Larry James, Advisor
School of Psychology
Georgia Institute of Technology

Dr. Jack Feldman
School of Psychology
Georgia Institute of Technology

Dr. Dennis Folds
GTRI
Georgia Institute of Technology

Date Approved: April 10, 2009

ACKNOWLEDGEMENTS

First and foremost, I would like to acknowledge the guidance of Dr. Larry James, my advisor, in developing and refining this thesis. His input has been invaluable. I would also like to thank Chia-huei Emily Ko for her encouragement throughout this process and for providing me with the tools and training needed to complete my thesis. This analysis would not have been possible without Brian Frost's generosity in allowing me to use the data he so meticulously and time-consumingly collected. Thank you for giving me the opportunity to extend your research. A special thanks to Jad Tompkins for his unfailing support throughout this process. I truly could not have done it without him. Finally, I would like to thank my mother and father for their love, encouragement, and constant belief in me.

TABLE OF CONTENTS

LIST OF TABLES

SUMMARY

Previous research has indicated that aggression is generally detrimental to performance in the occupational domain (Campbell, 1990; James et al., 2005; Sackett, 2002; Viswesvaran et al., 1999). In certain athletic contexts, however, aggression may serve to enhance performance at the team level. For this analysis, team-level aggression is hypothesized to be positively related to team performance in basketball. Aggression in this context is defined as "the desire to inflict harm on another individual, group, or entity" (James, 2005, p.71). Both implicit (CRT-A) and explicit (NEO-PI-R) aggression were measured, and team performance was represented primarily by team scores. The data demonstrate that team-level implicit aggression is significantly and positively related to team performance, however team-level explicit aggression does not have a significant relationship with team performance.

CHAPTER 1

INTRODUCTION

Traditionally, aggression has been viewed as a hindrance to performance (Campbell, 1990; James et al., 2005). Support for this viewpoint has been found across many different occupational domains (James et al., 2005). The premise proposed in this paper, however, is that there are certain situations with specific characteristics in which aggression may enhance performance. Most of the industrial-organizational research on aggression has focused on aggressive individuals working in industrial settings, and in these settings aggressive behavior typically is deemed inappropriate and tends to hurt the aggressive individual's performance due to the disruption of interpersonal relationships, the disturbance of productivity, and the increased risk of legal consequences. However, if the context in which performance is being measured allowed for, or perhaps rewarded, aggressive behavior, then one might expect aggression to be beneficial to performance.

Basketball, for instance, is a team sport that is exceptionally physical in nature and that invites forceful contact among players. Shoving, grabbing, elbowing, and blocking are all common (though potentially foul-attracting) occurrences in any basketball game. In fact, these behaviors are actively used in strategy to score and prevent the opposing team from scoring. This is an environment to which aggressive individuals may be drawn, as it allows them to display aggressive behavior in a somewhat socially acceptable way and potentially benefit from that behavior. In this study, aggression is defined as "the desire to inflict harm on another individual, group, or entity" (James, 2005, p.71). By this definition, aggressive individuals or teams would be expected to engage not only in the normal forceful strategic behaviors associated with basketball, but

also to engage in behavior that is extreme and outside the norms of accepted strategy. This analysis will explore whether these highly aggressive teams do have a performance advantage and, if so, the mechanisms through which that advantage would be gained.

CHAPTER 2

FROST BASKETBALL STUDY

The data used in this analysis are from the Frost (2005) basketball study. In this study, Brian Frost sought to test a channeling model of aggression using both implicit and explicit aggression measures. The sample consisted of 227 intramural male and female basketball players on 36 teams in a large southeastern university. After excluding some participants due to insufficient playing time, 183 participants remained, 113 of whom were male and 70 of whom were female. The participants' ages ranged from 18 to 30 years old, with a mean of 21.82 years (SD = 2.79). Participants had a mean of 8.83 years (SD = 5.25) experience playing basketball and 14.11 years (SD = 4.53) of experience playing in team sports. Seventy-eight percent were Caucasian, 16% were African-American, and 6% declared themselves as "Other."

Measures of Aggression

The participants completed consent forms, demographic information, and two personality measures at the beginning of the intramural season. One personality measure, the Conditional Reasoning Test of Aggression (CRT-A), was administered for the purpose of assessing implicit aggression (James & McIntyre, 2000). The CRT-A is based on a theory of implicit personality that states that when an individual has a socially unacceptable motive, such as aggression, the individual will develop cognitive justification mechanisms (JMs) that allow that individual to express the objectionable motive while maintaining a favorable view of the self (James, 1998). These justification mechanisms (JMs) reflect biases the individual has developed related to that motive. JMs affect an individual's reasoning process. The CRT-A capitalizes on this by using JMs to

attempt to measure an individual's implicit aggressive motive via an inductive reasoning format (James, 1998).

The CRT-A is a 25-item measure with 22 conditional reasoning problems and three actual inductive reasoning problems (James & Mazzerole, 2000). The participant has four multiple-choice answer options. Two options are illogical, deemed so because they do not logically follow from the premise in the stem of the item, and two options are logical, one of which is attractive to those who use a prosocial reasoning process, and the other of which is attractive to those who have one or more JMs for aggression. The aggression responses on this test are dichotomously scored as "1" for aggressive and "0" for all other responses. The aggressive responses are then summed to calculate the total aggression score. Higher aggression scores on the CRT-A indicate the presence of one or more JMs that influence the respondent's reasoning process. A lower score indicates the absence of these JMs, therefore those individuals with high scores are expected to engage in more aggressive behavior than those with moderate or low scores. The CRT-A aggression scores for participants in this study ranged from 0 to 10 (SD = 2.21), with a mean of 3.96. The internal consistency estimate of reliability for the CRT-A using a Kuder-Richardson (Formula 20) coefficient is reported in the test manual as .76 for a sample of 1,603 respondents, and the reported mean corrected criterion-related validity coefficient across samples is .44 (James et al., 2005).

The Angry Hostility scale from the NEO Personality Inventory (Revised) (NEO-PI-R) was used to measure explicit aggression in this study (Costa & McCrae, 1992). Each of the eight items includes a 5-point scale ranging from 1 (*strongly agree*) to 5 (*strongly disagree*). Higher scores are proposed to indicate an individual's tendency to

"experience anger and frustration" (Frost, 2005). The mean score for this sample was 19.02, with scores ranging from 8 to 37 (SD = 5.4). The test manual reports the internal consistency as a coefficient alpha value of .75.

Aggressive Behavior Coding

Because many aggressive incidents in a basketball game are never called by league officials, further observation and coding of aggressive behaviors was deemed necessary. Three undergraduate students in psychology were selected to aid in tracking aggressive events based on years of experience as a referee or coach in competitive basketball and overall grade-point-average. A behavioral score sheet was created to assist in recording data for each player on the following criteria: "(a) hard fouls, defined as fouls that knocked the opponent to the ground, (b) number and types of technical fouls, (c) verbal harassment directed towards referees, fans or other players, (d) physical altercations or fighting, and (e) passive-aggressive incidents" (Frost, 2005, p. 28). Acts of aggression were described in a separate column on the score sheet and included: "a) designating the trigger as either a referee's call (or lack thereof), an opponent's action, other cause, or none; b) designating the target as either a referee, a specific opponent, other, or none; c) describing the action in sufficient detail" (Frost, 2005, p. 23). All of the assistants were trained until they could demonstrate 90% agreement or better after simultaneously scoring the same game as the primary researcher. Behavioral observations were recorded for the five-game regular season and the five-game playoffs.

After the data collection, five subject matter experts in personality and aggression research coded the behaviors into the three categories of interest. The three categories

were expression of hostility, obstructionism, and overt aggression. The guidelines for each category were:

"A behavior should be classified as an expression of hostility if:

(1) the behavior is primarily verbal or symbolic in nature, except for threats of physical violence; or

(2) the behavior is a physical act of frustration and not aimed directly at the target person.

Examples include: physical gestures, facial expressions, verbal criticism or ridicule, and belittling someone else's opinion.

A behavior should be classified as obstructionism if:

(1) the behavior is of a passive or covert nature; or

(2) the aggressor attempts to conceal his/her intent to harm from the target person; or

(3) the aggressor intends to impede an individual's ability to perform his or her duties or interfere with a group's ability to meet its' objectives.

Examples include: refusing target's request, preventing target from completing work or expressing self, intentional work slowdown, and withholding behavior.

A behavior should be classified as overt aggression if:

(1) the behavior is of a physical or active nature; and

(2) the aggressor's intention to harm the target person is blatant or unconcealed.

Examples include: physical attacks and extreme verbal threats" (Frost, 2005, p. 30).

Special care was taken to make a distinction between behavior that is typical basketball strategy, including acts that would be considered aggressive in other contexts but that are commonplace and accepted in basketball, and truly aggressive acts that would be considered extreme by the basketball norms. Linda Keeler (2007) distinguishes between assertiveness and aggressiveness in sports. She describes assertiveness as "distinct from aggressiveness in that it is the non-hostile, non-coercive tendency to behave with intense and energetic behavior to accomplish one's goal" (p. 58). This type of behavior is routine in basketball. Keeler notes the difficulty of distinguishing between assertiveness and aggression, because they are often confused in the literature and because they are, in part, differentiated by intent, which is not observable. This difficulty was anticipated and addressed by Frost in the design of his study. All of the observers had extensive experience as basketball players, referees, or coaches and were familiar with what constitutes reasonable competitive physical contact. Behaviors were only coded as aggressive if they were excessive in nature and outside the realm of normal competitive play.

For instance, not all personal fouls, hard fouls, or technical fouls were coded as aggressive. Examples of behaviors coded as aggression follow:

Overt Aggression: "Pulled #35 to ground, picked up ball from between his legs and threw him to the ground."

Obstructionism: "After teammate called for 5th foul, turned around on opposite basket and took practice shots while ref beckoned for the ball."

Verbal Hostility: "As he walked off the court, he told his replacement, 'Number 4's a jackass, give 'em a good elbow for me.'"

To further clarify, two tables from the Frost et al. (2007) paper have been included that illustrate behaviors that were viewed as non-aggressive and part of normal play (Table 1) and behaviors that were aggressive and excessive in nature (Table 2).

Table 1: Competitive Basketball Behavior Considered Non-Aggressive

- Setting a screen (or pick)
- Simple fouls (i.e., a reach-in or a shooting foul)
- An offensive charge
- Fouls to stop the clock that were not excessive
- Fouls that caused a player to fall when the cause was the speed of play or inadvertent contact
- Technical fouls charged to the team
- Legal jostling for position to receive a pass or grab a rebound
- Hard physical fouls conducted in a sportsmanlike manner (i.e., the fouling player apologized to his opponent afterwards)
- Complaining to referees conducted in a cordial or constructive manner
- Wrestling for a ball on the ground during game play (before a whistle is blown)

Table 2: Sample Behaviors Recorded during Games and Corresponding Categorizations

I.	Categorized as Overt Aggression ▪ Purposely shoved #19 to ground on shooting foul and stared at him as he stood over. ▪ When fighting for ball, he became extremely aggressive and hit another player in the face with the ball. ▪ Pushed #6 while both players were on the ground. ▪ Elbowed #34 in the stomach b/c she kept yelling "Ball!" and then laughed. ▪ Pulled #35 to ground, picked up ball from between his legs and threw him to the ground. ▪ Violently shoved #25 to ground; received Push foul. ▪ Put #15 in a headlock. ▪ Initiated verbal tirade towards referees (insults, yelling, finger pointing), so extreme that he was suspended from the league for the season.
II.	Categorized as Obstructionism ▪ After called for foul, stared at referee and refused to give the ball to him, dropping it at his feet instead. ▪ Frustrated when initially asked to sit down in front of scorer's table, after series of bad calls, refused requests to sit. ▪ When noticed that teammate was subbing back in for her, she walked down the court on offense and ignored teammates on the bench. ▪ Purposely brushed passed opponent on their way to the bench during timeout. ▪ Did not acknowledge opponent when #31 tried to apologize for fouling her hard and hitting her in the head. ▪ After called for foul, grabbed ball and bounced it away from the referee. ▪ After teammate called for 5th foul, turned around on opposite basket and took practice shots while ref beckoned for the ball. ▪ Tried to brush past opponent after timeout.
III.	Categorized as Expressions of Verbal Hostility ▪ Talked behind referee's back, "I hate that little f***er." ▪ "This is f***ing ridiculous! I don't care! What are you going to do? Write me up?!" to referee. ▪ "I've got f***in' 5 guys on me, why don't you shut the f*** up!" to player on own team. ▪ As he walked off the court, he told his replacement, "Number 4's a jackass, give 'em a good elbow for me." ▪ Yelled at official, "You gotta call that s***" and clapped sarcastically at referee gave technical. ▪ "Great call, ref!" and clapped her hands mockingly, then turned to teammates on bench, "Where do they find these guys?" ▪ Taunted crowd with gestures and called them "idiots." ▪ After ball stolen, yelled in frustration, "I'm going to kick the f…(stopped himself)" and flailed arms in frustration.

Frost found that the CRT-A total aggression score demonstrated a small and non-significant relationship with the Angry/Hostility scale of the NEO-PI-R ($r = .06$, ns) supporting his hypothesis that each measure assesses different things. He also found support for the channeling model he proposed that indicated that the combination of implicit and explicit aggression scores for an individual predict how that individual will express aggression (or lack of aggression) in this context.

CHAPTER 3

BACKGROUND

In general, occupational research has indicated that individuals with high levels of aggression tend to perform more poorly on the job than those with lower levels of aggression (Campbell, 1990; James et al., 2005; Sackett, 2002; Viswesvaran et al., 1999). James et al. (2005) describe several studies in which scores on the Conditional Reasoning Test for Aggression (CRT-A) demonstrated that aggression is negatively related to performance. Patrol officers' CRT-A scores were negatively related (r = -0.49) with their supervisory performance ratings, restaurant employees scores were positively related (r = 0.32) to attrition, package handlers' scores were positively related to absences (r = 0.34), and temporary employees' scores were positively related to work unreliability (r = 0.43). Another means of operationalizing aggression that is commonly used in occupational research is counterproductive work behaviors. Campbell (1990) describes the US Army Selection and Classification Project, also known as Project A, which investigated several variables in a sample of 4,039 soldiers in nine military enlisted jobs. The findings show observed uncorrected mean correlations of -0.19 and -0.17 between counterproductivity and general and specific task performance dimensions, and a mean correlation of -0.59 between counterproductive behavior and effort/leadership. Hunt (1996) focused on generic work behaviors and a counterproductive behavior composite. In a sample of 18,000 supervisory ratings across 36 organizations, Hunt found a correlation of -0.67 between the two. Viswesvaran, Schmidt, and Ones (1999) conducted a meta-analysis in which the mean correlation between counterproductive behavior and supervisory ratings of citizenship and task domains was -0.57 and -0.54, respectively. These are just a few

examples of the many studies that indicate that aggression is detrimental to workplace performance.

Research in the sports domain has had mixed results regarding the aggression-performance relationship. The most robust body of literature on aggression in sports and its relationship to team performance is in ice hockey. Russell (1974) looked at three behavioral indices of aggression in amateur ice hockey players. These were physical aggression, challenge to authority, and total aggression. Russell observed six teams over a 30-game season and found that goal scoring is positively related to challenge to authority and total aggression and assists are highly correlated with all measures of aggression. McCarthy and Kelly (1978) studied a sample of 30 male college ice hockey players in two groups. They found that when certain types of penalties were used as a measure of aggression, groups rated high in aggression scored significantly more goals than those low in aggression. The high aggressive group also took significantly more shots than the low aggressive group. However, Widmeyer and Birch (1979) found that in amateur ice hockey, aggression, measured as penalty minutes, is not related to success for either teams or individuals. Widmeyer and Birch (1984) also discovered that aggression committed in the first period by 32 professional hockey teams had a significant positive relationship with overall performance, whereas aggression committed later in the game was not related to performance. So while the sports research on aggression's relationship to performance, at least in ice hockey, is relatively consistent with the findings on aggression and workplace performance, there is some indication that aggression may aid in performance in an athletic team context.

The Aggression-Performance Relationship

In most contexts, aggression is harmful to performance, however there are characteristics of basketball that encourage the expression of aggression. One of these characteristics is that basketball is a team sport. There is substantial evidence that being in a group increases the probability that the group will both aggress and be aggressed against. Meier and Hinsz (2004) found that intergroup interactions were significantly more aggressive than interindividual interactions in studies in which the participants administered hot sauce, and Meier et al. (2007) found that groups commit and receive more aggression than individuals. Another characteristic is the frequency of play. Widmeyer and McGuire (1997) conducted a study of 840 NHL games, and they found that the professional ice hockey teams that competed more frequently (intradivisionally) displayed more aggression ("subject-defined aggressive penalties") than those who competed less frequently (interdivisionally). They also discovered that all teams displayed more aggression as the number of games increased. Therefore it appears, by some mechanism, that continually engaging in competitive contact increases the probability of aggressive behavior. A third characteristic is that basketball is a contact sport. Frankl (2009) explains that sports with a substantial amount of contact increase arousal in individuals, and arousal is related to hostile aggression.

The literature describes the qualities of basketball that invite aggression, but two issues remain. The first is how aggression helps performance, and the second is, if all teams are engaging in increased aggressive behavior in this environment, why the most aggressive teams would perform best. One effect of aggressive behavior is intimidation of the opposing team. Aggressive behavior by one team may inhibit the other team from

playing as forcefully, due to fear of physical or psychological harm upon contact with the aggressive team. Jones (2002) performed a study designed to determine if sports officials are more likely to penalize individuals who belong to teams with aggressive reputations. Thirty-eight football referees were randomly assigned to either an experimental or control group. They watched videos of football teams and were asked to assess penalties for one of the teams. The experimental group was told that the team had a reputation for "foul and aggressive" behavior. Jones found that the experimental groups gave more severe penalties to the team than the control group. This illustrates that a team's aggressive reputation does impact others in the game and provides indirect support for the idea that aggression by one team could elicit reactive responses from others in the game.

There are strategic advantages that playing on an aggressive team might provide. Acts of physical aggression involve pushing, elbowing, grabbing and hitting, all of which help to gain and maintain possession of the ball in this contact sport. The use of *excessive* force may distract and disable opponents for a longer time than normal strategic behaviors. Obstructionistic behavior permits a team to enjoy the advantages of aggressive behavior, such as intimidation and opponent distraction, covertly without drawing fouls. A team may use their most aggressive players to block or disable the best opposing players, providing fewer obstacles to other teammates when attempting to score. This may also increase the confidence and efficacy of the aggressive player's teammates via a vicarious mechanism in which they gain status and pleasure by dominating others without the personal risk.

Frankl (2009) describes how arousal in an individual contributes to aggression. It is possible that the teammates of aggressive players become more aroused themselves

through interactions with the aggressive players, resulting in more assertive play. From a practical standpoint, practicing and playing with aggressive teammates allows opportunity for the other teammates to practice interacting with aggressive players. This can benefit the team, because they will have developed strategies for engaging aggressive people on the court, and future interactions with aggressive players on opposing teams should then yield fewer surprises.

Though aggressive players may be used by others on their team to gain competitive advantage and their behavior may offer strategic benefits to the team, it does not necessarily follow that these players are behaving this way for instrumental purposes themselves. They are behaving aggressively due to the underlying aggressive motive, which is to harm others. Keller (2007) distinguishes between instrumental aggression, behavior that intentionally harms another in pursuit of greater performance, and hostile aggression, behavior driven by the sole desire to hurt someone. Keller measured life aggression, sport hostile aggression, and sport instrumental aggression in female athletes. Keller found sport instrumental aggression is negatively related to sport hostile aggression and life aggression, whereas life sport hostile and life aggression are positively related. This highlights the fact that instrumental and hostile forms of aggression are distinct, and that hostile aggression in sports is likely related to a stable personality trait, such as implicit aggression.

It is proposed that the highest-performing aggressive teams in the Frost study manifest predominantly hostile aggression, as this form of aggression is most likely related to implicit aggression. The effectiveness of aggression for performance is not the primary motive for these teams. The degree of aggressiveness and the unstructured nature

of the aggression (because there is no goal other than to inflict harm) combine to create many more opportunities to aggress in much more severe ways. And because of the combative, competitive spirit of basketball, as well as the priming for aggressive behavior, these increased acts of aggression work. They benefit the aggressive team. The fact that the aggression may be instrumental to performance is advantageous to the aggressive team, but the team is not deliberately being instrumentally aggressive.

CHAPTER 4

RESEARCH AGENDA

Hypotheses

In this study aggression was measured at both the implicit and explicit level. Implicit and explicit aspects of personality frequently fail to yield high correlations with each other (Frost, 2005). Bornstein (2002) proposed that these may be "naturally occurring discontinuities" that instead of reflecting a failure of convergence in measurement, may reflect different facets of personality and, by using both measures, a more complete assessment of the personality would be possible. Self-report personality measures tend to assess features of the personality that are related to self-presentation, that are consciously accessible, and that are explicit (Hogan, 1996). Individuals do tend to willingly distort their answers on self-report measures to adhere to socially desirable standards, but these measures can still provide valuable information (Hogan, 1996; James & Mazzerole, 2002; McClelland et al., 1989). Implicit personality is not accessible to the conscious, and therefore not measured by self-report, and is more related to "spontaneous behavior across multiple situations and settings" (Frost, 2005). When implicit personality is assessed using a well-validated instrument, it has substantial success in predicting aggressive behavior (Frost 2005; Frost 2007; James, 1998; James et al., 2000; James et al., 2005). To more accurately capture the relationship between aggression and performance, both the implicit scores (CRT-A) and the explicit scores (NEO) will be analyzed.

Within-Group Agreement. Because explicit aspects of one's personality tend to be accessible to an individual's conscious self and are related to social presentation, it is

plausible that when aggression is communicated either directly or indirectly within groups, this communication offers valuable information that influences the individual's self-reported level of aggression (Bandura, 1977; Hogan, 1996). Interaction with teammates allows individuals to share information about themselves and their personalities, and the desire to cooperate with and be accepted by those teammates may influence individuals to alter certain aspects of their self-perceived and expressed personality, as well as their reports on their personality, so as to conform to the perceived standards. Implicit personality, in contrast, is not accessible to the individual's conscious awareness, so an individual can neither intentionally share, nor intentionally alter those aspects of personality. Therefore, one would expect there to be greater within-group agreement on the explicit aggression measure than the implicit aggression measure.

Hypothesis 1: The within-group consensus for the explicit aggression (NEO-PI-R) measure will be higher than the within-group consensus for the implicit aggression measure (CRT-A).

Overt Aggression. Aggressive behavior has many benefits to performance in the context of basketball. Physically aggressive behaviors can serve as a powerful form of intimidation. Rival players may not want to risk physical injury, particularly in intramural basketball, by engaging the aggressive team any more than necessary, resulting in less assertive play. Overtly aggressive behaviors also act to put valuable opposing players briefly out of commission by distracting them and redirecting their activities to defending themselves.

Hypothesis2: Team-level overt aggression is positively related to team performance.

Obstructionism. Obstructionism includes behavior, such as withholding something of value to another or blocking another's ability to achieve a goal, that is "covert and interferes with another's ability to perform his or her duties" (Frost, 2005, p.28). Obstructionism has the advantage of being concealed, which allows a team to behave aggressively and impede the other team's performance, while avoiding fouls. Therefore, obstructionism is expected to be positively related to performance.

Hypothesis 3: Team-level obstructionism is positively related to team performance.

Expression of Hostility. The relationship of expression of hostility with performance is unclear. It is not related to the CRT-A total aggression score in Frost's 2005 analysis. Because this behavior (gestures, facial expressions, criticism) does not physically impact another player, it may have a less pronounced role in team performance in basketball (Frost, 2005). Expression of hostility is also more common in females than males, who traditionally perform better at sports, therefore, it is expected that relationship between overt aggression and performance, as well as the relationship between obstructionism and performance would be greater than the relationship between expression of hostility and performance (Frost et al., 2007).

Hypothesis 4a: The strength of the team-level overt aggression-performance relationship will be greater than the expression of hostility-performance relationship.

Hypothesis 4b: The strength of the team-level obstructionism-performance relationship will be greater than the expression of hostility-performance relationship.

Overall Incidents of Aggression. The overall incidents of aggression variable is the sum of the recorded incidents of aggression from each of the three subcategories (expression of hostility, obstructionism, and overt aggression). Because this variable is comprised of two subcategories that are predicted to be positively related to team performance, obstructionism and overt aggression, it is expected that this variable, too, will be positively related to team performance.

Hypothesis 5: Team-level overall incidents of aggression are positively related to team performance.

Implicit Aggression and Performance (CRT-A). In Frost's 2005 study there is a strong positive relationship between individual total aggression and obstructionism (*r=.61*), as well as individual total aggression and overt aggression (*r=.54*). Since these behaviors are expected to be positively related to team performance, it is likely that mean team implicit aggression would be related to team performance as well. The CRT-A aggression scores also tend to correlate more strongly with objective criteria, so using the game scores as criteria should increase the probability of significant positive correlations (Frost, 2005; Frost et al., 2007; James, 1998; James et al, 1984; James & Mazzerole, 2000; James et al., 2005).

Hypothesis 6: Team-level implicit aggression is positively related to team performance.

Explicit Aggression and Performance (NEO-PI-R). The NEO-PI-R demonstrates a significant relationship with two of the aggressive behavior subcategories, expression of hostility and overt aggression (Frost, 2005). Because expression of hostility is not expected to correlate with performance, but overt aggression *is* expected to correlate with

performance (positively), it is unclear what relationship the NEO will have with performance. However, the NEO is a self-report measure, and therefore prone to the well-documented weaknesses inherent in the self-report process (Morgeson et al., 2007). Individuals may use intentional deception on the NEO to minimize the appearance of aggression, or they may not have conscious access to the implicitly aggressive aspects of their personality, preventing them from reporting on them. Therefore, the NEO scores are prone to contamination and would not be expected predict performance as well as the CRT-A scores.

Hypothesis 7: The strength of the team-level implicit aggression-performance relationship is greater than the team-level explicit aggression-performance relationship.

CHAPTER 5

METHODOLOGY

Participants. Five teams were excluded from the sample of 36 used by Frost, because data were recorded on three or fewer players on those teams. This left a remaining 31 teams in the sample. One individual was excluded due to having five illogical responses, exceeding the preset cutoff set by Frost. There were 172 participants remaining, 108 of whom were male and 64 of whom were female. Their ages ranged from 18 to 30 years with a mean of 21.81 years (SD = 2.79). The majority were Caucasian (89.5 %), 8.72% were African-American, and 1.74% were categorized as Other.

Conditional Reasoning Test for Aggression (CRT-A). The CRT-A aggression scores for participants in this sample ranged from 0 to 10 (SD = 2.21), with a mean of 3.90.

NEO Angry Hostility Scale. The mean score for this sample was 19.02, with scores ranging from 8 to 37 (SD = 5.4)

Performance Criteria. Previously unanalyzed data were obtained from Brian Frost that included a variety of performance measures, including both halftime and final scores for each game in the regular and playoff seasons. These data were used for the performance criteria described in further detail below.

Number of Games Played. This variable is the total number of games played throughout the regular and playoff seasons. This variable reflects performance because it includes extra games played as a result of making it to the playoffs (good performance) and excludes games forfeited by the team (bad performance). However, it also excludes

games forfeited by the opposing team, which likely does not relate to performance, so this variable may not have as strong a relationship to aggression and aggressive behaviors as the other criteria.

Made It to Playoffs. This dichotomous variable reflects whether or not the team made it to the playoffs, a reflection of their success in the regular season.

Regular Season Final Score. This variable is the mean final score of the games played by that team in the regular season.

Regular Season Halftime Score. This variable is the mean halftime score of the games played by that team in the regular season.

Overall Final Score. This variable is the mean final score of the games played by that team in the regular season and the playoff season.

Overall Halftime Score. This variable is the mean halftime score of the games played by that team in the regular season and the playoff season.

Aggregation. This analysis occurs at the team level. One key issue in this analysis is the appropriateness of aggregating the implicit and explicit personality scores from the individual level to the team level. It should be noted that individual measures of performance were not recorded in this study, therefore the individual aggression scores must be aggregated to allow for the analysis of the aggression-performance relationship. There are a variety of reasons aggregation is appropriate in this context.

First, because basketball is a team sport, performance is most logically measured at the team level, and for reasonable inferences to be made about the predictive validities of the predictors, it is most appropriate to measure them at the team level as well. However, it is important to consider what team-level aggression means and whether there

must be within-group agreement on the aggression variable for a team to be considered an aggressive team.

Chan addresses the topic of aggregation in his 1998 paper on composition models. These models specify the relationship among constructs at different levels of analysis. He describes five types of composition models, additive, direct consensus, referent-shift, dispersion, and process, and their functional relationships between levels. Of these five models, the additive is most appropriate for this analysis. In an additive model, the higher-level construct unit is a summation of the lower-level construct units and does not require consensus among the lower-level units. The relevant question, then is, "Does a team need to have equally aggressive players for that team to be considered aggressive?"

Consensus is unnecessary, because highly aggressive individuals disproportionately contribute to the overall occurrence of aggressive behavior. In this sample of 172 players, five players were responsible for 22.14% of the 131 recorded aggressive behaviors. These players dominate play with their aggressive actions, and it is expected that they will dominate performance as well, so it is unnecessary to have multiple players with comparably high aggression scores on a team to consider that team aggressive.

Regardless, the point may be moot, because high levels of aggression are an exceptionally low base rate occurrence. It is unlikely that there would be several players on a team with extreme aggression levels, and if there were, the likelihood that those players could function productively and cooperatively for any period of time is small. Indeed, in this sample 14 teams had players who scored 7 or higher on the CRT-A, placing them in the top 15.12% in this sample. All but one of these teams had two or

fewer players scoring in this range, and the remaining team had three. So, for those teams that had highly aggressive players, those players represented only a small proportion of the team members.

Measure of Within-Group Agreement. $r_{WG.}$ To assess the degree of within-group agreement on both the CRT-A and the NEO, the r_{WG} for each team was calculated for each measure. r_{WG} is an estimate of interrater reliability, or group consensus. The r_{WG} was chosen as the interrater reliability estimate because it controls for response bias, and therefore prevents inflation of the estimate.

CHAPTER 6

RESULTS

Data Analyses Overview

First, zero-order correlations were computed for all of the variables of interest. Table 3 contains the means, standard deviations, and Pearson product-moment correlations for these variables. Due to the dichotomously scored criteria and continuously scored predictors, as well as the skew of the predictors, polyserial and polychoric correlations were generated in PRELIS 2.50**.**

Table 3: Descriptive Statistics Zero-Order Correlations

Variables	1	2	3	4	5	6	7	8	9	10	11	12
1. CRT-A	-											
2. NEO-PI-R Hostility	.05	-										
3. Overt Aggression	.39*	.27	-									
4. Obstructionism	.39*	.11	.50**	-								
5. Express Hostility	.13	.48**	.44*	.41*	-							
6. Overall Incidents of Aggression	.32	.42*	.76**	.68**	.89**	-						
7. Number of Games Played	.45*	.28	.75**	.61**	.50**	.74**	-					
8. Made It to Playoffs	.24	-.09	.42*	.28	.24	.37*	.59**	-				
9. Final Regular Season Score	.47**	.04	.47**	.32	.22	.39*	.64**	.51**	-			
10. Regular Season Halftime Score	.51**	-.03	.52**	.41*	.22	.43*	.67**	.51**	.92**	-		
11. Overall Final Score	.46**	.13	.49**	.32	.29	.44*	.64**	.46**	.98**	.89**	-	
12. Overall Halftime Score	.51**	.00	.47**	.37*	.22	.40*	.62**	.39*	.92**	.98**	.91**	-
M	3.89	2.37	.25	.14	.38	.77	5.13	.42	35.11	18.77	34.50	17.97
SD	.92	.30	.29	.20	.51	.80	1.23	.50	9.52	5.97	8.89	5.33

*Note: n=182, * p <.05, ** p <.01*

Hypothesis 1:r_{WG}.

The r_{WG} was calculated for each team for the CRT-A (.957) and the NEO-PI-R (.983), respectively. Then, mean of the r_{WG} group means was calculated for each measure. These two means were compared using a paired groups t-test. As predicted, the mean r_{WG} for the CRT-A aggression score was significantly smaller than the mean r_{WG} for the NEO-PR-R hostility score (t = -6.676, $p < .01$).

Hypothesis 2: Overt Aggression and Team Performance

The results demonstrated that there is a significant positive relationship between overt aggression and the number of games played ($r = .75$, $p < .01$), making it to the playoffs ($r = .42$, $p < .05$), the regular season final score ($r = .47$, $p < .01$), the regular season halftime score ($r = .52$, $p < .01$), the overall final score ($r = .49$, $p < .01$), and the overall halftime score ($r = .47$, $p < .01$), respectively. Thus, Hypothesis 2 is supported.

Hypothesis 3: Obstructionism and Team Performance

Obstructionism was positively correlated with the number of games played ($r = .61$, $p < .01$), the regular season halftime score ($r = .41$, $p < .05$), and the overall halftime score ($r = .37$, $p < .05$), partially supporting Hypothesis 3.

Hypothesis 4a: Comparison of Expression of Hostility-Team Performance Relationship with Overt Aggression-Team Performance Relationship

Hypothesis 4b: Comparison of Expression of Hostility-Team Performance Relationship with Obstructionism-Team Performance Relationship

Expression of hostility had a significant positive relationship only with the number of games played ($r = .50$, $p < .01$), providing support for Hypotheses 4a and 4b.

Hypothesis 5: Overall Incidents of Aggression and Team Performance

Overall incidents of aggression is significantly and positively related to the number of games played (r = .74, p <. 01), making it to the playoffs (r = .37, p <. 05), the regular season final score (r = .39, p <. 05), the regular season halftime score (r = .43, p <. 05), the overall final score (r = .44, p <. 05), and the overall halftime score (r = .40, p <. 05), providing support for Hypothesis 5.

Hypothesis 6: CRT-A Aggression Score and Team Performance

The results provide strong support for the relationship between mean implicit aggression, as measured by the CRT-A, and performance. Mean implicit aggression positively correlated with the number of games played (r = .45, p < .05), the regular season final score (r = .47, p < .01), the regular season halftime score (r = .51, p < .01), the overall final score (r = .46, p < .01), and the overall halftime score (r = .51, p < .01).

Hypothesis 7: Comparison of CRT-A Aggression Score-Team Performance Relationship with NEO-PI-R Aggression Score and Team Performance

A t-test was performed comparing the CRT-A correlations with each of the performance variables with each of the NEO-PI-R correlations with each of the performance variables using Steiger's equation #7 from his 1980 article. There were no significant differences between the CRT-A and NEO-PI-R correlations with the number of games played (t = .74), making it to the playoffs (t = 1.30), final regular score (t = 1.86), and final overall score (t = 1.38). The CRT-A's correlations with the halftime regular score (t = 2.36) and the halftime overall score (t = 2.25) were significantly greater than the NEO-PI-R's correlations with these variables. Therefore, this hypothesis was only partially supported.

Exploratory Analyses

Gender and Race Hierarchical Regression Analyses. Hierarchical regression analyses were conducted to determine if implicit aggression explained the majority of the variance in the performance criteria when accounting for gender or race. Due to several missing data points, a regression analysis was not possible for the race variables. The gender analyses revealed that gender has no significant relationship with any of the performance criteria, except the overall final score. In the case of the overall final score relationship, there was a significant increase in the variance explained by including implicit aggression ($\Delta R^2 = .15$, $p = < .01$) in the equation, and gender ceased to display a significant relationship with this criterion upon the addition of implicit aggression.

CHAPTER 7

DISCUSSION

Discussion of Results

In general, the results show that team-level overt aggression, obstructionism, and overall aggressive incidents are positively related to performance, whereas expression of hostility has no relationship. This is consistent with earlier findings by Frost (2005) that show that expression of hostility correlates positively with the NEO score ($r = .35$, $p < .01$), and that neither expression of hostility nor the NEO score has a significant relationship with the CRT-A score. Based on this data, it is not clear if implicit aggression does a better job of predicting performance than explicit aggression; this needs further investigation.

Since the implicit aggression-performance relationship is supported by this data, there is value in further exploration of what links the two constructs psychologically. Most aggression research has been done at the individual level. Since this is a group phenomenon, social psychology theories were reviewed and three offer some explanation to how aggression might work in a group to enhance performance. Social Learning Theory proposes that people can learn by observation, and the consequences of the model's behavior can affect the learner vicariously (Bandura, 1977). While it is unlikely a teammate could learn to be highly aggressive without the underlying motive, an aggressive teammate may provide a model for more assertive play. When the aggressive individuals' teammates observe of the rewards of aggressive play for that player and the team, this too may encourage more forceful behavior from the teammates.

Festinger's (1954) Social Comparison Theory describes how individuals evaluate their own opinions and desires by comparing themselves to others. This theory also proposes that people have a drive to improve their abilities relative to others, but non-social constraints make

this difficult. According to this theory, the teammates would be motivated to become more like an aggressive teammate who is successful. Teammates using a highly aggressive person as a comparison other will discover a large gap between the aggressiveness of their behavior and that of the aggressive teammate. Therefore, they can engage in substantially more forceful behaviors without believing themselves to be aggressive in comparison.

The third theory, that of moral disengagement, describes the process of applying different moral standards when committing inhumane acts in an effort to suppress self-condemnation. Bandura (1996) describes the mechanisms of euphemistic labeling, dehumanization, distortion of consequences, and diffusion of responsibility. The physicality and competitiveness of basketball provide a context in which aggression can be seen as acceptable. Euphemistic labeling could easily occur in this situation. A violent foul could easily be explained as "strategy" or an "accident." The "suck it up" culture of basketball encourages the target not to express vulnerability or weakness after an aggressive attack, thereby dehumanizing the target to the aggressor and helping the aggressor distort the consequences of the attack by buffering the aggressor from observing the detrimental impact of his actions. Meier et al.'s (2007) work showing groups are more likely to be aggressed against and to aggress may be attributed to the diffusion of responsibility that can occur in a team context. Each of these processes contributes to and increases the likelihood of aggressive acting out.

Suggestions for Future Research

The positive relationship between aggression and performance found in this analysis is atypical. Thus, there is a need for replication of this study in a similar sports context. There are a handful of factors that likely contributed to these findings. The fact that this study took place in intramural basketball is somewhat unusual. This helped to control for a variety of other variables

that could have impacted a study of college or professional players, such as status rewards, monetary rewards, and higher stakes play. The use of an implicit measure of aggression was also unique. Self-report measures have several problems, primarily related to social desirability, and may well have not accurately assessed aggression in many other studies. As discussed earlier, the way that aggression is operationalized in aggression studies varies greatly and is often confused with assertiveness. The painstaking effort taken by Frost to code only extremely aggressive acts probably reduced contamination in the criteria, allowing for a clearer picture of the aggression-performance relationship. Teams are another crucial element that most likely needs to be present for aggression to aid in performance. It is not expected that aggression would be as apt to help individual-level performance. The fact that basketball is a contact sport also greatly impacts the aggression-performance relationship. Researchers conducting studies on this relationship should take each of these factors into account.

Another aspect of this study that is of interest is the instrumental versus hostile aggression relationship to performance. It would be interesting to investigate if either of these types of aggression is related to performance in a sports team context and, if a relationship exists, in what way they help or hurt. It was shown that there is a greater consensus on the NEO measure, than on the CRT-A measure. These measures were given at the start of the intramural season. Considering the proposed theories on the impact of an aggressive member of teammates, a study in which the NEO is administered both at the beginning and end of the season might provide more insight as to how aggressive players influence their teammates.

Limitations

Data were not collected at the individual level for performance measures. This prevented an analysis of how each player, specifically the highly aggressive ones, contributed to overall

team performance. This is an important piece of knowledge to the overall understanding of how aggressive teams are composed and function. A replication of this study should include individual performance measures. The results of this aggression-performance relationship analysis are promising, but may be constrained to the circumstances described above. Future exploration of this topic is anticipated and encouraged.

REFERENCES

Bandura, A. (1977). *Social learning theory*. Oxford, England: Prentice-Hall.

Bandura, A. (1996). Moral disengagement in the perpetration of inhumanities. *Personality and Social Psychology Review, 3*, 193-209.

Bornstein, R. F. (2002). A process dissociation approach to objective-projective test score interrelationships. Journal of Personality Assessment, 78, 47-68.

Campbell, J. P. (1990). An overview of the Army selection and classification project (Project A). *Personnel Psychology, 43*, 231-239.

Chan, D. (1998). Functional relations among constructs in the same content domain at different levels of analysis: A typology of composition models. *Journal of Applied Psychology, 83*, 234-246.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five Factor Inventory (NEO-FFI).* Odessa, Florida: Psychological Assessment Resources, Inc..

Festinger, L. (1954). A theory of social comparison processes. *Human Relations, 7*, 117-140.

Frankl, D. (2009). Kids first soccer. Retrieved February, 26, 2009 from http://www.kidsfirstsoccer.com/violence.htm

Frost, B. C. (2005). Implicit and explicit personality: An integrative approach to predicting aggressive behavior in a field setting. (Doctoral dissertation, The University of Tennessee, Knoxville, 2005).

Frost, B. C., Ko, C. E. & James, L. R. (2007). Implicit and explicit personality: A test of a channeling hypothesis for aggressive behavior. *Journal of Applied Psychology, 92*, 1299-1319.

Hogan, R. (1996). A socioanalytic interpretation of the Five-Factor Model. In J. Wiggins (Ed.), The Five-Factor model of personality (pp. 163-179). New York: Guilford.

Hunt, S.T. (1996) Generic work behavior: An investigation into the dimensions of entry-level, hourly job performance. Personnel Psychology, 49, 51-83.

James, L. R. (1998). Measurement of personality via conditional reasoning. *Organizational Research Methods, 1*, 131-163.

James, L. R., Demaree, R. G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology, 69*, 85-98.

James, L. R., & Mazzerole, M. D. (2000). *Conditional Reasoning Test of Aggression Test Manual*. Knoxville, TN: Innovative Assessment Technology.

James, L. R., McIntyre, M. D., Glisson, C. A., Green, P. D., Patton, T. W., LeBreton, J. M., Frost, B. C., Russell, S. A., Sablynski, C. J., Mitchell, T. R., & Williams, L. J. (2005). Conditional reasoning measure for aggression. *Organizational Research Methods, 8,* 69-99.

Jones, M. V. (2002). The impact of a team's aggressive reputation on the decisions of association football referees. *Journal of Sports Sciences, 20,* 991-1000.

Keeler, L. A. (2007). The differences in sport aggression, life aggression, and life assertion among adult male and female collision, contact, and non-contact sport athletes. *Journal of Sport Behavior, 30,* 57-76.

Keltikangas-Jarvinen, L., and Keinonen, M. (1988). Aggression, self-confidence, and cardiovascular reactions in competitive performance in adolescent boys. *Aggressive Behavior, 14,* 245-254.

McCarthy, J. F., and Kelly, B. (1978). Aggression, performance variables, and anger self-report in ice hockey players. *Journal of Psychology: Interdisciplinary and Applied, 9,* 97-101.

McClelland, D. C., Koestner, R., & Weinberger, J. (1989). How do self-attributed and implicit motives differ? *Psychological Review, 96,* 690-702.

Meier, B. P., and Hinsz, V. B. (2004). A comparison of human aggression committed by groups and individuals: An interindividual-intergroup discontinuity. *Journal of Experimental Social Psychology, 40,* 551-559.

Meier, B. P., Hinsz, V. B., and Heimerdinger, S. R. (2007). A framework for explaining aggression involving groups. *Social and Personality Psychology Compass 1,* 298–312.

Morgeson, F. P., Campion, M. A, Dipboye, R. L., Hollenbeck, J. R., Murphy, K., & Schmitt, N. (2007). Reconsidering the use of personality tests in personnel selection contexts. *Personnel Psychology, 60,* 683-729.

Russell, G. W. (1974). Machiavellianism, locus of control, aggression, performance and precautionary behaviour in ice hockey. *Human Relations, 27,* 825-837.

Sackett, P. R. (2002). The structure of counterproductive work behaviors: Dimensionality and relationships with facets of job performance. *International Journal of Selection and Assessment, 10,* 5-11.

Steiger, J. (1980). Tests for comparing elements of a correlation matrix. *Psychological*

Bulletin, 87, 245-251.

Viswesvaran, C., Schmidt, F.L. and Ones, D.S. (1999) The role of halo error in interdimensional ratings: The case of job performance ratings examined via meta-analysis. Manuscript submitted for publication.

Widmeyer, W. N., and Birch, J. S. (1979). The relationship between aggression and performance outcome in ice hockey. *Journal of Applied Sport Sciences, 4*, 91-94.

Widmeyer, W. N., and Birch, J. S. (1984). Aggression in professional ice hockey: A strategy for success or a reaction to failure? *Interdisciplinary and Applied, 117*, 77-84.

Widmeyer, W. N., and McGuire, E. J. (1997). Frequency of competition and aggression in professional ice hockey. *International Journal of Sport Psychology, 28*, 57-66.