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AGGRESSION AND PERFORMANCE
IN ICE HOCKEY

by

Larry W. Jacobs

B.Ed. University of Calgary, 1970


Presented in partial fulfillment of the requirements for
the degree of

Master of Science

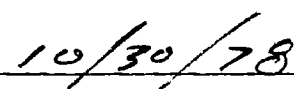
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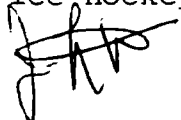
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ABSTRACT

JACOBS, Larry W., M.Sc., 1978 Health and Physical Education

Aggression and Performance In Ice Hockey (71 pp.)

Director: Dr. John Dayries



The purpose of the present investigation was to examine the relationship between self reported aggression levels and performance measures of ice hockey players.

The Buss Durkee Hostility Inventory, which measures seven subclasses of aggression was administered to 37 Junior B hockey players (18 to 22 years of age) and compared to their point totals and accumulated penalty minutes for the 1977-78 hockey season.

All data were submitted to factor analysis by means of Pearson correlation coefficients. The resulting matrix revealed the strength of correlations between the instrument subscales, total aggression score and performance measures.

The results indicated that players reporting higher levels of aggression were significantly higher ($p < .05$) on penalty minutes served but exhibited no significant differences in regard to point totals. Position played had no effect on aggression reported or exhibited but point totals were significantly higher ($p < .05$) for forwards.

Within the confines of the present study it was concluded that aggression fails to augment the point scoring potential of ice hockey players but does correlate highly with penalized acts of aggression regardless of position played.

ACKNOWLEDGEMENTS

I would like to express my sincere gratitude to my advisor Dr. John Dayries for his guidance and support in the completion of this study. To Dr. Brian Sharkey and Dr. John Hunt many thanks for their advice and assistance.

Appreciation is also expressed to the coaches and players who participated in the study and were instrumental in its successful completion.

To my family and friends I am indebted for their continuous assistance in the realization of my lifelong goals.

Finally, this study would not have been as rewarding to me without the encouragement and support of my companion, Susan. It is to her and the special friendship of my brother, Paul, that I dedicate this thesis.

Edmonton, Alberta
August, 1978

Larry W. Jacobs

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CHAPTER I

INTRODUCTION TO THE PROBLEM

Of the many dimensions of human personality none has elicited more controversy in recent years than that of aggression. Man's record of aggression against himself in just this half century has given ample reason to search for the underpinnings of his aggressive behavior.

Early attempts to understand aggression were based on philosophic observation. Freud noted, "A powerful measure of desire for aggression has to be reckoned as part of man's instinctual endowment" (19:10). This view, that aggression is instinctual, has been popularized in the literature, especially in the works of Ardrey (2) and Lorenz (32). They argued that man is by instinct an aggressive creature, and it is this innate propensity to violence that accounts for individual and group aggression.

Undeniably, there must be superlatively strong factors which are able to overcome the commands of individual reason so completely and which are so obviously impervious to experience and learning (32:237).

Because of its instinctual and spontaneous nature, Lorenz reasoned that aggression must be allowed to dissipate through some sort of valve mechanism. If not allowed to drain off in some orderly manner, aggression levels will rise until some form of violent behavior occurs.

The value of sport however is much greater than that of a simple outlet for aggression in its coarser and more individualistic behavior patterns such as pummeling a punch ball. It educates man to a conscious and responsible control of his own fighting behavior. More valuable still is the educational value of the restrictions imposed by the demands of fairness and chivalry which must be respected even in the face of the strongest aggression eliciting stimuli (32:280-281).

Nevertheless, this theory has been severely criticized for its failure to consider individual differences and for its reliance on informal observation instead of empirical evidence. Montague (35) discounts the instinct theory suggesting that extrapolation from animal to man is a tenuous foundation upon which to build a theory of aggression. He states further that no supportive evidence exists which would substantiate the view that instinctive animal behavior is in any way relevant to the motive forces of human behavior.

An alternate theory views aggression as a response to cues in the environment. Representative of this view is the frustration-aggression hypothesis first formulated by Dollard, Doob, Miller, Mowrer and Sears in 1939. Their contention was that:

Aggressive behavior always presupposes the existence of frustration and the existence of frustration always leads to some form of aggression (14:60).

Later research by Sherif and Sherif (40:301-329) suggests that the sporting environment contains the necessary frustrating factors that give rise to aggressive behavior. In a research situation that they devised, two groups of children were allowed to compete in a mutually exclusive contest, in this case a tug-of-war. The bitter feelings that arose from this contest were manifested not only in name calling and derogatory remarks but in actual outbursts of physical violence.

A third theory views aggression as a learned social behavior. In reference to sport, aggression may result from frustration of various socially acquired values or motives. Alderman suggests that:

Those motives predominant in sport which usually generate aggression when thwarted revolve around achievement, dominance, power, recognition and prestige, and excellence. For example, if a boy places high incentive on one or a combination of these

motive incentive systems, and he is blocked from attaining or satisfying them, then he becomes frustrated, . . . which often results in aggression toward the frustrating agent (1:35).

Athletes, according to Bandura and Ross (3) learn skill mechanics as well as social behavior through imitation of successful role models. Consequently, violent aggressive behavior by the role model (provided it is socially acceptable) becomes a reference behavior for younger players (4).

An interesting adjunct to learning theory has been proposed by Volkamer (46). In one of the most comprehensive studies to date, Volkamer investigated aggressive behavior in more than 1800 soccer games. As a result he correctly predicted, in most cases, when aggressive acts would occur, suggesting that aggression is a result of stimuli evolving during the course of the game. Volkamer also suggests that aggression is "sociologically and psychologically normal on athletic teams," influenced by at least four variables:

- a) whether a team is winning or losing,
- b) whether it is playing at home or away,
- c) whether the difference in scores is great or small, and
- d) whether the opponents rank is at the upper, middle or lower order in the standings.

Volkamer's study does not directly espouse a catharsis theory for the participant; instead he suggests that aggression may be controlled by variables changing continuously throughout the course of the event. Aggression in this light seems to be a controlled variable that coaches and participants would try to manipulate so that in turn the end result of the contest could be manipulated. Volkamer alludes to this in at least two instances. He states that "games which are extremely close

as well as those that are not contested evidence fewer fouls than do games that are moderately close." Also, when teams from the extreme upper and lower levels played they exhibited more fouls than when teams in the middle of the standings played. The author suggested that lower place teams did not want to finish dead last (hence the use of aggression) nor did the high-place teams want to lose a championship berth (hence their use of aggression).

In conclusion, evidence seems to indicate that aggression is a learned drive, partially controllable even in an aggression-eliciting environment like sports. When the aggression stimulus from the environment becomes too severe, this control breaks down and the aggressive acts become more and more hostile and non-useful. In this light, the level at which aggression fails to augment the performance becomes an important consideration to coaches and participants alike. A crucial question at this stage may be, what is the nature of the relationship that exists between levels of aggression and successful athletic performance?

STATEMENT OF THE PROBLEM

The purpose of this study was to identify levels of aggression as measured by the Buss Durkee Hostility Inventory of junior age hockey players (18-22 years of age), and compare these levels with their recorded performance over the 1977-78 hockey season.

STATEMENT OF HYPOTHESIS

Very little research has been done in the area of aggression and sports performance. At the coaching level there is much subjective feeling that aggression is an integral part of ice hockey and that it is a contributing factor to successful team and player performance. To ascertain some measure of this relationship the following null hypothesis was tested.

There will be no significant difference in the performance measures between athletes with high reported aggression levels and those with low reported aggression levels.

SIGNIFICANCE OF THE PROBLEM

Coaches and athletes have long recognized the importance of an aggressive attitude to sports performance. In the minds of many observers the more aggressive an individual is, the better chance he has of realizing his potential and demonstrating consistently high levels of performance. Vaz, in his discussion of minor hockey in Canada, suggests aggression is a structural part of the hockey scene, differentiating between successful and unsuccessful hockey players.

Intense competition, the injunction to use increasingly aggressive means and the strong motivation to be chosen for the junior or professional ranks are structural conditions which help generate and differentially account for physical aggression in the league, i.e., among players of higher level teams (45:222).

To what extent this is shown to be true may effect the emphasis given to aggression in the future. If aggression levels correlate highly with performance measures, coaches may have an effective complementary aid for choosing team personnel. A poor correlation between aggression

and sport performance could suggest aggressive acts have little value in terms of successful individual or team performance.

SCOPE AND DELIMITATIONS

1. The study was delimited to members of the Peace Cariboo Junior Hockey League of Northern Alberta and British Columbia.
2. All subjects were male, aged 18-22 years, in accordance with the Canadian Amateur Hockey Association guidelines.
3. The study was delimited to the 1977-78 hockey season.

LIMITATIONS

1. The instrument used to assess levels of aggression was the Buss Durkee Hostility Inventory. All subclasses of the inventory were used to ascertain an overall aggression profile, however, particular emphasis was placed on those subclasses (assault, indirect hostility, irritability, negativism, and verbal hostility) forming the factor aggression (10:170).
2. The statistical record of the 1977-78 hockey season, provided by the Peace Cariboo Hockey League, was used to ascertain measures of performance (penalty minutes and points per game) for each player.

ASSUMPTIONS

The following assumption was made in the process of this study:

1. The Buss Durkee Hostility Inventory is a valid instrument for measuring the aggression levels of athletes.

DEFINITION OF TERMS

For ease of understanding the following terms and definitions were used in this study:

Athlete--the term athlete will refer to a male member of the Peace Cariboo Hockey League for the 1977-78 season.

Aggression--refers to the "delivery of noxious stimuli to another organism" resulting in a violation of the normative rule structure in hockey (10:1).

CHAPTER II

REVIEW OF THE LITERATURE

This chapter will attempt to review the most significant theories and research dealing with aggression and sport. As a guideline to discussion the following format is presented: 1) the nature and definition of aggression, 2) measurement of aggression, 3) influence of viewing sport on spectator aggression, 4) influence of sport on participant aggression, and 5) summary of the review of literature.

THE NATURE AND DEFINITION OF AGGRESSION

The nature of aggression and the role it plays in a sport situation is a complex and unique phenomenon. To come to a more complete understanding of this relationship requires that we begin with a clearer understanding of the term aggression.

Social scientists have at times defined aggression as "harm doing behaviors initiated by the intent to do harm" (18:250). In the sports context this definition is of limited value since many sports present a paradox of violent, aggressive actions which are not specifically designed to do harm. To overcome this apparent inconsistency many researchers have resorted to a categorization rather than a definition of the term aggression.

Layman (30) suggests a two category system based on the intent of the athlete precipitating the aggressive act. Her first category,

reactive aggression, implies that retaliatory measures are being taken against another athlete based on some negative perception of that athlete's behavior. Alderman (1) adds that anger is usually present and injury of the athlete is the perceived outcome of the aggressive action.

Layman's second category of aggression is referred to as instrumental, or goal directed, in that it aims toward the larger purpose of victory rather than intentional injury of another athlete. Injury may result from this type of aggression but it lacks the directed anger characteristics of reactive aggression.

Fromm (20) suspected that aggressive acts could be even more complex in their nature than Layman suggested. In his attempts to further clarify the concept of aggression, he added the categories of conformist and self-assertive aggression.

Conformist aggression, as defined by Fromm, can be considered an adjunct to the reactive aggression concept formulated by Layman (30). The notable difference is that conformist aggression is predicated by a desire to please or conform to the wishes of significant others while reactive aggression springs from one athlete's negative or angry perception of another athlete. Conformist aggression can be person oriented, but the impetus for the aggressive act lies outside of the athlete.

Fromm's category of self-assertive aggression runs parallel to Layman's concept of instrumental aggression. The contention is that peak personal performance can only be achieved when an athlete is assertive enough to pursue individual or group goals without being deterred by obstacles.

In spite of the efforts of Layman and Fromm to clarify the concept of aggression, researchers are still left with the problem of determining the athlete's intent in performing aggressive actions. During a sports contest, an athlete's motives for aggression may shift from instrumental to reactive, or from self-assertive to conformist at a moments notice with no outward behavioral clue being apparent to the researcher. The problem of measurement becomes further complicated when one realizes that each category's goals are open to subjective interpretation by those involved. Bandura (5) refers to this problem when he points out that any instance of so called reactive aggression can easily be classified as instrumental if injurious consequences are substituted for winning or prestige as rewards.

As an alternative Bandura (5:31) suggests that aggressive behavior be differentiated according to its functional value rather than attempting to determine into which category a particular behavior falls. Bandura's differentiation becomes more realistic when considering heavy contact sports such as hockey where "playing the man" is considered a premium tactic. It now becomes unnecessary for the researcher to analyze every act of aggression to determine the relationship between the goals of the activity and the situation in which the violence occurred (7). In place of this task an attempt was made to measure aggression tendencies with a larger purpose of determining their functionality.

MEASUREMENT OF AGGRESSION

It would seem germane at this point to review some of the instruments that have been used in assessing aggressive tendencies. The instruments in the order as they appear in this section are as follows: 1) direct natural observation, 2) direct controlled observation, 3) projective tests, and 4) self report inventories. A comprehensive breakdown of each instrument is not intended in this review, merely an attempt to ascertain the most suitable instrument for the study of aggression in sport situations.

Direct Natural Observation

Observation of behavior in its natural setting has always been considered one of the most reliable methods of personality study.

Kleinmuntz states:

The real advantage, however, of direct viewing of behavior over its substitutes is that it permits the noting of behavior simultaneously with its spontaneous occurrence. Moreover direct observation is independent of the subjects ability or willingness to report (29:83).

Natural observation allows the collection of data untainted by the researcher's presence or the subject's perception of his own behavior. Of equal importance is the inherent ability of this research method to chronologically place aggressive acts with reference to the immediate game situation. Information of this type would be useful in correlating aggression with game score, stage of the game and with perceived outcome.

In just such a study Volkamer (46) observed over 1800 soccer games and concluded that aggression is a result of stimuli evolved during the course of a game. Incidence of aggression could be correlated with

four variables: 1) whether a team is winning or losing, 2) whether a team is at home or away, 3) whether the difference in score is great or small, and 4) whether the opponents rank is at the upper, middle or lower order in the standings. The chronological record of aggression obtained from his study also allowed him to predict, in most cases, when aggressive acts would occur.

Cullen and Cullen (13), in a similar study, observed the aggressive behaviors of a Massachusetts hockey team over the course of a season. Their findings indicated that teams in a deprived structural position (losing) were generally less prone than winning teams to violate the rules. Exceptions were noted when a team was losing by three or four goals, or during the middle stages of a game.

Natural observation has potential for teams of researchers where reliability of observation is maintained through numbers, but training a staff complement so they are familiar with the behavior and situation under study, is too large an undertaking for the singular researcher.

Direct Controlled Observation

The essence of controlled observation is that the researcher "rigs" a situation so as to produce a high incidence of a particular behavior. Since the boundaries for subject and situation are so closely defined by the researcher he can accumulate highly pertinent data under conditions easily replicated for comparison studies. The strength of controlled observation lies not so much in noting the occurrence of the behavior, but in analyzing the variables surrounding it. In studies of aggression this technique has been used successfully in determining the relative strengths of antecedent variables to expression of aggression.

For example, Geen (22) investigated the effects of frustration, attack and prior aggressive training upon aggressive expression (measured by intensity of electric shock) delivered against a confederate. Results showed that the frustrated group behaved significantly more aggressively than the control group, but were less aggressive when compared to the other two experimental groups.

A study by Buss (11) found that of three variables tested--instrumentality of aggression, feedback and frustration--only frustration did not effect aggression (measured by electric shocks). Aggression, which was perceived as having instrumental value, was more intense than when it was perceived as valueless and feedback (moans and groans) resulted in a lowered intensity of aggression.

In a similar study by Taylor and Pisano (44) the effects of frustration and physical attack on aggression were examined. Subjects who were exposed to task frustration (success vs. failure) and delay (long versus short) were found to be more aggressive than the non-frustrated subjects. Attack on the other hand was found to have a significant effect on raising aggression levels.

Although widely heralded as the most scientific of research methods, controlled observation does present some serious problems for sport research. For instance, the time involved in analyzing numbers of athletes, to determine modalities of behavioral expression unique to sports, makes its use prohibitive. Also, the apparatus and situation manipulation require a degree of expertise and financial support unavailable to all but the most serious researcher. Finally, it can always be argued that manifest displays of behavior are no more important to the study of personality than is its latent content; the beliefs,

attitudes and feelings that influence the expression of aggression. To obtain this type of information researchers have traditionally relied on the projective and self report tests of personality.

Projective Tests

The basic assumption underlying projective personality tests is that subjects, when presented with ambiguous stimuli, are forced to draw upon their own personality structure to facilitate comprehension of the stimuli. Their verbalized responses to the stimuli will allow the clinician an inside view of their personality, assuming the meaning the subject attaches to external situations is reflective of his own internal states. Because of this assumption projective tests rely heavily on the skill of the clinician who must record every verbal and physical response to aid in his interpretation of the subject's personality structure. Typically the clinician offers little direction for the response; any form of guidance and the subject may perceive the intent of the test and manipulate his responses accordingly. This element of disguise has been especially useful with clinical patients in uncovering unconscious factors related to behavior and personality but is of questionable value outside of the clinical setting.

By far the most popular of projective testing instruments is the Rorschach Inkblot test devised in 1921. It based its rationale on the assumption that responses to the unfamiliar shapings of the inkblots were reflective of the individual's underlying personality structure (36). Since no direction is given for the response, nor is the inkblot suggestive of a culturally prescribed response the subject must look to his inner world to facilitate comprehension and explanation of the inkblot

before him. The subject, through these projections, reveals aspects of his personality without his consciously being aware that he is doing so. Initially, the Rorschach was devised to detect deviant behavior in clinical patients. As an aid to other psychometric tools it could provide background information regarding the patient's various cognitive and affective functions. In terms of evaluating aggressive tendencies it could separate passive from aggressive personalities but was incapable of finer discriminations. Kleinmuntz (29:285) in his review of projective personality tests suggests the predictive strength of the Rorschach is such that a short interview with the subject would present a comparable personality profile. Until some standardization of administration and interpretation procedure is attempted the Rorschach Inkblot test will find little use outside of the clinical setting.

A projective test which rivals the Rorschach in popularity is the Thematic Apperception Test commonly referred to as the TAT. Conceived in 1935 by Morgan and Murray (33) the TAT utilizes the imagination or apperception of the subject when making inferences about his personality structure. Subjects are presented with a series of pictures for which they are expected to create a brief plot outlining what events led up to the situation depicted in the picture, what the picture is about and what will be the outcome, describing the feelings and thoughts of the characters involved (36:464). As with the Rorschach it is felt that the presentation of ambiguous stimuli will force the subject into drawing on his own personality structure to facilitate comprehension of the stimuli. However, there is some evidence to suggest that the subject is not wholly unconscious of the fact that his story betrays certain

aspects of his personality. He may, as a result, introduce socially desired refinements into his storytelling to offset any sensitive probing into his personality (29:298).

This aspect of projective testing was alluded to in a study by Stone (34:500) who attempted to compare aggression levels of football players with a control group over the length of a playing season. Both groups were given the TAT at regular intervals before, during and after the season. Results showed both groups to be equal on imaginative aggression during the season but after the season the football group showed a reduced aggression tendency. In interpreting the results Stone concluded that during the season football players had to mobilize their aggression, decreasing it only when the season was over and its expression was unwarranted. Stone surmised that their superior size and strength made aggressive displays unnecessary during the off-season. He also suggested that football players were anxious about their aggression and notably defensive about it after the season. It is also possible that the players became aware that their aggression levels were being tested and took steps to make it appear as if they were less aggressive than initially proscribed.

A similar study by Husman (28) utilized a battery of projective tests, including the TAT, to ascertain differences in aggression potential between athletes of various sport backgrounds. The battery was administered at regular intervals through the season to 9 boxers, 8 wrestlers, 9 cross-country runners and 17 control subjects. Results of the study depicted the boxing group as being the lowest on aggression potential. As a result of these findings Husman concluded that

aggressive sports (boxing being the most aggressive of the groups studied) have a cathartic effect on further aggressive tendency. Husman's conclusions and his support of the TAT should be viewed with some skepticism in light of the data accrued within the battery. For example, the Rosenzweig Picture Frustration test showed boxers to be higher on intra-punitive aggression, while the TAT showed them to be lower on intra-punitive aggression. The TAT showed a post-season increase for all athletes in aggression while the Rosenzweig Picture Frustration test depicted a decrease in aggression. More recent research has concluded that the Rosenzweig Picture Frustration test has more validity than the TAT, making Husman's interpretation considerably more difficult to support.

Before projective testing can be used successfully in sport aggression studies some serious shortcomings must be dealt with. Standardization of administration and interpretation techniques is imperative; Husman noted that one of his major problems was in maintaining high inter-scorer reliability on the TAT. Projective tests are time consuming, approximately 90 minutes per subject; some type of adaptation is mandatory before groups can be tested within a satisfactory time limit. Finally, since both the Rorschach and the TAT were devised as clinical aids, some form of validation other than comparison with clinical histories must be attempted if their use is to expand beyond the clinical setting.

Self-Report Inventories

The self-report inventory was developed to facilitate interviewing large numbers of subjects simultaneously. By printing interview questions

or statements in booklets and limiting the subjects to a yes or no, true or false response, psychologists hoped to greatly simplify administration and scoring procedures. Emphasis was on quantitative assessment and test development procedures (collection of norms, factor and item analyses) rather than on dynamics of personality or defense mechanisms.

The forerunner of most self report inventories was the Minnesota Multiphasic Personality Inventory (MMPI) devised by Hathaway and McKinley in 1940 (26). The instrument was radically different from other inventories popular at the time, in that it made no a priori assumptions regarding personality. The MMPI only selected items that were capable of statistically differentiating between normal and abnormal groups in society. Eventually 550 items were selected capable of detecting deviation on 10 clinical scales (depression, schizophrenia, paranoia, etc.) and 4 validity scales designed to detect aberrations in test taking attitudes. To validate the scales, the items were administered to persons exemplifying the extreme of the pattern of behavior under inspection. Their responses were selected as one end of the scale, while responses from normal control subjects constituted the opposite end of the scale.

Since the MMPI's major strength lies in the identification of psychiatric populations, studies employing the instrument on athletes typically result in conclusions based on psychopathic deviation. Concluding that all personality functions, tending toward the psychiatric end of the scale, are aberrations in the normal individual is a difficult context from which to analyze sport performance (42). Other critics maintain that the scales are not independent of one another, making it possible for a subject to score high on several traits when the score is

only valid for one. It has also been argued that test construction was based on samples of insufficient size, making the MMPI vulnerable to temporal fluctuations and low scale reliability (29:236).

As a device for measuring aggression the MMPI is definitely limited; none of the scales centres itself on aggression, nor is the term mentioned in any of the interpretive statements (27:28). It may be possible to assess an abnormally aggressive personality based on a composite interpretation of the 10 scales, but levels of aggression existing to various degrees in the normal populace are undetectable.

The Edwards Personal Preference Schedule (EPPS) was an attempt to construct an inventory based on H.A. Murray's theory of personality needs postulated in 1938. Edwards designed the inventory by selecting items which seemed to adhere to a definition of the particular need; aggression for example, is defined in terms of the need to attack, the need to criticize, to become angry and to blame others. The completed inventory contained 225 paired items scored on 15 personality needs. The test is designed so that the subject must choose the statement he feels is most descriptive of his own personality (16). In a forced choice inventory of this type Edwards realized it was necessary to control for the tendency of subjects to make socially desirable responses (15). To achieve this control he obtained ratings of the social desirability of statements and then matched pairs of items with comparable ratings.

The major weakness of the EPPS is that the items were selected on the basis of face validity, that is they seemed relevant to a particular need. Aside from this the EPPS has shown itself particularly useful in studies of personality and sport.

For example Sage (38) utilized the EPPS in a personality study of athletes from 8 different sports (football, basketball, baseball, wrestling, gymnastics, swimming, track and tennis) over a 9 year period and found that most athletes exhibited similar personality profiles. Notable exceptions were athletes from wrestling and football teams who exhibited higher needs for achievement, dominance and aggression during their winning seasons.

In a similar study utilizing the EPPS Singer (41) attempted to discover if personality differences existed between high-skill and low-skill athletes. The personality profiles of 26 varsity baseball players, 33 freshman baseball players and 10 varsity tennis players were compared to rankings (provided by the respective coaches) of each athlete's skill performance. Findings of the study revealed no significant differences existed between high-skill and low-skill athletes on any of the 15 personality variables. When compared to the college norms of non-athletes, compiled by Edwards, the tennis group was significantly higher on the variable of aggression, but comparable on all other personality variables.

In studies such as these where the total personality is under investigation the EPPS is a useful tool. However, for the present study what is needed is an instrument that measures only aggression, to the exclusion of other personality variables. The instrument should provide a global measure of aggression potential as well as estimating the relative intensities of various modes of aggressive expression. One possibility is the questionnaire developed by Buss and Durkee (9). The Buss Durkee Inventory provides measures on seven sub-classes of aggression (Assault, Individual Hostility, Irritability, Negativism, Resentment,

Suspicion, Verbal Hostility) as well as a Guilt variable. In addition these 7 sub-classes can be grouped into two factors. Resentment and Suspicion make up the Hostility (attitudinal component) while the other 5 sub-classes form the factor aggression (behavioral component) (10:170).

The Inventory consists of 75 items to be answered in a true or false manner reflective of the respondent's personal assessment of the statement. In order to minimize the variable of social desirability the following item writing techniques were employed: 1) assume a socially undesirable state exists and ask how it is to be expressed, 2) provide justification for aggressive behavior and 3) include cliches and idioms that find ready acceptance (10:180). With the use of these techniques the correlation between social desirability and the endorsement of the item dropped from .87 recorded by Edwards to .27 (men) and .30 (women) on the Buss Durkee instrument (10:180). Studies involving the Buss Durkee Inventory demonstrate that the instrument has potential in assessing aggressive potential and discriminating among its modes of expression.

To determine the ability of the Buss Durkee Inventory to measure persons with known violent tendencies Gunn and Gristwood (25) tested 86 British prisoners convicted of violent crimes. Although they were not able to confirm a significant relationship between the total hostility score on the Buss Durkee instrument and the violence levels among the prisoners, (self reported by interview) they did make some interesting observations regarding the instrument. The small inter-scale correlations they found supported Buss and Durkee's hypothesis that there are discreet subtypes of hostility. They also found that the Assault subscale correlated only slightly ($r = .26$) with the total hostility score. This may indicate

that the Assault subscale is the main predictor of assaultive behavior, compared to the other scales which may be attitudinal in nature.

In an effort to compare inventories and behavioral technique as predictors of aggression, Leibowitz (31) tested 38 undergraduate male psychology students. The study was designed to assess the students on three measures of aggressive tendency: the Buss Durkee Hostility Inventory, role playing and the Buss Aggression machine. Four to six weeks prior to participating in the aggression machine and role playing tasks, all subjects were given the Buss Durkee inventory. Procedures for the other two measures were as follows: the aggression machine employed a fake learning situation where the subject could shock a confederate when mistakes were made in the learning process, while role playing employed a mock situation in which the subject was asked to respond as if the fantasy situation were really occurring.

Results of the experiment showed that the best behavioral measure of physical aggression is the Buss Aggression machine, which allows the subject to actually inflict pain on another. The best self report measure of physical aggression is the Assault subscale on the Buss Durkee Inventory. Verbal aggression was best predicted by role playing and the remaining subscales of the inventory. Their conclusion was that aggression was best thought of as verbal or physical and not as lying along a continuum from indirect to direct or from covert to overt.

INFLUENCE OF VIEWING AGGRESSION ON SPECTATOR AGGRESSION

The assumption has long existed that viewing aggressive spectacles will provide for a cathartic release of pent up aggression on the part of

the spectator. Even in the gladiatorial contests of antiquity there was little doubt that spectators were influenced by what they perceived in the game environment, but the assumption that this influence constituted a reduction in aggressive tendency is unfounded in research evidence.

In a study by Goldstein and Arms (24) three subcategories of the Buss Durkee Hostility Inventory (Indirect Hostility, Resentment and Irritability) were combined with 8 filler questions in an attempt to measure pre- and post-game levels of hostility in spectators. Two sporting events were selected--a football game and a gymnastics meet. One hundred and fifty subjects participated in the football study (97 pre-game, 53 post-game) while 81 participated in the gymnastics study (49 pre-meet, 32 post-meet). The football data indicated a significant increase in post-game aggression tendencies regardless of which was the preferred team. Spectators viewing the gymnastics meet showed no significant increase in hostility. The authors suggested the differences in post-event hostility levels were attributable to the stronger aggressive cues existing in football.

In an experimental situation designed by Walters and Thomas (47) control and experimental groups were randomly selected from hospital attendants, high school boys and young female adults. Each group was shown a movie sequence. The experimental group viewed a knife fight from the movie "Rebel Without a Cause," the control group viewed adolescents engaged in constructive activities. After the movie sequence each group was solicited to assist in a teacher learner situation. Their role was to shock the researcher's confederate (unknown to them) each time he committed an error in the learning process. Subjects had not differed

significantly in pre-test shock levels but analysis of post-test shock levels indicated the experimental group was significantly higher.

Viewing aggressive behavior does not necessarily lead to subsequent aggressive actions on the part of the spectator. Research has indicated that the physiological arousal and interpretation of that arousal are necessary prior to aggressive expression on the part of the viewer. This was demonstrated in an experiment by Geen and O'Neal (23) who aroused subjects with white noise and then allowed them to watch either an aggressive boxing film or a clip from a non-aggressive sports film. The subjects were then asked to evaluate (via electric shock) a confederate's solution to a human relations problem. While the evaluation was in progress, half of the subjects were subjected to white noise, the remaining subjects heard nothing. Results showed that noise facilitates aggression and that the effect was greater with the group that had previously been exposed to aggressive cues.

Zillman (48) in an experiment designed to study the relationship between arousal and aggression stimulated his subjects via erotic or aggressive movies prior to their aggressing against a confederate. Results of the study showed the viewers of the erotic movie to be higher on retaliatory aggression than the viewers of the aggressive movie. Zillman concluded that excitation provided by the film was transferred to and summated with, the aggressive arousal provided by the confederate. This excitation-transfer principle leads to the prediction that aroused subjects when angered, behave more aggressively than unaroused subjects exposed to the same anger arousing stimuli.

In a similar study of arousal and aggression Zillman and Johnson

(5) took arousal measures on three subject groups while they delivered electric shocks to a confederate. Each group was then exposed to a violent movie scene, a historical travelogue or no movie at all. Subsequent arousal levels and intensity of electric shocks were recorded and compared to those obtained at the start of the experiment. The data revealed that the subjects who viewed the violent film were not significantly more aggressive than those who saw no film and that subjects who saw the non-aggressive film were less aggressive than those who did not view either film. In the discussion that followed the authors suggested that the non-arousing film, following anger, served to distract the individual, hence lowering his arousal level. The aggressive film and no film groups were allowed to dwell on and thereby maintain their high state of arousal so that considerable residual excitation was carried over to the next set of retaliatory shocks.

Thus it appears research evidence provides no support for the contention that the viewing of aggressive behavior purges the spectator of any pent up hostility. In fact given a composite interaction of the following variables: 1) a high level of physiological arousal in the spectator, 2) interpretation of that arousal as anger, based on a perceived inequity existing in the environment, 3) aggression being a dominant response in the individual and 4) a perception that aggressive action will lead to positive consequences, it would seem that viewing aggression acts as a catalyst for spectator aggression.

INFLUENCE OF SPORT ON PARTICIPANT AGGRESSION

The widespread popularity of the hostility catharsis theory has led many people to assume that participation in physical exercise or competitive sport will act as a cathexis in the reduction of aggressive tendency. Research evidence indicates however that unless an individual is in a state of acute physical exhaustion, his tendency to aggress will actually increase as a result of physical exercise.

In a study by Zillman, Katcher and Milavsky (51) subjects were aggressively instigated (low vs. high) and placed in different states of arousal (low vs. high) through disc threading or bike pedalling. When subjects were subsequently allowed to aggress against the instigator, the angered subjects who engaged in physical activity revealed the highest aggression levels. The authors concluded that their findings were counter to the expectation that strenuous physical exercise would serve to drain off aggressive tension thus inducing catharsis.

In a study utilizing a similar experimental design Zillman and Bryant (49) provoked their subjects after they had been engaged in bike riding and disc threading. The results were similar, in that subjects who had been involved in bicycle riding exhibited higher levels of aggression. In the discussion that followed the authors suggested that during a state of intense emotional anger an aggressive disposition is formed that commits an individual to behave aggressively whenever the behavior can be perceived as instrumental in reaching his objectives. It would appear that allowing a person to "cool off" may only serve as time for him to mentally rehearse his intended aggressive behavior.

Ryan (37) in a study of catharsis through physical activity angered some of his subjects while the remainder received neutral treatment. A treatment group was allowed to swing a rubber mallet at a pounding device while the no-treatment group sat and waited. In a subsequent opportunity to aggress against the instigator the group involved in physical activity were no lower on aggressive expression than those subjects who merely sat and waited.

Physical exercise would seem to provide the high level of arousal that according to Zillman (48) is subject to reinterpretation as anger in a provoking situation. Sport with its emphasis on competition and winning may provide the variables necessary for the athlete to perceive just such a provocation. Frustration was long regarded as the prime antecedent variable necessary to aggressive expression especially in the sports environment as indicated in the following comment by Berkowitz:

Competition must be regarded as a frustration by most definitions of these terms. Writers, of course, have differed in the details of their analyses of competition but all are agreed as to the essentials. These involve: 1) two or more units, either individuals or groups, engaged in pursuing the same rewards, with 2) these rewards so defined that if they are attained by one unit, there are fewer rewards for the other units in the situation. The losing unit is clearly frustrated (6:178).

Sherif and Sherif (39) sought to test this assumption when they investigated intergroup problems arising from competitive activities among well adjusted young boys in a summer camp. After being permitted to form spontaneous groupings and friendships, the boys were divided into two groups (Bull Dogs and Red Devils) in such a way that approximately two-thirds of their friendship choices were in the opposite group. The two groups were separated physically as much as possible and engaged in various camp activities independently. Following this period of in group

formation, the groups engaged in a tournament of competitive contests in which the winners were given highly valued prizes while the losers received nothing. At first both sides displayed good sportsmanship, however, as the tournament progressed and the Bull Dogs were winning most of the contests, the Red Devils began calling the other team cheaters and similar derogatory remarks. Soon there was a rapid increase in inter-group rivalry, hostility and aggressive behavior by both groups. It was concluded that:

The sufficient condition for the rise of hostility and aggressive deeds and for the standardization of social distance, justified by derogatory images of the out-group, was the existence of two groups competing for goals that only one group could attain, to the dismay and frustration of the other group (39:85).

In a reexamination of the relationship between competition and aggression Epstein and Taylor (17) designed an experimental situation to test aggression as a function of the degree of defeat and perceived aggressive intent of the opponent. Subjects were randomly divided into three groups, each to be defeated to different degrees by an imagined opponent (actually a pre-programmed machine). The experiment was designed as a contest in which the faster of the two opponents (subject vs. machine) could deliver an electric shock of pre-determined intensity to the loser. In actuality the results of the contests and the intensities of the electric shocks had been pre-programmed by the researcher. Results revealed that subjects bore no ill will against an opponent who repeatedly defeated them provided he did not exhibit high levels of aggressive intent (reflected by level of shock administered). The authors concluded that aggression in a competitive situation is determined not so much by frustration as by learned social values which determine how an opponent's aggressive behavior should be dealt with.

The contention that socialization plays an important role in the display of violence has been supported in a study by Smith (43) who investigated violence in several hockey teams over the period of a playing season. His analysis showed that players are continually encouraged to acquire assaultive skills as tools of the trade. He also concluded that:

. . . theory and data at both the psychological and sociological levels suggest that much of the violence in sport is the product of socialization, triggered by aggressive cues but enacted on the basis of learned response (43:56).

In a similar analysis of minor hockey league attitudes Vaz (45) found that aggression and rough tactics assumed the status of technical skills and were among the criteria used by coaches to evaluate players. He also found that "techniques of illegal violence," including fighting, are sometimes taught directly, presumably, by the coach.

In a study to determine the conditions surrounding illegal aggression in the sporting situation, Cullen and Cullen (13) observed hockey teams over the duration of a season. They concluded: a) winning teams had a higher incidence of norm violation than losing teams, b) winning teams were required and expected to break the rules and c) losing teams were less prone than winning teams to violate the rules unless losing by three or four goals or in the middle stages of the game. The authors added that when losing teams fall too far behind, not being competitive yet not truly out of the game, risks become worthwhile and violations result. When the discrepancy in goals becomes greater than five, the game is virtually conceded and losing teams have little to gain by aggressive play. In situations like these the winning team increasingly takes advantage of their superior position by increasing their violations

of the normative system and presumably gaining greater advantage from these actions.

It would appear therefore that participation in competitive sports does not produce a cathartic drain of aggressive urges, in fact the research evidence available suggests that participation in competitive sport situations serves to increase the occurrence of aggressive expression.

SUMMARY OF THE REVIEW

While there is not unanimous agreement psychologists and sociologists as to a definition of aggression, there is agreement that aggression constitutes a social problem of considerable magnitude in our society. The increase of violence in what has long been regarded a proper venue for aggressive expression has prompted researchers to reinvestigate the relationship between aggression and sport. While the evidence is by no means conclusive, research indicates that, contrary to society's expectation, sport does not provide an opportunity for aggression catharsis to take place. In fact studies have shown that sport provides an ideal environment in which heightened physiological arousal can be generated (via aggressive cues) into unwarranted aggressive behavior. Aggression will continue in the sports environment as long as there are individuals who perceive aggression as functional and necessary to sport performance. In turn the aggression expressed by the participant will have a circular effect on spectator aggression. If a functional limit can be arrived at for participant aggression there will perhaps be a modicum of control established over the aggressive behavior of the spectator.

CHAPTER III

METHODOLOGY AND PROCEDURE

The procedures discussed in this chapter are outlined in the following manner: selection of subjects, selection of the testing instrument, inventory composition, test administration and treatment of data.

SELECTION OF SUBJECTS

The subjects were selected from the Peace Cariboo Junior "B" Hockey League composed of the following teams: Grande Prairie North Stars, Dawson Creek Kodiaks, Quesnel Millionaires, Fort. St. John Golden Hawks, Prince George Spruce Kings and the 100mile House Blazers. All players were male, aged 18 to 22 years in accordance with Canadian Amateur Hockey Association guidelines. Initial contact was made through the league president seeking sanction for the study. Contact was made with coaches and executives of each team soliticing their cooperation in the investigation. The eventual study group (N=37) consisted of 22 forwards (including centres) and 15 defensemen selected from the following teams: Grande Prairie North Stars, Dawson Creek Kodiaks and the Prince George Spruce Kings.

SELECTION OF THE TESTING INSTRUMENT

The Buss Durkee Hostility Inventory was the instrument used to measure aggression levels of the athletes. In developing the inventory, Buss and Durkee (9:343) noted that other aggression inventories failed to distinguish between the various ways in which hostility can be expressed. Instruments providing only total aggression scores would be unable to distinguish between someone who beats his children and someone who is spitefully late for appointments. To obtain a more reliable picture of an individual's aggressive makeup would require not only a global estimate of aggression but also estimates of the intensities of the various sub-classes. In order to provide these measures the Buss Durkee Inventory contains seven sub-classes of aggression (Assault, Indirect Hostility, Irritability, Negativism, Resentment, Suspicion, and Verbal Aggression) as well as a guilt variable. In addition these seven sub-classes can be grouped into two factors. Resentment and Suspicion make up the factor Hostility while the other five sub-classes form the factor aggression (10:170). The first factor reflects the attitudinal components of the inventory while the aggression factor reflects the behavioral components.

In addition to being particularly appropriate to a study of aggression, the Buss Durkee Hostility Inventory is relatively easy to administer and interpret. The seventy-five item inventory is designed so that each true or false response allows the researcher to obtain an estimate of the intensity of each aggression category by merely noting the positive responses and matching them to their appropriate sub-class.

INVENTORY COMPOSITION

The Buss Durkee Hostility Inventory is composed of seventy-five items or questions. Sixty when answered true and fifteen when answered false (Question # 34, "I never play practical jokes," must be answered false to provide a positive response) indicate aggressive tendencies. The seventy-five items are broken down into the following eight categories:

Assault (A)--physical violence against others. This includes getting into fights with others but not destroying objects (items = 10).

Indirect Hostility (IN)--both roundabout and undirected aggression. Roundabout behavior like malicious gossip or practical jokes is indirect in the sense that the hated person is not attacked directly but by devious means. Undirected aggression, such as temper tantrums and slamming doors, consists of a discharge or negative affect against no one in particular--it is a diffuse rage reaction that has no direction (items = 9).

Irritability (IR)--a readiness to explode with negative affect at the slightest provocation. This includes quick temper, grouchiness, exasperation, and rudeness (items = 11).

Negativism (N)--oppositional behavior, usually directed against authority. This involves a refusal to cooperate that may vary from passive non-compliance to open rebellion against rules of convention (items = 5).

Resentment (R)--jealousy and hatred of others. This refers to a feeling of anger at the world over real or fantasied mistreatment (items = 8).

Suspicion (S)--projection of hostility onto others. This varies from merely being distrustful and wary of people to beliefs that others are being derogatory or are planning harm (items = 10).

Verbal Hostility (VH)--negative affect expressed in both the style and content of speech. Style includes arguing, shouting, and screaming; content includes threats, curses and being overly critical (items = 13).

Guilt (G)--feelings of being bad, having done wrong, or suffering pangs of conscience (items 9) (10:169-170).

TEST ADMINISTRATION

The Buss Durkee Inventory was administered to each athlete after a hockey practice session, in what was considered an unaroused state. There are some obvious limitations to considering the post-practice environment as an unaroused state, but it was the most acceptable time for all concerned to meet for test administration. At the beginning of the test period a set of instructions was given to the subjects before they began answering the inventory. These instructions are included in Appendix A.

TREATMENT OF THE DATA

The data from each team was submitted to factor analysis by means of Pearson product correlation coefficients. The resulting matrix revealed the strength of correlations between the subscales, total aggression score and the performance measures, as well as the respective levels of significance. (For the purposes of this study the .05 level of

confidence was chosen as the criterion for accepting or rejecting the null hypothesis.) In order to facilitate further analysis the aforementioned procedures were repeated, this time using the pooled data from all players. The players were then divided into forwards (including centres) and defensemen to determine the relationship between position played and aggression.

A one way ANOVA was performed on the data to determine subject and scale variations, followed by the Scheffé test to determine where the inter-scale variations were most pronounced. Finally a t-test between the original norms established by Buss and Durkee and the data established in this study was evaluated to determine significant differences in study groups.

CHAPTER IV

RESULTS AND DISCUSSION

RESULTS

As indicated in Chapter I the hypothesis under investigation suggested there would be no significant relationship between aggression levels and performance measures. Prior to analyzing all data, an attempt was made to analyze each item separately to detect variations in the data provided.

The descriptive statistics and Pearson correlation coefficients for team 1 are summarized in Tables I and IA respectively (Appendix B). Analysis of the correlation matrix revealed that a significant negative correlation existed between points scored per game and the subscales of Negativism (.02), Resentment (.03), and Total Hostility (.04). The remaining subscales, although not significant, indicate a negative correlation exists between points scored and aggression levels reported. Analysis of penalty minutes served and aggression levels revealed no significant correlations.

Tables II and IIA (Appendix B) contain the descriptive statistics and Pearson correlation coefficients for team 2. An analysis of points scored and subscales of aggression failed to show statistical significance. Between scales of aggression and penalty minutes served the following revealed a significant positive correlation--Assault (.008), Indirect Hostility (.006), Irritability (.007), Suspicion (.03), and Total Hostility (.003).

The descriptive statistics and Pearson correlation coefficients for team 3 are summarized in Tables III and IIIA respectively (Appendix B). Analysis of the matrix revealed that a significant negative correlation existed between the subscale Resentment and points scored (.02). Review of the remaining subscales showed this to be a trend similar to that exhibited by team 1 (i.e., negative correlation between aggression and points scored). Regarding penalty minutes served and aggression scales, one factor showed significance (Guilt at .03). Finally, a review of penalties served and points scored revealed a significant negative correlation ($p < .02$).

An analysis of each team separately clearly indicates that a low, or in some cases a negative, correlation existed between the subscales of aggression and points scored. Individual team analysis would also seem to indicate a positive correlation existed between the subscales of aggression and penalty minutes. To ascertain a clearer picture of these results and determine the statistical significance of the relationships alluded to, the data of all thirty-seven players was pooled and statistically analyzed. The resultant data is summarized in Tables A and B.

Analysis of the matrix revealed that high correlations existed between Total Hostility and the various subscales (Assault .001, Indirect .001, Irritability .001, Negativism .001, Resentment, .001, Suspicion .001, Verbal .001, Guilt .009). Analysis of Total Hostility and penalty minutes served revealed a high positive correlation (.01). Although negatively significant in only one case (Resentment .05) the data indicates a trend negatively correlating points scored and the various subclasses of aggression.

To test the contention that different positions in hockey demand different aggressive personalities (highly aggressive for defense, less so for forwards) a t-test was applied to the data to determine significant differences between forwards (including centres) and defensemen (Table C). Analysis of the t-tests revealed no significant differences between forwards and defensemen other than number of points scored (.02). This difference is to be expected as forwards are typically in a much better scoring position than are defensemen. Notable in its absence was evidence for the assumption that defensemen are more aggressive, or serve more penalty minutes than forwards. The supposition that defensemen are more aggressive due to the nature of their position does not appear to be reflected in this study. As a group they were not significantly higher on total hostility scores or in penalty minutes served.

A one way ANOVA was utilized to determine the degree of subscale and subject variation. The summary, tabulated in Table IV (Appendix B) reveals high subject response variation as well as significant variation between subscales (F ratio 7.57; probability .001). This data would seem to support the contention made by Buss and Durkee that the "various scales are tapping at least partially independent behaviors" (9:347).

The Scheffé test (Table V, Appendix B0) was used to analyze the differences indicated by the one way ANOVA. The resultant sequence of means (Suspicion, Indirect Hostility, Guilt, Negativism, Resentment, Irritability, Verbal Hostility, and Assault) and inter-scale groupings seem to support Buss and Durkee's contention that aggression can be separated into attitudinal and behavioral components.

A t-test performed between the original Buss Durkee norms and

Table A
Aggression Scores and Performance Measures
for All Players

Variable	Cases	Mean	Standard Deviation
Assault	37	7.27	2.16
Indirect	37	4.59	2.41
Irritability	37	6.92	2.03
Negativism	37	2.70	1.29
Resentment	37	4.54	1.99
Suspicion	37	4.70	2.22
Verbal	37	8.76	2.67
Guilt	37	4.70	2.31
Total Aggression	37	44.24	10.70
Goals	37	0.72	0.51
Penalty Minutes	37	1.84	1.57

Table B

Pearson Correlation Coefficients and Aggression Scores and Performance
Measures for All Players (N=37)

Variable	Assault	Indirect Hostility	Irritability	Negativism	Resentment	Suspicion	Verbal	Guilt	Total Hostility	Goals	Penalty
Assault	1.0000*	0.4924*	0.3918*	0.2498	0.1201	0.0462	0.3060*	0.1785	0.5631*	-0.0444	0.3791*
Indirect Hostility	0.4924*	1.0000*	0.7022*	0.4256*	0.4400*	0.4647*	0.5498	0.1476	0.8575*	0.0239	0.3169*
Irritability	0.3918*	0.7022*	1.0000*	0.2770*	0.3743*	0.2897*	0.4567*	0.1428	0.7405	0.0525	0.1850
Negativism	0.2498	0.4256*	0.2770*	1.0000*	0.4103*	0.4924	0.2206	0.3339*	0.6343*	-0.2422	0.1591
Resentment	0.2101	0.4400*	0.3743*	0.4103*	1.0000*	0.5513*	0.1088	0.1566	0.6146*	-0.2731*	0.0322
Suspicion	0.0462	0.4647*	0.2897*	0.4924*	0.5513*	1.0000*	0.1841	0.3073*	0.6540*	0.0922	0.2780*

*Significance level of .05 exceeded when $-0.2730 > p > .2730$.

Table B (Continued)

Variable	Assault	Indirect Hostility	Irrit-ability	Negat-ivism	Resent-ment	Suspi-cion	Verbal	Guilt	Total Hostility	Goals	Penalty
Verbal	0.3060*	0.5498*	0.4567*	0.2206	0.1088	0.1841	1.0000*	-0.2644	0.5465*	-0.1230	0.1432
Guilt	0.1785	0.1476	0.1428	0.3339*	0.1566	0.3073*	-0.2644	1.0000*	0.3866*	0.0419	0.3730*
Total Hostility	0.5631*	0.8575*	0.7405*	0.6343*	0.6146*	0.6540*	0.5465*	0.3866*	1.0000*	-0.0801	0.3815*
Goals	-0.0444	0.0239	0.0525	-0.2422	-0.2731*	0.0992	-0.1230	0.0419	-0.0801	1.0000*	0.2239
Penalty	0.3791*	0.3169*	0.1850	0.1591	0.0322	0.2780*	0.1432	0.3730*	0.3815*	0.2239	1.0000*

*Significance level of .05 exceeded when $-0.2730 > p > .2730$.

Table C

Results of t-Test Between Forwards and Defense

Variable	Position	Cases	Mean	Standard Deviation	Separate Variance Estimate (two-tail probability)
Assault	Forwards	22	7.18	1.94	0.78
	Defense	15	7.40	2.50	
Indirect	Forwards	22	4.69	2.08	0.81
	Defense	15	4.47	2.90	
Irritability	Forwards	22	6.95	1.86	0.90
	Defense	15	6.87	2.33	
Negativism	Forwards	22	2.69	1.46	0.90
	Defense	15	2.73	1.03	
Resentment	Forwards	22	4.72	2.07	0.49
	Defense	15	4.27	1.91	
Suspicion	Forwards	22	4.95	1.91	0.44
	Defense	15	4.33	2.64	
Verbal	Forwards	22	8.32	2.64	0.23
	Defense	15	9.40	2.67	
Guilt	Forwards	22	4.82	2.34	0.72
	Defense	15	4.53	2.33	
Total Aggression	Forwards	22	44.41	8.23	0.92
	Defense	15	44.00	13.88	
Goals	Forwards	22	0.86	0.61	0.02*
	Defense	15	0.51	0.21	
Penalty Minutes	Forwards	22	1.58	1.59	0.23
	Defense	15	2.21	1.51	

*Significant at .05 level.

the data established in the present investigation revealed significant differences on all scales except indirect hostility, suggesting the samples may be representative of vastly different populations in regard to aggression.

DISCUSSION

The component of the null hypothesis postulating that no significant relationship existed between aggression levels and penalty minutes was found untenable at the .05 level of confidence. Although results of the Buss Durkee Hostility Inventory correlated highly with penalty minutes served, it may be an oversimplification to assume that the instrument has high validity in predicting illegal behavior in any sporting context outside of the present study. The fact that the high aggressive levels cashed out so readily in terms of illegal behavior may be a function unique to the hockey environment. Ice hockey may be one of the few sports in existence where the sanctioning system set up to deal with illegal behavior has actually taken on a positive reinforcement quality. Many observers feel that penalties have become an index to spectators, coaches and other players of the individual's degree of motivation and in turn to his potential as a hockey player (8). Smith (43) has argued that formal negative sanctions are in fact rewarded, not punished and that much of the violence existing in the hockey scene is in fact normal behavior.

As a supplement to this line of reasoning Byrne (12) has noted that in instances where attack or the threat of attack is imminent individuals tend to react most aggressively. Generalizing to the hockey

environment where players have been socially attuned to violence, where sanctions are weak or non-existent and aggressive cues in the form of attack are numerous, it is understandable that highly aggressive participants would frequently engage in violent displays of aggression.

Results of the study failed to disprove the hypothesis that no significant relationship existed between aggression levels and points scored. The analysis did point up a slight negative correlation however, putting some strain on the argument that a hockey player must be aggressive to score goals. The qualities more likely to aid in goal scoring are probably persistence and motivation which are very often lumped together with the term aggression. At the risk of belaboring the point, it is interesting to note that forwards were found to be as aggressive as defensemen. This was unexpected in light of the commonly held belief that defensemen are selected for their ability to protect their higher scoring team members and maintain a balance of power. A possible explanation stems from the fact that all players are subject to the same social learning processes throughout their hockey careers, resulting in high aggression development regardless of position or role played. It is feasible that the type of penalty incurred may be different for defensemen compared to forwards but since that facet of aggression was not pursued in the present study any conclusions would be tenuous at best.

The high aggression levels reported by all athletes were expected in light of research evidence provided by Volkamer (46) and Cullen and Cullen (13). What does merit discussion is the support this study seems to provide for the contention that the Buss Durkee Inventory is a valid predictor of aggression.

In their original study on aggression measurement, Buss and Durkee (9) concluded that the scales of Assault, Irritability and Verbal Hostility were the only scales to reflect a motor component to hostility (aggression). In a later analysis Buss (10:170) expanded the aggression component to include all factors except Resentment and Suspicion, in essence he perceived the instrument as measuring behavior rather than attitude. The data analysis in the present study does not support Buss' later categorization. The sequence of scale means, provided by a Scheffé analysis of participant response, clearly indicates that Assault, Verbal Hostility and Irritability form a separate factor from the scales of Suspicion, Indirect Hostility, Guilt, Negativism and Resentment. It would appear then that the main predictors of aggressive behavior are only the scales of Assault, Verbal Hostility and Irritability. This analysis finds some support in the literature. A study by Gunn and Gristwood (25) on British prisoners argues that the Buss Durkee Hostility Inventory measures attitudes rather than behavior and that the only scale capable of aggression assessment is the Assault variable. They also found, as did the present study, a high correlation between Suspicion, Indirect Hostility, Negativism, and Resentment suggesting that these scales are measuring, at best, different aspects of attitude not behavior.

This conclusion is also consistent with a study by Vaz (45) who concluded that the behavioral components of aggression, such as physical or verbal aggression, are most often exhibited by models, especially in the case of professional hockey players. It is not likely that the aggressive attitudes such as Resentment and Suspicion would be conducive to modelling by the younger hockey players.

At the practical level the results of this study are open to selective interpretation. Even though the evidence suggests that aggression in hockey has achieved proportions that are non-useful, one must realize that a "cold war" exists with reference to lowering aggressive display. If a team were to rely strictly on its playmaking and skill to win games the temptation for the opposition to gain an advantage through aggressive tactics would be overwhelming. Until such time as aggression is viewed as socially unacceptable by all parties involved through all stages of a hockey career it will continue as an approved method to ensure victory.

CHAPTER V

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

SUMMARY

The purpose of this study was to investigate the relationship existing between aggression and performance measures in the game of ice hockey. A total of thirty-seven hockey players, representing three teams from the Peace Cariboo Junior Hockey League volunteered to assist in the study. The Buss Durkee Hostility Inventory was employed as a measure of aggression and these results were compared to the statistical record of points scored and penalty minutes served over the 1977-78 playing season.

CONCLUSIONS

The following conclusions were formulated on the basis of the results of the study.

1. Hockey players with high reported aggression levels serve more penalty minutes than players with low reported aggression levels.
2. No significant relationship exists between reported aggression levels and points scored.
3. No differences were found to exist between forwards and defense-men on self reported aggression levels.
4. Hockey players exhibited higher levels of aggression than those reported for subjects in the original Buss Durkee study.

5. The best predictors of aggression on the Buss Durkee Hostility Inventory are the scales of Assault, Verbal Hostility and Irritability.

RECOMMENDATIONS

Based on the findings and conclusions of this study, the following recommendations are made.

1. Aggression inventories should be developed specific to each particular sport.
2. A study should be undertaken to investigate audience and participant interactions with reference to aggressive display.
3. A study should be undertaken investigating the enforcement of varying degrees of sanctions on subsequent aggressive behavior.
4. A study should be undertaken investigating the effects of various types of distractions on spectator aggression levels.

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APPENDIX A

THE INVENTORY

INSTRUCTIONS

The following instructions were read to the subjects prior to the administration of the inventory.

Before you begin, remember these points:

1. Read all the instructions carefully.
2. There are no right or wrong answers, so do these questions by yourself.
3. All answers will be kept secret.
4. Answer how you feel now, not how you think you should feel.
5. Please answer each statement.
6. Print your name and position at the top of the first page.

Instructions

On the following pages you will find a series of statements which a person might use to describe himself. Read each statement and decide whether or not it describes the way you feel right NOW.

If you agree with a statement or decide that it does describe the way that you feel now answer true (circle T). If you disagree with a statement or feel that it is not descriptive of the way you feel now, answer false (circle F).

Answer every statement either true or false, even if you are not completely sure of your answer.

- T F I seldom strike back, even if someone hits me first.
- T F I sometimes spread gossip about people I don't like.
- T F Unless somebody asks me in a nice way, I won't do what they want.
- T F I lose my temper easily but get over it quickly.
- T F I don't seem to get what's coming to me.
- T F I know that people tend to talk about me behind my back.
- T F When I disapprove of my friends' behavior, I let them know about it.
- T F Once in a while I cannot control my urge to harm others.
- T F I never get mad enough to throw things.
- T F Sometimes people bother me just by being around.
- T F When someone makes a rule I don't like I am tempted to break it.
- T F Other people always seem to get the breaks.
- T F I tend to be on my guard with people who are somewhat more friendly than I expected.
- T F I often find myself disagreeing with people.
- T F I can think of no good reason for ever hitting anyone.
- T F When I am angry, I sometimes sulk.

- T F When someone is bossy, I do the opposite of what he asks.
- T F I am irritated a great deal more than people are aware of.
- T F I don't know any people that I downright hate.
- T F There are a number of people who seem to dislike me very much.
- T F I can't help getting into arguments when people disagree with me.
- T F If somebody hits me first, I let him have it.
- T F When I am mad, I sometimes slam doors.
- T F I am always patient with others.
- T F Occasionally when I am mad at someone I will give him the "silent treatment."
- T F When I look back on what's happened to me, I can't help feeling mildly hurt.
- T F There are a number of people who seem to be jealous of me.
- T F I demand that people respect my rights.
- T F Whoever insults me or my family is asking for a fight.
- T F I never play practical jokes.
- T F It makes my blood boil to have somebody make fun of me.
- T F When people are bossy, I take my time just to show them.
- T F Almost every week I see someone I dislike.
- T F I sometimes have the feeling that others are laughing at me.
- T F Even when my anger is aroused, I don't use "strong language."
- T F People who continually pester you are asking for a punch in the nose.
- T F I sometimes pout when I don't get my own way.
- T F If somebody annoys me, I am apt to tell him what I think of him.
- T F I often feel like a powder keg ready to explode.

- T F Although I don't show it, I am sometimes eaten up with jealousy.
- T F My motto is "Never trust strangers."
- T F When people yell at me, I yell back.
- T F When I really lose my temper, I am capable of slapping someone.
- T F Since the age of ten, I have never had a temper tantrum.
- T F When I get mad, I say nasty things.
- T F I sometimes carry a chip on my shoulder.
- T F If I let people see the way I feel, I'd be considered a hard person to get along with.
- T F I commonly wonder what hidden reason another person may have for doing something nice for me.
- T F I could not put someone in his place, even if he needed it.
- T F I get into fights about as often as the next person.
- T F I can remember being so angry that I picked up the nearest thing and broke it.
- T F I often make threats I don't really mean to carry out.
- T F I can't help being a little rude to people I don't like.
- T F At times I feel I get a raw deal out of life.
- T F I used to think that most people told the truth but now I know otherwise.
- T F I generally cover up my poor opinion of others.
- T F If I have to resort to physical violence to defend my rights, I will.
- T F If someone doesn't treat me right, I don't let it annoy me.
- T F I have no enemies who really wish to harm me.
- T F When arguing, I tend to raise my voice.

- T F I have known people who pushed me so far that we came to blows.
- T F I don't let a lot of unimportant things irritate me.
- T F I seldom feel that people are trying to anger or insult me.
- T F Lately, I have been kind of grouchy.
- T F I would rather concede a point than get into an argument about it.
- T F I sometimes show my anger by banging on the table.

Please check that you have given an answer for each statement.

This is very important.

Thank you for your participation.

APPENDIX B

The Tables

Table I
Aggression Scores and Performance Measures
for Team 1

Variable	Cases	Mean	Standard Deviation
Assault	13	7.54	1.51
Indirect	13	5.46	1.94
Irritability	13	7.54	1.71
Negativism	13	3.08	1.32
Resentment	13	5.08	2.02
Suspicion	13	5.46	1.56
Verbal	13	9.54	2.18
Guilt	13	4.31	2.59
Total Aggression	13	48.00	7.22
Goals	13	0.80	0.36
Penalty Minutes	13	1.21	1.24

Table IA

Pearson Correlation Coefficients of Aggression Scores and
Performance Measures for Team 1 (N=13)

Variable	Assault	Indirect Hostility	Irrit- ability	Negat- ivism	Resent- ment	Suspi- cion	Verbal	Guilt	Total Hostility	Goals	Penalty
Assault	1.0000*	0.1074	-0.1217	0.0612	0.0400	-0.0791	0.0565	-0.0672	0.2068	-0.3847	0.1602
Indirect Hostility	0.1074	1.0000*	0.2447	-0.1775	0.5216*	0.4464	0.5851*	-0.2622	0.6418*	-0.0974	0.1813
Irrit- ability	-0.1217	0.2447	1.0000*	-0.2777	0.3242	0.0240	0.1833	0.2971	0.4848*	-0.1363	-0.2313
Negat- ivism	0.0612	-0.1775	-0.2777	1.0000*	0.2789	0.4261	-0.0445	0.1628	0.2971	-0.5752*	-0.1514
Resent- ment	0.0400	0.5216*	0.3242	0.2789	1.0000*	0.5167*	0.1788	0.0906	0.7543	-0.5360*	-0.0279
Suspicion	-0.0791	0.4464	0.0240	0.4261	0.5167*	1.0000*	0.4100	0.0855	0.7023*	-0.2670	0.1967

*Significance level of .05 exceeded when $-0.4882 > p > 0.4882$.

Table IA (Continued)

Variable	Assault	Indirect Hostility	Irrit- ability	Negat- ivism	Resent- ment	Suspi- cion	Verbal	Guilt	Total Hostility	Goals	Penalty
Verbal	0.0565	0.5851*	0.1833	-0.0445	0.1788	0.4100	1.0000*	-0.4288	0.4913*	-0.0910	0.0985
Guilt	-0.0672	-0.2622	0.2971	0.1628	0.0906	0.0855	-0.4288	1.0000*	0.2891	-0.0056	0.3387
Total Hostility	0.2068	0.6418*	0.4848	0.2971	0.7543*	0.7023*	0.4913*	0.2891	1.0000*	-0.4810*	0.1858
Goals	-0.3847	-0.0974	-0.1363	-0.5752*	-0.5360*	-0.2670	-0.0910	-0.0056	-0.4810*	1.0000*	0.2262
Penalty	0.1602	0.1813	-0.2313	-0.1514	-0.0279	0.1967	0.0985	0.3387	0.1858	0.2262	1.0000*

*Significance level of .05 exceeded when $-0.4882 > p > 0.4882$.

Table II
Aggression Scores and Performance Measures
for Team 2

Variable	Cases	Mean	Standard Deviation
Asault	15	7.80	2.04
Indirect	15	4.93	2.34
Irritability	15	6.93	2.19
Negativism	15	2.80	1.32
Resentment	15	4.73	1.75
Suspicion	15	4.67	2.38
Verbal	15	8.67	2.74
Guilt	15	5.47	1.51
Total Aggression	15	46.13	11.03
Goals	15	0.74	0.73
Penalty Minutes	15	2.28	1.97

Table IIA

Pearson Correlation Coefficients of Aggression Scores and
Performance Measures for Team 2 (N=15)

Variable	Assault	Indirect Hostility	Irrit- ability	Negat- ivism	Resent- ment	Suspi- cion	Verbal	Guilt	Total Hostility	Goals	Penalty
Assault	1.0000*	0.6236*	0.6206*	0.2490	-0.3355	-0.0881	0.4080	0.0558	0.5022*	-0.0194	0.6067*
Indirect Hostility	0.6236*	1.0000*	0.8213*	0.5955*	0.1172	0.3541	0.6295*	0.5154*	0.8842*	0.0054	0.6283*
Irrit- ability	0.6206*	0.8213*	1.0000*	0.4405*	0.3308	0.3248	0.5320*	0.3573	0.8562*	0.0565	0.6149*
Negativism	0.2490	0.5955*	0.4405*	1.0000*	0.2842	0.3409	0.4537*	0.6612*	0.7229*	-0.2494	0.4033*
Resent- ment	-0.3355	0.1172	0.3308	0.2842	1.0000*	0.3198	0.2032	0.1048	0.3791	-0.3019	0.0738

*Significance level of .05 exceeded when $-0.4405 > p > 0.4405$.

Table IIA (Continued)

Variable	Assault	Indirect Hostility	Irritability	Negativism	Resentment	Suspicion	Verbal	Guilt	Total Hostility	Goals	Penalty
Suspicion	-0.0881	0.3541	0.3248	0.3409	0.3198	1.0000*	0.3756	0.5248*	0.6029*	0.2167	0.5092*
Verbal	0.4080	0.6295*	0.5320*	0.4537*	0.2032	0.3756	1.0000*	0.0577	0.7310*	-0.3038	0.3859
Guilt	0.0558	0.5154*	0.3573	0.6612*	0.1048	0.5248*	0.0577	1.0000*	0.5723*	0.1741	0.3417
Total Hostility	0.5022*	0.8842*	0.8562*	0.7229*	0.3791	0.6029*	0.7310*	0.5723*	1.0000*	-0.0838	0.6762*
Goals	-0.0194	0.0054	0.0565	-0.2494	-0.3019	0.2167	-0.3038	0.1741	-0.0838	1.0000*	0.3533
Penalty	0.6067*	0.6283*	0.6149*	0.4033	0.0738	0.5092*	0.3859	0.3417	0.6762*	0.3533	1.0000*

*Significance level of .05 exceeded when $-0.4405 > p > 0.4405$.

Table III
Aggression Scores and Performance Measures
for Team 3

Variable	Cases	Mean	Standard Deviation
Assault	9	6.00	2.78
Indirect	9	2.78	2.39
Irritability	9	6.00	2.06
Negativism	9	2.00	1.00
Resentment	9	3.44	2.13
Suspicion	9	3.67	2.55
Verbal	9	7.78	3.11
Guilt	9	4.00	2.83
Total Aggression	9	35.67	10.56
Goals	9	0.57	0.18
Penalty Minutes	9	2.00	0.97

Table IIIA

Pearson Correlation Coefficients of Aggression Scores and
Performance Measures for Team 3 (N=9)

Variable	Assault	Indirect Hostility	Irrit- ability	Negat- ivism	Resent- ment	Suspi- cion	Verbal	Guilt	Total Hostility	Goals	Penalty
Assault	1.0000*	0.3763	0.3049	0.1796	0.3798	0.0352	0.2307	0.3175	0.6634*	-0.2613	0.4131
Indirect Hostility	0.3763	1.0000*	0.8385*	0.5762*	0.4896	0.4178	0.2785	0.1667	0.8698*	-0.5068	0.2568
Irrit- ability	0.3049	0.8385*	1.0000*	0.4244	0.2850	0.1903	0.4284	-0.2358	0.6718*	-0.0693	-0.2244
Negativism	0.1796	0.5762*	0.4244	1.0000*	0.5874*	0.7354*	-0.1606	0.3094	0.6866*	-0.3739	0.4266
Resent- ment	0.3798	0.4896	0.2850	0.5874*	1.0000*	0.7911*	-0.3228	0.2077	0.6750*	-0.6973*	0.3388

*Significance level of .05 exceeded when $-0.5762 > p > 0.5762$.

Table IIIA (Continued)

Variable	Assault	Indirect Hostility	Irritability	Negativism	Resentment	Suspicion	Verbal	Guilt	Total Hostility	Goals	Penalty
Suspicion	0.0352	0.4178	0.1903	0.7354*	0.7911*	1.0000*	-0.4514	0.4160	0.5897*	-0.4276	0.2449
Verbal	0.2307	0.2785	0.4284	-0.1606	-0.3228	-0.4514	1.0000*	-0.4826	0.1838	0.2404	-0.0974
Guilt	0.3175	0.1667	-0.2358	0.3094	0.2077	0.4160	-0.4826	1.0000*	0.3725	-0.3822	0.6405*
Total Hostility	0.6634*	0.8698*	0.6718*	0.6866*	0.6750*	0.5897*	0.1838	0.3725	1.0000*	-0.5076	0.4338
Goals	-0.2613	-0.5068	-0.0693	-0.3739	-0.6973*	-0.4276	0.2404	-0.3822	-0.5076	1.0000*	-0.7164*
Penalty	0.4131	0.2568	-0.2244	0.4266	0.3388	0.2449	-0.0974	0.6405*	0.4338	-0.7164*	1.0000*

*Significance level of .05 exceeded when $-0.5762 > p > 0.5762$.

Table IV
Analysis of Variance Summary

Source	Degrees of Freedom	Mean Squares	F Ratio	Probability
Within subjects	36	1708.18	--	--
Within instrument	7	2889.28	7.57	.001
Within subjects and instrument	252	381.83	--	--

Table V

Results of Scheffé test on Instrument Subclasses
 (Sequence of Means Based on SEM of 3.21)

Suspicion (47.03)	Indirect (51.05)	Guilt (52.25)	Negativism (54.05)	Resentment (56.76)	Irritability (62.9)	Verbal (67.36)	Assault (72.70)
					*		

*Lines refers to means that are not significantly different from each other.

Table VI

t-Test Between Original Buss Durkee Norms and
Data Established in this Study

Sub-category of Aggression	Buss Durkee Mean	Mean from Present Study Data	t value	Probability Level
Assault	5.07	7.27	4.62	0.00001*
Indirect	4.47	4.59	0.26	0.40
Irritability	5.94	6.92	1.98	0.025 *
Negativism	2.19	2.70	1.93	0.028 *
Resentment	2.26	4.54	5.96	0.00001*
Suspicion	3.33	4.70	3.25	0.00075*
Verbal	7.61	8.76	2.12	0.018 *
Guilt	5.34	4.70	1.59	0.057 *

*Significant at .05 level.

