A SYSTEMATIC OBSERVATION OF HOSTILE AGGRESSION IN JUNIOR B HOCKEY

By

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A thesis

presented to Brock University

in partial fulfillment of the

thesis requirement for the degree of

Masters of Arts

in

Applied Health Sciences (Physical Education – Kinesiology)

St. Catharines, Ontario, Canada, 2004

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Dedication

“Outside of wartime, sports is perhaps the only setting in which acts of interpersonal aggression are not only tolerated but enthusiastically applauded by large segments of society”  (Russell, 1993)

This thesis is dedicated to those athletes who have been senselessly injured by aggressive or even violent behaviour within the sporting domain. This document is hopefully a step in the right direction with respect to eliminating these behaviours from sport.
Acknowledgments

A very special thanks to my advisor Dr. Philip Sullivan for his countless hours of guidance and continually going above and beyond the call of duty. You forced me to view things from different perspectives, and for that I am forever grateful. Your time, patience, and mentorship will never be forgotten. You are the greatest advisor a student could ever hope for. Thanks for everything.

I would also like to extend my gratitude to Dr. Diane Stevens and Dr. James Mandigo who served as committee members throughout this research endeavour. Your suggestions and comments were vital to the development of this project. Also, to Dr. Kim Dorsch, who served as the external examiner. Her expertise in this area of inquiry, and subsequent feedback, were integral in finalizing this document.

Special thanks to those athletes and coaches who volunteered to participate in this study. Also, to the two students who volunteered to help with the data collection. Without your help, this would have never taken place.

To my fellow graduate students here at Brock University. Your constant support and friendship have made this one of the most memorable experiences of my life. I wish all of you the best in your future endeavours. Also, to my girlfriend Jenna who was there every step of the way. Your support and encouragement are the driving forces behind all that I do.

And finally, I would like to thank my parents for instilling in me a love for learning. Your constant support and unconditional love have made this all possible. This document is as much a reflection of your hard work and sacrifice, as it is mine.
Abstract

Aggressive behaviours within the sport of hockey appear to be increasing in both prevalence and consequence (Biasca, Wirth, & Tegner, 2002). Accordingly, this area of inquiry is currently garnering a considerable amount of attention from society and academics alike. The problem however, is that our current understanding of these behaviours has been deemed both incomplete and unreliable. The inconsistencies inherent within this body of knowledge have been traced back to a variety of methodological shortcomings. The purpose of this investigation was to assess hostile aggression using a more ecologically valid and comprehensive research design. Ten Junior B hockey games were tapped and subsequently coded by three independent observers, using a validated operational list. Two hundred and fifty-nine behaviours were extrapolated and examined according to the score differential, period, position of the aggressor, status of the aggressor's team, and whether the aggressor was a member of the home or visiting team. It was concluded that the frequency of aggressive behaviours significantly differed according to the score differential, and status of the aggressor's team ($p < .01$). However, these hostile acts did not differ according the aggressor's position, period, and the home versus away status of the aggressor's team ($p > .01$). It was also determined that the majority of aggressive acts (69.11%) across these ten games went unsanctioned. This highlights the profound influence that "positive misses" have on penalty measures of aggression, while concurrently highlighting the ecological validity present with observational designs. Consequently, by assessing aggressive behaviour in a more inclusive and ecologically valid manner, a more accurate picture of the frequency and distribution of hostile aggression may be provided.
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I. Introduction

Aggressive behaviour in the sport of ice hockey appears to be becoming increasingly more prevalent and consequential (Biasca, Wirth, & Tegner, 2002). As a result, these behaviors have garnered a considerable amount of attention from academics; however, despite the overwhelming interest shown, a reliable and comprehensive knowledge base regarding the dynamics underlying aggressive behaviour is still missing (Kirker, Tennenbaum, & Mattson, 2000). The inconsistencies surrounding this area's body of knowledge can be for the most part traced back to methodological and conceptual shortcomings (Stephens, 1998a; Widmeyer, Dorsch, Bray, & McGuire, 2002). Consequently, this investigation attempted to overcome several of these limitations while concurrently providing insight into how aggression is manifested and distributed throughout the game of hockey. As well, this investigation applied several of the suggestions outlined by Kirker et al. (2000) and examined aggressive behaviour using a systematic observation design.

1.1 Definitions

Aggression has been defined as “any overt act (verbal or physical) that has the capacity to cause psychological or physical injury to another. The act must be purposeful (nonaccidental) and chosen with the intent of causing injury” (Stephens, 1998a, p.277). This rather broad term has been subdivided into two distinct categories, based primarily on the reinforcement sought through the behaviour (Husman & Silva, 1984). When an aggressive behaviour is initiated with the sole purpose of harming another individual, the act is considered to be a form of hostile (reactive) aggression. The reinforcement in this instance is simply viewing the pain and suffering that your opponent must endure. An
example of hostile aggression would be punching your opponent in the face because they provoked you. Consequently, the aggressive act is viewed as an end in and of itself. However, when aggression is used as a means to an end other than suffering, it is considered to be instrumental in nature. Here pain and suffering are not the primary objectives; rather, they are used as the means to achieve some other non-aggressive goal (e.g., praise, removal of that player, victory). An example of instrumental aggression would be a player who intentionally harms an opponent (i.e., hit from behind) in order to stop a scoring opportunity. Even though injury is not the primary objective sought through instrumental acts, they are still intentionally initiated harmful behaviours and therefore contain the appropriate conceptual criteria.

The term aggression, as a result of both its social and academic overuse, has developed into an umbrella term encompassing all highly physical behaviours. The social overuse of the term aggression has had a significant detrimental impact on its subsequent empirical examination. Within academia there appears to be a lack of consensus concerning the term's conceptual definition with a variety of studies using the terms aggression, violence, hostility and assertiveness synonymously (Stephens, 1998a). An example of this conceptual misunderstanding can be found in a rejoinder to the International Society of Sport Psychology's (ISSP) position stand on aggression. Kerr (1999) wrote "individuals require some level of aggression" and that "without aggression, the athletes cannot gain pleasure and satisfaction from or be successful in these sports" (p. 86). Kerr is not alone in his belief that the term aggression also encompasses highly physical behaviours that appear to be integral components of today's power/performance activities. These behaviours (e.g., body check, tackle) are often executed with great force
and have the potential to cause significant harm to those on the receiving end. Consequently, they have routinely been referred to as "aggressive" within the sporting domain. Due to the ambiguity surrounding this construct, Stephens (1998a) has suggested that 'intent to harm' is the defining characteristic that distinguishes aggressive behaviour from all other highly physical and accidental acts. In the literature, highly physical behaviours that fall within the formal rules of the sport have been labelled as assertive (Silva, 1979). These acts have the potential to cause harm, and in some cases may; however, the individual committing them lacks the intent to do so. Therefore, unless the individual intends on harming his/her opponent the behaviour cannot be considered aggressive and therefore must not be included in an empirical investigation.

1.2 Validity

An important concept in the assessment of any psychological construct is validity. Validity is an evaluative judgment of the degree to which the evidence and theoretical rationales support the adequacy and appropriateness of the conclusions drawn from some form of assessment (Messick, 1989; 1995). Several types of validity are important at both the measurement and design level. At the measurement level, content validity concerns itself with the degree to which a measure assesses all relevant aspects of the conceptual or behavioural domain that the instrument is intended to measure. A measurement tool's criterion validity is concerned with how accurately the instrument predicts the gold standard indicator of a particular concept. Further, if the measure is high in criterion validity it should be able to predict past, present, and future outcomes of interest (Bryant, 2000). And finally, a measure's construct validity is concerned with whether a given operational definition actually assesses the underlying conceptual
variable that it is intended to represent (Bryant, 2000). With respect to this investigation, these forms of validity will all be discussed in more detail in subsequent chapters.

At the level of the empirical design, validity is still very important. Researchers must conduct studies with cross-validation (i.e., generalizability) in mind and therefore pay special attention to external forms of validity. One such form is ecological validity. Most commonly this term refers to whether the environment, or situational context, of a study is representative of the natural or "real-world" social context in which the behavioural phenomenon exists (Bryant, 2000). In other words, researchers must balance the control present in laboratory investigations with their potential lack of generalizability to real-world conditions. Recently, two more dimensions of ecological validity have emerged in the literature and have demonstrated importance with respect to maximizing the external validity of research designs (Schmuckler, 2001). The first, concerns itself with the degree to which the stimuli used to elicit the behavioural response are indicative of the "actual" stimuli that would elicit the behavioural response within its natural environment. As this investigation assessed aggressive behaviour through a videotaped observation design, the influential stimuli inherent in the competitive atmosphere were also included. The final dimension of ecological validity, and the one that this investigation attempted to maximize, concerns itself with the degree to which the behaviours under investigation are indicative of how these behaviours truly exist within their natural environment (Schmuckler, 2001). As was discussed earlier in this paper, certain methodological and conceptual shortcomings have led to inconsistencies throughout the aggression literature. Several of these shortcomings are directly associated with this final form of ecological validity. As a result, this investigation's
primary objective was to overcome these limitations with the hope of providing a more realistic sample of aggressive behaviours from which more accurate and generalizable conclusions could be drawn.

1.3 Theoretical Frameworks

A multitude of theoretical frameworks have been formulated in an attempt to explain the etiology of aggressive behaviour; however, many have been rooted in the dominant ideology that governed the time of their inception. Historically, sport has been male dominated and the use of aggression has been promoted to maintain this exclusivity. Consequently, aggression within sport was previously viewed as an acceptable part of the character building experience and an integral component of the masculine identity (Coakley, 2001). This belief is still heavily ingrained within our current ideology and remains one of the major roadblocks in the way of our eventual comprehensive understanding of these behaviours.

1.3.1 Catharsis-Hypothesis

The catharsis-hypothesis was derived from the psychoanalytic work of Dr. Sigmund Freud. Freud believed that human behaviour was the result of an individual's constant battle between their innate primal instincts and the norms of contemporary society. Thus, Freud put forth the notion that all humans have an innate cumulative drive towards an aggressive episode and that the individuals must release these pent up urges in a socially acceptable manner (i.e., swear, punch a wall). Further, once these pent up urges have been released one should feel peaceful or cathartic for some time after. As a result, it was previously believed that “competitive games provide(d) an unusually satisfactory social outlet for this instinctive aggressive drive” (Menninger, 1948, p.343).
Consequently, sport was heralded as the perfect medium through which these pent up instincts could be released in a controlled and socially acceptable manner. For instance, Brill (1963) called sport “a salutary purgation of combative instincts which, if damned up within, would break out in a disastrous way” (p. 97). However, this commonly held justification exists in the face of contradictory evidence, as empirical studies have been unable to validate this hypothesis (Berkowitz, 1964; Ryan, 1970; Stone, 1950; Zillman, Katcher, & Milavsky, 1972). In actuality, individuals who are angry and are permitted to overtly express their emotions do not report peacefulness but actually exhibit increased aggression in the future (Russell, 1981). These positive perceptions towards sporting violence were a direct result of the masculanized ideology of the time and the popularity of the psychoanalytical approach. However this pervasive mindset, in which sport violence is believed to possess some positive attributes, still plagues contemporary society.

1.3.2 Instinctual Theory

Another popular theory regarding the etiology of aggressive behaviour also points the finger at natural or innate sources. However, unlike the Freudian explanation, these researchers believe that aggressive urges are under genetic control and that contemporary forms of aggressive behaviour exist because aggression holds some evolutionary function (Scott, 1958). Researchers have observed genetic differences in levels of aggression across a variety of species and have subsequently generalized these findings to the human race. Therefore, just like the “terrier breeds which have been selected for their ability to start and win fights and the hounds which have been selected for their ability to get along with strangers” (Scott, 1978, p.130), humans exist on a similar continuum. Using this
theoretical approach, aggressive behaviour is viewed as natural, and should therefore be employed to gain evolutionary advantages. Furthermore, it is posited that males who display violence will be feared by their less aggressive rivals and subsequently desired by the female spectator. Consequently, sporting violence becomes symbolized as a heroic territorial battle and therefore a legitimized component of society. The naturalization of aggressive behaviour relieves not only the aggressor, but also society from any responsibility. The individual is not at fault because the reaction is genetically controlled and therefore initiated subcortically; whereas society cannot be held accountable because the behaviours are genetic and therefore considered unchangeable components of human biology. However, as the work of Morris (1967) has demonstrated, “with the exception of the instinctoid reactions in infants to sudden withdrawals of support and to sudden loud noises, the human being is entirely instinctless” (p.11). More recently, the genetically controlled hormone testosterone has received attention as a possible mediating factor. A plethora of studies have been concerned with the relationship between an individual’s level of testosterone and their subsequent aggressive tendencies (Bahrke, Yesalis, & Wright, 1990; Bjorkqvist, Bjorklund, & Bjorkqvist, 1994; Salvador, Suay, Martinez-Sanchis, Simon, & Brain, 1999). A recent meta-analysis in this area found a weak positive relationship between testosterone levels and aggressive behaviour. However, no cause and effect conclusions have yet to be forwarded (Book, Starzyk, & Quinsey, 2001). Therefore, scholars are not entirely sure how testosterone produces this increased aggressive behaviour and have been unable to rule out mediating factors (e.g., anticipation, environment, provoked). There exists little to no empirical evidence that aggressive behaviours are entirely genetically controlled. Overall, this biological theory
Aggression gives little credence to environmental factors and provides relatively little insight into the dynamic nature of aggressive behaviour.

1.3.3 *Frustration-Aggression Hypothesis*

The frustration-aggression hypothesis postulates that in order to illicit an aggressive act, frustration must be present (Dollard, Doob, Miller, Mowrer, & Sears, 1939). Furthermore, that the link between this emotional-behavioural response is an innate component of human nature (Berkowitz, 1962). Subsequently, individuals who become frustrated, often as a result of their inability to obtain a goal, will aggress against the object of their frustration until they reach catharsis. Individuals who are unsuccessful in their aggressive attempt are hypothesized to be more likely to aggress in the near future when compared to those who have achieved success. This circular pattern is believed to continue until the individual reaches the operative goal of catharsis (see Figure 8.1). Critics of the frustration-aggression hypothesis dispute the fact that frustration is a necessary condition for the elicitation of an aggressive act (Berkowitz, 1962; 1989). Miller (1941) empirically illustrated that frustration did not always result in aggression and that its role may be better understood as a trigger cue or instigator of aggressive behaviour. Therefore, in the presence of frustration, certain stimuli may serve as triggers to release pent up aggression in predisposed individuals. Moreover, it is currently believed that the frustration-aggression relationship might not be innate, as was previously hypothesized, but may in fact be learned (Berkowitz, 1989). This paradigm shift has subsequently created some problems for the frustration-aggression hypothesis. With the acceptance of learning as an intervening variable, the term frustration can now be manifested in the interference of a goal response, task failure, lack of reinforcement,
internal arousal, or continued failure resulting in low self-esteem (Silva, 1984). The majority of researchers do not refute the fact that aggression is sometimes a response to frustration; however, because it's tolerated, not part of our genetic make-up (Smith, 1978a). This theoretical approach has recently been replaced by a social learning perspective; however, it has nonetheless been influential in how we currently approach the study of aggressive behaviour within the sporting domain. Remnants of this once influential theory can still be found in many of the rationalizations put forth concerning the existence of aggressive behaviour within the sport of hockey. For example, former NHL president John Ziegler stated “in a game where frustration is constant, for men to drop their gloves and sticks to take a swing at each other. I think that kind of outlet is important for players in our game” (Smith, 1978a, p.187). Remarks such as this illustrate support for the frustration-aggression link and the drive for catharsis, even when the evidence states the contrary (Smith, 1978a).

1.3.4 Social Learning Theory

The social learning theory states that most behaviour is learned observationally through modeling in primary social settings (Bandura & Huston 1961). Subsequently, it was Bandura and Huston’s (1961) work which demonstrated that children “readily imitated aggressive behaviour exhibited by a model in the presence of the model” (p. 316). These studies confirmed that children would model those behaviours that they witnessed others being rewarded for exhibiting. In order to demonstrate this phenomenon, the researchers conducted what is now known as the “bobo doll” experiment. Here, mothers of infants were placed in a room with a bobo doll, and instructed to interact with the doll in a certain manner (e.g., hug, punch, kick). The
mothers were then either rewarded for their behaviours or not. The infants were then placed in the same environment and their behaviours recorded. The researchers found that the infants would replicate the behaviours of their mother, if the mother was originally rewarded. The frequency of this replication however decreased if no reward was given or if punishment was introduced.

Moreover, the social learning theory also states that individuals can learn new behaviours from models not in their immediate social environment. Therefore, those aggressive behaviours that are so commonly displayed on sport related television programs may also have a profound impact on young hockey players’ competitive behavioural repertoires (Smith, 1978a). Bandura (1973) outlined four criteria that may affect the acquisition of particular behaviours through vicarious learning: (a) characteristics of the performer, (b) value of observed reward/ frequency of observed punishment, (c) similarity of observed setting to potential performance setting, and (d) the status of the model. In conjunction with the above criteria, the observer must also pay attention to the behaviour, retain the necessary information, be physically able to reproduce the behaviour, and finally be motivated to do so. As a result, it is not as simple as “monkey see, monkey do”. The practical application of this approach to the sporting world is quite obvious. Observing aggressive behaviours being rewarded (e.g., by coach, fans, teammates, parents) can lead to similar behaviours being exhibited by the observer.

Canadian researcher Michael Smith has examined the profound influence of a variety of social contexts on the behaviours of young hockey players. Smith highlights the important role that family members, coaches, and teammates have on influencing an individual’s beliefs and attitudes pertaining to the use of aggressive behaviour (Smith,
1975; 1978a; 1979a; 1979b). Smith has also examined the social influence of the mass media on youth hockey players' behavioural repertoires, more specifically viewing televised professional hockey. Smith demonstrated that youth players acquired a variety of aggressive cues from watching professional hockey and subsequently adopted them into their own competitive tactics (Smith, 1979a). These same results have been replicated using a population of youth football players (Mugno & Feltz, 1985).

According to Bandura and Huston (1961), simply learning a new behaviour is not sufficient enough for an individual to completely adopt it, there needs to exist some form of reinforcement. Within sport, the primary source of reinforcement appears to be progression through the ranks or competitive levels (Faulkner, 1974; Smith, 1979a). Several studies have demonstrated that youth hockey players view the use of aggression, and other illegal tactics, as necessary for impressing coaches and scouts (Faulkner, 1973; 1974; Smith, 1979a; 1979b). Consequently, these behaviours have been almost universally adopted by youth hockey players.

Several theories have been put forth in order to explain the etiology of aggressive behaviour within the sporting realm. The theoretical shift from an instinctual to a learning basis for aggression has allowed social scientists to better understand how these behaviours are acquired and transmitted throughout society.

1.4 Aggression Methodologies

Two methodological approaches have dominated the study of aggressive behaviour in sport. Both have a multitude of strengths; however, both approaches also have inherent limitations which appear to detract from their overall utility. These limitations, with the help of current technology, appear to be surmountable. Following a
discussion of these two methods, a new methodological approach that appears to
overcome these limitations, will be discussed.

1.4.1 Self-report Methodologies

Self-report measures are a form of descriptive research that seeks to determine the
current practices or perceptions of a specific population (Thomas & Nelson, 2001). The
most widely used method involves the distribution of questionnaires. Self-report
measures, in the area of aggression analysis, possess a variety of strengths which make
them relatively appealing to academics. First, and by far this method’s strongest
attribute, is its ability to directly assess an individual’s intentions. As the intent to cause
harm is the distinguishing feature of an aggressive act, the ability to assess these
intentions is of the utmost importance. Other methodologies in this area of inquiry are
unable to directly assess an individual’s intentions and have therefore been plagued by an
inherent inferential bias. Consequently, there has been a strong push by academics to
incorporate these self-report instruments into more ecologically valid designs (Kirker et
al., 2000; Stephens, 1998a). Secondly, these self-report measures can oftentimes be
easily interpreted and subsequently compared with normative criteria. Finally, designs
utilizing these instruments can be conducted in a concise manner and can include
relatively large sample sizes. This is especially important when one is conducting
multivariate statistical analyses.

Some shortcomings inherent in the self-report methodology include its lack of
ecological validity, predictive ability, and overall comprehensiveness. As was stated
earlier, ecological validity is concerned with the degree to which the construct is being
tested under real-world conditions (Thomas & Nelson, 2001). With respect to aggressive
c cognitions in sport, this entails that these cognitions be directly assessed during competition. This of course is not practical when dealing with questionnaires. These instruments are often administered during practice and/or pre-game sessions with the hope that an individual’s responses will be similar to those they would give during competition. However, according to Bredemeier and Shields (1986a), athletes use different patterns of moral reasoning while engaged in competition than they do in other social contexts. This limitation is directly associated with the previously discussed second dimension of ecological validity – influential stimuli. Therefore, because the competitive atmosphere possesses relatively distinct stimuli (e.g., crowd, game importance, rivalries), one has to ensure that these stimuli are present when individuals are being assessed. Consequently, one cannot assume that an individual’s responses to these self-report measures will be similar across different social settings.

This of course lends itself to the second point, this method’s lack of predictive ability. The underlying assumption of all these self-report measures is that in some way shape or form they are related to actual aggressive behaviour. If this was not the case, they would be of little empirical value. However, there is a good reason to believe they are associated with actual overt aggressive behaviours and are therefore important for understanding the etiology of these actions. Unfortunately, due in part to the previously mentioned limitation, it has been demonstrated that an athlete’s perceptions of and attitudes towards aggression are not necessarily associated with their actual competitive behaviours (Loughead & Leith, 2001; Worrell & Harris, 1986). This may be partially explained through Bredemeier and Shields (1986b) concept of the athletic “moral transformation”. Bredemeier and Shields (1986b) demonstrated that an athlete’s method
of moral reasoning (i.e., deciding what is right from wrong) changes dramatically when they enter into the competitive atmosphere. Consequently, the attitudinal and perceptual results obtained outside the competitive atmosphere are not indicative of how these constructs exist within competition and are therefore not highly associated with actual overt behaviours.

The final limitation inherent in this methodology is its overall lack of comprehensiveness. Aggressive behaviour is a dynamic construct that is influenced by a variety of factors and can take on a variety of forms. New forms of aggressive behaviour are constantly emerging (i.e., spitting, kicking, head-butting) and are subsequently overlooked using these measures. These dynamic qualities cannot be fully appreciated, nor assessed, through a static paper and pencil measure.

The self-report measures developed by academics can be divided into three distinct categories: (a) legitimacy of aggressive behaviour, (b) likelihood to aggress, and (c) perception of own aggressive motives. All three approaches are cognitive in nature and therefore examine a subject’s thoughts rather than their actual overt behaviour.

1.4.1.1 Legitimacy of Aggressive Behaviour. Investigators have attempted to assess individual athlete’s perceptions of the legitimacy of aggressive acts, with the notion that those who perceive aggressive behaviour as legitimate will be more likely to exhibit such behaviour within the competitive context. These investigations have sought to understand what intrapersonal factors contribute to the formation of these particular legitimacy perceptions. Such factors as an individual’s achievement motivation (Atkinson, 1964), guilt (Berkowitz, 1962), arousal level (Spence, 1964), machiavellianism (Christie & Geiss, 1970), moral reasoning (Bredemeier & Shields,
and goal orientation (Duda, Olson, & Templin, 1991) have been determined to affect how an individual legitimates the use of aggressive behaviour. Further investigations have uncovered several influential interpersonal factors including an athlete’s perception of their coach’s goal orientation and their perception of their teammates' beliefs about aggressive behaviour (Stephens & Bredemeier, 1996).

A plethora of instruments have been administered in order to assess athletes’ legitimacy perceptions; however, one of the newest operational tools to be developed is the Sport Behavior Inventory (SBI; Conroy, Silva, Newcomer, Walker, & Johnson, 2001). This measurement device provides the respondent with ten hypothetical sporting scenarios that include incidents with varying degrees of aggressive severity. This allows investigators to obtain an upper limit with respect to what an individual views as acceptable within the sporting domain. A hockey specific example contained in the SBI would read:

In a hockey game, a forward heads down the ice on a breakaway, but they are stopped on a daring play by a defender. The next time the forward comes down the ice, they intentionally shoot the puck directly into the defender’s stomach. Participants then rate their responses across an 8-point Likert scale (1 = never O.K; 8 = always O.K.) for the twelve situational questions that correspond with each scenario. Upon completion, a mean score is calculated which reflects a subject’s overall legitimacy perception regarding the use aggressive behaviour within sport. The assumption is that those individuals who legitimize aggressive behaviour, will be more likely to utilize it within competition. This assumption has never been directly assessed and is something
that appears to be necessary in order to understand the relationship between an individual's cognitions and their actual overt behaviour (Stephens, 1998a).

1.4.1.2 Likelihood to Aggress. Using a similar format as the one provided above, this approach examines the likelihood that an individual will perform the behaviour described in the scenario. Therefore, instead of asking whether the individual feels the behaviour is legitimate, they are asked if they would execute the behaviour in a similar competitive circumstance. The rationale behind this approach is that those individuals who report a likelihood to aggress will in fact demonstrate similar behaviour in an actual competitive environment. The first sport related instrument to assess this construct was The Sport Children’s Action Tendency Scale (SCAT; Bredemeier, Shields, Weiss, & Cooper, 1986). This instrument demonstrated acceptable psychometrics and was able to reproduce several of the discriminately valid results previously published (i.e., higher scores for males). However, more recently Stephens, Bredemeier, and Shields (1997) developed The Judgments About Moral Behavior in Youth Sport Questionnaire (JAMBYSQ). The JAMBYSQ was developed to assess this construct in conjunction with an individual’s level of moral reasoning. Subjects are provided with sport specific scenarios to which they must respond to six questions rated on a 5-point Likert scale. Questions three and six tap the respondent’s self-described aggressive tendencies. Individual scores on the JAMBYSQ have demonstrated a positive correlation with an individual’s perception of their team’s norms surrounding aggression (r’s > .54) and also their coach’s ego orientation (r’s > .19). These results have been used to establish the construct validity of this instrument (Stephens, 1995; Stephens & Bredemeier, 1996; Stephens & Kavanagh, 2003). The JAMBYSQ currently remains one of the only
operational tools to assess aggression using this perceptual approach. However, similar to the above approach, a valid behavioural criterion must first be established in order to assess the concurrent and predictive validity of this instrument.

1.4.1.3 Perception of Own Aggressive Behaviour. The final self-report approach requires subjects to rate how frequently they experience certain motives to commit aggressive behaviours while competing. Again, there is reason to believe that those individuals who report experiencing higher frequencies of these motives, in fact exhibit such behaviours in actual competitive situations. The Bredemeier Athletic Aggression Inventory (BAAGI; Bredemeier, 1978) was created to assess these constructs. The BAAGI is a 100-item inventory that examines both instrumental and hostile motives across a 4-point Likert scale (1=strong agreement; 4=strong disagreement). Scores on the BAAGI have been associated with the different subscales comprising the Buss-Durkee (1957) hostility inventory. However, when an individual’s perceptions have been assessed in relation to their actual competitive behaviour (i.e., penalties), this instrument has demonstrated rather poor predictive validity (Louhead & Leith, 2001; Worrell & Harris, 1986). The BAAGI has subsequently been modified (BAAGI-S; Wall & Gruber, 1986) to a 28-item inventory that includes only those items that previously demonstrated the highest factor loadings. This instrument has been used extensively and has shown strong internal psychometric properties (Keeler, 2000; Wall & Gruber, 1985; 1986). However, similar to the above two approaches, this instrument needs to be used in conjunction with a more ecologically valid behavioural criterion.

Overall, the assessment of intrapersonal constructs through the use of self-report measures appears to be extremely important in the study of aggressive behaviour.
However, there appears to be a great need to validate these instruments against an ecologically valid, reliable, and comprehensive behavioural criterion. This will subsequently provide the necessary predictive validity for these instruments while concurrently solidifying their underlying assumptions.

1.4.2 Archival Methodology

Another method for analyzing sport specific aggression utilizes the official penalty records from the respective sports. Aggressive behaviours in this instance are operationalized as those acts that violate the formal rules of the game and are subsequently punished by the game officials. Some behaviours (e.g., too many men on the ice) are obviously not aggressive in nature, and are subsequently omitted from these investigations. Overall, this approach has become the most widely used methodology in this area and is subsequently responsible for the bulk of the information that has been generated.

The archival methodology has several strengths which make it quite appealing to academics. First, an individual’s overt aggressive behaviours are now under examination. This demonstrates an attempt on the part of researchers to assess aggressive behaviours within their natural competitive setting. Consequently, an individual’s use of aggressive behaviour can now be recorded within the highly charged, and sometimes morally void, competitive atmosphere.

As well, this methodological approach appears enticing because investigators do not have to be present at the sporting event to obtain their data. This of course eliminates any social desirability biases that could be present if the athletes were aware that they were being observed. Another benefit associated with using game records is the ability to
accumulate large sample sizes. Archival records can be used to assess aggressive behaviour across games, seasons, and even careers. This allows researchers to provide a detailed description of how aggressive behaviours are manifested and distributed across a variety of environmental and situational factors. For example, Volkamer (1971) assessed 1,986 soccer matches while Widmeyer and McGuire (1997) sampled 840 National Hockey League games. Sample sizes of this magnitude would be almost impossible using any other method.

Proponents of the archival approach have also attempted to overcome the inferential biases associated with assessing aggressive behaviour in this manner. Widmeyer and Birch (1984), through semi-structured interviews, demonstrated that hockey players committed fourteen acts (charging, boarding, kneeling, elbowing, roughing, fighting, high sticking, slashing, cross-checking, butt-ending, spearing, instigating, checking from behind, head butting) primarily with the intention of causing harm or intimidation. Only those acts that demonstrated "intent to harm" 80 percent of the time or more were included. Therefore, investigations concerned with these fourteen behaviours can be relatively confident that players are committing these acts in an attempt to cause harm. This is extremely important as "intent" is the defining characteristic of aggressive behaviour (Stephens, 1998a). Consequently, Widmeyer and Birch's (1984) results allow investigators to assess these fourteen acts of aggression without having to assess an individual's intent each time. Their results demonstrate that the intent to harm is inherent in these fourteen acts and therefore these acts adhere to aggression's conceptual criteria.
Nevertheless, this measurement technique possesses some limitations. First, infractions within the game of hockey have a variety of time punishments associated with them. This can range from two minutes to five and even ten-minute penalties. As a result, using total penalty minutes as a dependent variable would be misleading and a gross error on the part of any investigator (Kirker et al., 2000). Rather, the frequency of each type of aggressive penalty would be a more representative measure and has more recently been the preferred method. Second, and the most profound criticism regarding this methodology, is the high rate of "positive misses". A "positive miss" is a behaviour that meets the appropriate operational criteria (i.e., aggressive) but goes unnoticed or overlooked by the game official (Kirker, et al., 2000). This limitation has inadvertently been assessed on a few occasions and has shown to be quite profound. These studies have unanimously concluded that the majority of rule violations (i.e., aggressive behaviours) go unnoticed or unsanctioned during competition (Bar-Eli & Tenenbaum, 1989; Gee & Sullivan, 2004; Kirker et al., 2000; Mark, Bryant, & Lehman, 1983). However, advocates of this approach appear to come up with significantly different results. Katorji and Cahoon (1992) found that only 5.2 percent of aggressive behaviours went unnoticed by the game official and that the influence of these "positive misses" would only minimally affect the study of aggressive behaviour in hockey. However, in this investigation the three independent observers were forced to code behaviours in real time. Consequently, due to the fast paced nature of the game it is not surprising that they were only able to account for an additional five percent. Different methods of data collection have subsequently been employed and have reiterated those findings that highlight this methods significant underestimation of aggressive behaviour (Bar-Eli &
Tenenbaum, 1989; Gee & Sullivan, 2004; Kirker et al., 2000). As a result, any conclusions drawn using only penalty records may be inaccurate while any discussion on the frequency of aggressive acts may be significantly under reported.

The use of penalty indices as a method for assessing aggressive behaviour is built upon the assumption that penalties represent the observations of trained observers (i.e., referee). Two reasons have been forwarded as to why these “positive misses” exist within the game of hockey. First, the game of hockey is extremely fast paced and dynamic and therefore some behaviours merely go unnoticed. This is heightened by the fact that several acts of aggression (i.e., slash, spear) are committed in a simultaneous and covert manner (Smith, 1979b). Further, several acts of aggression take place behind the play and are therefore not in the game officials line of sight (Katorji & Cahoon, 1992). The National Hockey League (NHL) has recently addressed this issue and has implemented a two-referee system that should inevitably aid in remedying this problem.

Even more profound, are the number of aggressive acts that are merely overlooked by the game officials. The North American version of hockey appears to have normalized a great deal of aggressive behaviour. Consequently, players have almost universally adopted these behaviours and appear to utilize them for a variety of performance and outcome reasons (Faulkner, 1974; Smith, 1978a). As a result, these acts may occur at such an alarming rate that officials may have no other choice but to overlook those infractions that do not significantly impact the contest. Therefore, only those behaviours that significantly interrupt the flow of the game or illegally interfere with a scoring opportunity may be punished and subjected to data analysis. Several environmental factors may also influence an official’s decision (Stephens, 1998a). We
have all heard the old adage that the game officials have “put away their whistles and are letting the two teams play”. This refers to those instances when officials, not wanting to be the deciding factor in a contest, overlook infractions in an attempt to allow both teams to win on their own merits. As well, factors such as the game importance, time remaining, score differential, and the crowd may also exert influence over the game official’s decisions. For example, Nevill, Newall, and Gale (1996) found that in soccer, the size of the home team’s crowd significantly influenced the number of penalties issued against their team. Therefore, a behaviour’s inclusion may be more associated with situational or contextual matters, than it does with the fact that the behaviour is in violation of the formal rule book. The practical reasons for this are quite obvious. If game officials penalized every illegal tactic, they would spend more time dealing with these matters than actually playing the game. This would of course significantly detract from the speed and action inherent in hockey. However, if researchers are to gain more ecologically valid insight into these behaviours they need to include all acts that fit the appropriate operational criteria.

One final limitation associated with this approach, is the lack of consistency between games. When multiple games are assessed, several different officials act as trained observers. Consequently, different perceptions and attitudes regarding what constitutes a rule infraction may be used (Stephens, 1998a). This obviously calls into question the validity and reliability of using penalty measures as operational indices. However, this is something that has never received empirical attention, and probably should in order to strengthen this method’s psychometric properties.
As was mentioned above, the bulk of the information concerning aggressive
behaviour in sport has been obtained according to this methodology. However, due to the
profound influence that “positive misses” appear to exert, there seems be a great need for
previously postulated factors to be re-assessed from a different perspective.

1.4.3 Direct Observation Design

In an attempt to overcome the previously mentioned limitations, observational
research designs have been employed. Observational research is a descriptive technique
in which participants’ behaviours are observed and coded within their natural setting
(Thomas & Nelson, 2001). With respect to aggression, Kirker et al. (2000) stated that
“the observation of game behaviour in real time and the context in which it occurs
provides the best opportunities to understand the dynamics of aggressive behaviour in
sport” (p.376). Consequently, direct observation may provide a flexible, thorough, and
objective approach that has the ability to overcome several of the previous measures’
inherent limitations.

Contemporary direct observation designs have been significantly improved with
the invention of the video camera (Thomas & Nelson, 2001). No longer must
investigators code behaviour in real time, as the camera allows behaviours to be viewed
from a variety of angles and speeds in order to obtain the most accurate results. Direct
observation techniques within the sporting realm have opted to use multiple cameras in
order to maximize the detail while presenting a variety of angles (Gee & Sullivan, 2004;
Kirker et al., 2000; Teipel, Gerisch, & Busse, 1983). This ensures that the entire
atmosphere under examination can be included and that all behaviours of interest are
subjected to data analysis. Consequently, an accurate assessment of the behaviour, as it
truly exists, may be provided. With respect to the coding of aggressive behaviours, it is important that only those that adhere to the operational criteria are included. The ability to stop, rewind, and pause the competitive action allows coders to assess behaviours several times before coming to any conclusions. This of course is a luxury that is not afforded to game officials. As a result, this approach appears to possess a distinct advantage when it comes to coding aggressive behaviours in an ecologically valid manner.

The most dramatic improvement associated with videotaped observation designs, specific to the study of aggression in sport, is their ability to incorporate those behaviours that have become part of the unwritten rule book. For example, it is not uncommon for offensive players poking at the goalie after the whistle to be punched, pushed or knocked over by the opposing team’s defensive players, without penalty. Several of these behaviours (i.e., punching, cross-checking) adhere to the appropriate operational criteria and therefore should be included in an investigation concerned with aggressive behaviour. However, within the ice hockey culture, these behaviours are viewed as acceptable methods of protecting one’s goalie and therefore are often overlooked by the game officials. The ability to incorporate these behaviours represents a dramatic improvement with respect to the “positive misses” limitation that is inherent in studies which utilize only penalty records. As was stated earlier, it has been demonstrated that the majority of aggressive acts go unnoticed or unsanctioned within a competitive event (Bar-Eli & Tenenbaum, 1989; Gee & Sullivan, 2004; Kirker et al., 2000). Those that are overlooked, may be the result of game officials not wanting to be the deciding factor in a competitive contest. However, as was outlined above, aggressive behaviours are still
being committed during these instances and therefore need to be accounted for. Using videotape, coders can include those behaviours that have become part of the unwritten rule book without having to endure the negative reactions of the crowd, coaches, and athletes. Furthermore, these behaviours can be included without actually stopping the game. These are all factors that an official must take into account before they penalize a particular behaviour. The inclusion of these normalized acts of aggression will inevitably provide a more ecologically valid picture (i.e., more representative) of the frequency and distribution of aggressive behaviour in hockey.

The use of direct observation, at face value, also appears to be a more reliable methodological approach. As was previously mentioned, when using penalty measures the trained observer constantly changes. These individuals may have dramatically different perceptions and interpretations of the rules and therefore a variety of operational definitions may be employed. However, when using an observational approach, you can keep the coders constant across all games ensuring that some amount of consistency does exist. Those few designs that have employed an observational approach in this area, report high inter-rater reliabilities (Bar-Eli & Tenenbaum, 1989; Coulomb & Pfister, 1998; Harrell, 1980; Kirker, et al., 2000).

Direct observation designs are not without their limitations. One logistical barrier that has been frequently encountered is the need to provide validation for the behaviours being coded. Without such validation, designs are open for attack concerning subjectivity biases. For example, a study concerned with teacher effectiveness must provide a theoretical or empirical rationale for why certain behaviours are going to be included, while others are omitted. If this is not present, the study is open for
interpretation with respect to what actually constitutes effective teaching behaviours (Thomas & Nelson, 2001). Another concern with observational designs is the influence of social desirability on the part of participants. Individuals who are aware they are being observed may act differently than they would otherwise (Bar-Eli & Tenenbaum, 1989).

Consequently, investigators must be cognizant of this fact and work diligently in an attempt to reduce this disturbance. Direct observation designs are also resource intensive and oftentimes require multiple investigators in order to maximize efficiency and objectivity. Finally, a limitation that is directed specifically at the observation of aggressive behaviour, is this approach’s inability to directly assess an individual’s intent. As has been stated several times, intent is the defining characteristic of aggressive behaviour (Stephens, 1998a). Consequently, including behaviours without first assessing their underlying intent possesses a profound inferential bias.

Due in part to the time and resource intensiveness of direct observation, only a handful of studies have been conducted in the area of sport aggression. One of the earliest investigations to implement an observational technique was concerned with the ever increasing aggression in the sport of basketball (Harrell, 1980). The study involved two independent observers following players during a tournament and recording a variety of frustration-inducing stimuli (i.e., fouls committed, missed shots, turnovers). Harrell (1980) found that the most significant predictor of an individual’s likelihood to aggress was the amount of aggression directed by opponents towards that subject. Bar-Eli and Tenenbaum (1989) also examined aggressive behaviour in the sport of basketball using an observational approach. These authors had 22 experts observe 53 players during a local area tournament. They had the experts code behaviours in violation of the rule book
(i.e., minor, major infractions) and record the time of their occurrence. The authors concluded that significantly more aggressive acts were committed late in the game and that minor infractions far outnumbered major ones. Another important conclusion, and one that highlights the ecological validity present with observational designs, was that the majority of these rule-violating behaviours went uncalled. Consequently, by coding these behaviours from the stands, a more ecologically valid sample of behaviours was generated. One of the most recent, and by far the most ambitious observational study, was conducted by Kirker et al. (2000). These researchers implemented a two camera direct observation design and assessed a variety of factors associated with the facilitation of aggressive behaviour. The tapes (hockey and basketball) were entered into a computer program and coded according to a validated operational list. Then, factors that preceded and resulted from aggressive acts were examined in order to obtain a holistic picture of each aggressive incident. Again, it was concluded that the majority of aggressive acts go unnoticed during competition, and that using a direct observation technique allows for a more ecologically valid sample of behaviours to be assessed. This study was exploratory in nature but appears to promote direct observation as a viable method for assessing aggressive behaviour in hockey.

Direct observation has also demonstrated a great deal of success in other sport related areas including children's physical activity patterns (Macfarlane & Kwong, 2003; Sirard & Pate, 2001), training (Hopkins, 1998), and coaching behaviours (Trudel, Côté, & Donohue, 1993). Consequently, the approach appears to provide researchers with the ability to examine a variety of behavioural constructs in an ecologically valid and reliable manner.
II. Review of the Literature

Injuries resulting from aggressive behaviour in sport are increasing at an alarming rate (Biasca et al., 2002). The conduct of some athletes has become so negligent and careless that the Criminal Court system has had no choice but to intervene. As a result of the frequency and severity of these behaviours, aggression within sport has garnered a considerable amount of attention from academics and society alike. The purpose of these research endeavors has been to uncover particular factors associated with the facilitation of aggressive behaviour. Previous studies can be grouped into one of five categories based on the influential factors under investigation: (1) Intrapersonal, (2) Interpersonal, (3) Intragroup, (4) Intergroup, and (5) Environmental (Kirker et al., 2000). A variety of influential factors have been thoroughly examined however, as Kirker et al. (2000) have stated “comprehensive and reliable knowledge of the dynamics underlying aggressive behavior is [still] lacking” (p.373).

2.1 Intraperonal Factors

Individual attributes may play a significant meditating role in whether an individual will display aggressive behaviour. As a result, a plethora of studies have been concerned with assessing these intrapersonal factors using a variety of self-report instruments.

One of the most extensively investigated factors has been the gender of the participant. Unequivocally, males have been shown to display, perceive, and legitimize aggression more than their female counterparts. Silva (1983) found that males were significantly more accepting of aggressive behavior even when a variety of mediating variables were investigated (e.g., type of sport, experience, current level of participation).
In another investigation, Bredemeier, Shields, Weiss, and Cooper (1987) used a series of slides depicting aggressive behaviour to ascertain legitimacy perceptions of males and females. They found that males' legitimacy perceptions increased according to the physicality present in their sport; however, female judgments were significantly lower and were not related to sport involvement. Tucker and Parks (2001) recently provided similar results; however, also noted that an interaction effect between gender and sport type appears to be emerging. In their investigation a larger score differential was noted between female/male non-contact participants than female/male collision sport participants. A variety of explanations were offered with respect to this emerging trend. First, they hypothesized that females in non-contact sports were heavily influenced by gender role expectations. At the same time, males in these sports used the dominant male ideology, in which aggressive behaviour is revered, when completing these instruments. The smaller discrepancy found among collision sports may be attributed to the dramatic changes that women's sport has undergone since the enactment of Title IX. As a result of these female sporting programs being developed and modeled after male programs, some of the attitudes and values have subsequently carried over. Therefore, when competing in these activities female participants appear to modify their beliefs regarding the use of highly physical and even aggressive behaviour.

Another intrapersonal factor that has received considerable attention in the examination of aggressive behaviour is an individual's level of moral reasoning. The theories of Kohlberg (1981; 1984) and Haan (1991) have been the frameworks upon which several of these empirical investigations have been based. Both theories present a comprehensive depiction of how an individual develops his/her moral competencies in a
stage-like manner. Although these two theorists utilize different conceptualizations, both divide moral development into three levels: (a) pre-conventional, (b) conventional, and (c) post-conventional. The pre-conventional level is displayed when an individual’s decisions are dominated by a concern for his/her own personal welfare. When an individual moves to conventional reasoning his/her decisions become heavily influenced, and often times congruent, with the norms and expectations of their families, primary social groups, and/or team. Finally, post-conventional reasoning is best described as “doing unto others as you would have them do unto you”. This final, and most mature, level of moral reasoning is guided by universal beliefs about fairness and justice.

The most common method for assessing moral reasoning involves a semi-structured oral interview based upon the structural developmental approach (Piaget, 1932). Here participants are given hypothetical scenarios while investigators use standardized and probe questions to uncover the underlying rationale for why an individual chooses one action response over another.

When moral reasoning has been examined with relation to aggressive tendencies within sport, some significant patterns have emerged. Lower levels of moral reasoning (i.e., pre-conventional) have been associated with significantly higher aggressive tendencies across several empirical investigations (Bredemeier, 1985; Bredemeier & Shields, 1984; 1986a; Bredemeier, et al., 1987). Using a regression analysis, Bredemeier (1985) demonstrated that moral reasoning significantly predicted an individual’s rating of the legitimacy of aggressive behaviour. Another conclusion extrapolated from the moral reasoning literature was that individuals entering into a sporting atmosphere undergo a “moral transformation” (Bredemeier, 1985; Bredemeier & Shields, 1984; Shields &
In other words, one's moral reasoning level is quite different within the sporting domain than it is during everyday life. Therefore, to obtain accurate results, investigators must assess an individual's moral reasoning level while they are engaged in the environment under examination. Overall, a negative linear relationship appears to exist between an individual's moral reasoning level and his/her subsequent aggressive tendencies.

An additional intrapersonal factor that appears to be associated with aggressive behaviour is an individual's achievement motivation. Cox (1998) defined achievement motivation as "an athlete's predisposition to approach or avoid a competitive situation" (p. 238). Within the sport psychology literature, achievement motivation has been primarily discussed in relation to why people participate and persevere in certain activities. However, this relatively stable personality trait has also been helpful in predicting and explaining aggressive behaviour. The theoretical framework that underlies this construct attempts to understand behaviour by assuming that humans are goal-directed creatures and that behaviour can be predicted according to these goals.

From this research, two goal orientations have been identified. Task oriented individuals participate in activities generally for intrinsic reasons and attempt to demonstrate skill mastery rather than normative ability (Nicholls, 1989). Furthermore, these individuals interpret success according to personal standards rather than comparing themselves to others. While participating, task oriented individuals are expected to (a) display adaptive achievement behaviour, (b) exert effort, (c) select challenging tasks, (d) be intrinsically motivated, and (e) persist in the face of failure (Nicholls, 1989). In contrast, ego oriented individuals strive to demonstrate superior normative ability while concurrently avoiding
to appear incompetent (Nicholls, 1989). These individuals compare their performance with the performance of their peers in order to evaluate success. As a result, beliefs pertaining to competence become other-referenced and entirely outcome dependent. When achievement motivations are discussed in relation to aggression, it is hypothesized that ego oriented individuals will display aggressive tendencies in order to increase the likelihood that they will appear competent. In this respect, aggressive behaviour and/or poor sportspersonship is used instrumentally to demonstrate competence. Lemyre, Glyn, and Ommundsen (2002) supported this hypothesis when they demonstrated that ego oriented individuals received the lowest overall sportspersonship rating. Several other empirical investigations have documented similar results (Duda & Huston, 1995; Duda et al., 1991; Stephens, 1998b; Stephens & Kavanagh, 1997). However, the relationship between individual achievement motivations and aggressive tendencies does not always appear to exist. Lemyre et al. (2002) demonstrated that the mediating variable "perceived ability" negated this relationship. In other words, ego oriented individuals, who perceive themselves as possessing sufficient ability, did not feel the need to use instrumentally aggressive behaviour in order to display competence. This mediating factor may present one of the most profound avenues through which aggressive behaviour may be eliminated.

2.2 Interpersonal Factors

Aggressive behaviour may also be the result of interpersonal interactions. Unlike the above variables, which are present irrespective of other people, these factors arise only through social interaction. The social interaction in this instance transpires between two individuals. The two people may be teammates, opponents, family members or just
merely friends. The important thing to remember is that the information shared during this interaction influences the likelihood that an individual will exhibit aggressive behaviour in the future.

One variable that has received a considerable amount of academic attention is the reinforcement of aggressive behaviour by coaches and parents. Athletes who perceive these socializing agents as supportive of aggressive behaviour have been shown to display increased legitimacy perceptions regarding these acts (Stephens, 2000). Canadian researcher Michael Smith has conducted several descriptive studies surrounding interpersonal relationships and their association to aggressive behaviour. Using Schmitt’s (1972) concept of the “reference other”, Smith has sought to highlight the importance that interpersonal relationships have upon individual behaviour. The individual-other typology has three central components: (a) the reference other (the person that is influencing the individual), (b) the reference relationship (type of influence), and (c) the individual (the person being influenced). Within the sport of hockey, Smith (1979a) has focused on the relationships between an individual and his/her coach, parent, and teammates.

The coach has been heralded as one of the most profound “reference others” within the sporting domain. The coach possesses the potential to positively sanction illegal behaviour as a means to an end (i.e., winning) while continuously conveying messages about proper masculine deportment (Smith, 1979a). The belief by players that coaches demand aggressive behaviour, led Faulkner (1974) to conclude that players see fighting ability and coercive skills as extremely important when impressing coaches and management. As well, “some hockey coaches keep statistics on the number of hits [legal
and illegal] made by their players, often attributing losses to insufficient hitting” (Smith, 1975, p. 74). As a result, the coach is in a very powerful position when it comes to the modeling, reinforcement, and eventual facilitation of these aggressive behaviours. In one extreme example, a coach following a disappointing loss told a player that he had permission to fight an individual from the opposing team. Before he knew it, the player was down the hall pummeling the other boy from behind (Smith, 1979b). Therefore, players appear willing to execute a coach’s orders without any second thought. The influence of a coach is something that must never be underestimated. Mugno and Feltz (1985) found that football players, at both the minor and high school leagues, rated their coach as the most influential factor with respect to how they played the game.

Parents also appear to exert a significant influence over the behaviour displayed by their children during a sporting event. One of a parent’s primary role obligations is to transmit gender normative behaviours to their children. For young boys, this often includes behaviours pertaining to violence and aggression when they are insulted, threatened, or attacked by another individual. Smith (1974), using semi structured interviews, demonstrated that a father’s approval of fighting was significantly related to the number of fights that his son was involved in over an entire season’s play. Therefore, the interpersonal relationship between a father and son can have a profound impact on whether an individual will resort to violence when faced with confrontation. Furthermore, it has been postulated that “violent” sports like hockey may attract youngsters who receive this type of parental message at an early age.

The same learning - reinforcement pattern that has been described above also appears to exist between teammates (Smith, 1979a). It seems reasonable that individuals,
after spending a lot of time in this primary social group, would learn and mold their
behaviours in accordance with others' expectations. It has been postulated that an
individual's attitude towards aggressive behaviour may be dramatically different from the
behaviour they display in the presence of his/her peers (Matza, 1964). Therefore, even if
a parent tries to instill positive moral values in a child, that child is likely to compromise
those values in the presence of antisocial peers. This creates a mutual misunderstanding
in which individuals pretend and act aggressive, when in fact they know their behaviour
is inappropriate and compromises their moral upbringing (Matza, 1964).

The modeling and reinforcement of aggressive behaviour does not necessarily
have to take place directly in front of an individual. Vicarious learning of aggressive
behaviour, through the media, has also been shown to carryover into the competitive
event. Smith (1978b) stated that 70 percent of the players in his study reported watching
professional hockey at least once a week. Furthermore, out of the 604 minor league
players studied, 56 percent stated they had learned and used an aggressive behaviour
from watching hockey on television. They went on to give detailed descriptions of the
behaviours and also reported the frequency at which they utilized these behaviours during
competition. For example, one child stated “giving him a shot in the face as he's coming
up to you. The ref can’t see the butt-ends” (Smith, 1978b). In order to validate these
results, Smith (1978b) cross referenced each individual's response regarding the
frequency at which they used these behaviours and found a significant correlation with
the penalties that they had received. A major obstacle in the effort to eliminate
aggressive behaviour lies in the fact that these behaviours often fill highlight reels; thus,
sending the message that they are acceptable and desired components of the sport.
Therefore, approval and reinforcement from any of the above sources has been positively correlated with an individual’s likelihood to display aggressive behaviour while participating in competitive sport. These factors also appear to present a very profound and often under utilized medium through which these behaviours can be reduced or even eliminated.

Another interpersonal factor, which appears obvious at first, is the aggressive behaviour of an opponent. It has been documented that aggressive behaviours are overwhelming retaliatory (Harrell, 1980; Russell, 1974). In other words, if one is the recipient of an aggressive act, one usually reciprocates with an aggressive response. In Harrell’s (1980) investigation, a three person direct observation technique was used in order to assess individual athlete’s aggression scores. Harrell (1980) concluded through a regression analysis that an opposing player’s aggressive behaviour accounted for 66 percent of the variation in a subject’s aggression score. As a result, the more aggression a player received the more aggression a player likely displayed.

The amount of frustration an opponent causes has also displayed a positive association with an individual’s likelihood to aggress (Harrell, 1980; Russell, 1974; Stephens & Bredemeier, 1996). This observation stems directly from the tenants of the frustration-aggression hypothesis. Frustration results when an individual is stopped from achieving their desired goal. Harrell (1980) demonstrated that goal interferences in basketball, such as poor free-throw shooting and reduced scoring, increased the likelihood that an individual would resort to using aggressive tactics. Within hockey performance decrements could take on a variety of forms, from simply having the puck taken away, to being tripped while on a break-away. In either instance the outcome is not
conducive to the outcome desired by the individual and the final result would be frustration. Brice (1990) found a significant, but small correlation between the feeling of frustration and an individual’s desire to physically injure an opponent.

The frustration explanation has also been used to describe why competitive sport appears to illicit more aggression than other noncompetitive activities. Competitive interactions hinge on the notion that one competitor’s gain is the opposing competitor’s loss. As a result, competition seems to naturally foster aggressive behaviour (Leith, 1977; Nelson, Gelfand, & Hartmann, 1969; Sherif & Sherif, 1953). Therefore during the course of an interpersonal interaction, any frustration caused may increase the likelihood that an aggressive incident will transpire.

Frustration may also result from a poor officiating call. Only a couple of studies have examined this intervening variable, but both have concluded that the likelihood of an aggressive penalty increases after a poor officiating call (Avanzini & Pfister, 1994; Mark et al., 1983).

When opponents interact in a competitive arena there are numerous social and psychological processes occurring. Within contact sports these interactions are often not pleasant and have the potential to erupt into violent incidents. Sports are basically designed to illicit frustration and therefore aggressive tension between opposing parties (Sherif & Sherif, 1953). Furthermore, certain aggressive behaviours have the potential to give an individual a significant performance edge (Smith, 1979a). As a result, these behaviours are learned early in the skill acquisition phase and quickly utilized during competition to ensure victory (Smith 1979a). Consequently, research appears to indicate that the main sources of hockey violence are social in nature (Smith, 1979b).
Intragroup factors pertain to those beliefs, values, norms, and behaviours that are shared among all team members. Members of a team usually unite in a heterogeneous fashion and quickly become a homogenous unit. This unification process involves the reinforcement of appropriate behaviour combined with the punishment of negative behaviour (Carron & Hausenblas, 1998). The results are commonly held standards regarding the expected behaviour of all team members (e.g., be on time). If these norms are not followed, violators become susceptible to team sanctions. The sanctioning of norm violating behaviour may take on a variety of forms, from simple name calling to expulsion from the team. As a result, if an individual wants to be part of a team they may alter their intrapersonal characteristics in order to do so (Matza, 1964).

Team norms surrounding aggressive behaviour have been a construct of particular interest. Traditionally, to assess these norms, participants have been asked how many of their teammates would perform certain potentially injurious or illegal behaviours and then subsequently asked if they would perform the same behaviour. In three independent studies, each utilizing regression analyses, the team’s pro-aggressive norms emerged as the best predictor and accounted for the most variance with respect to a player’s self-described likelihood to aggress (24% - Stephens, 1998b; 29% - Stephens & Bredemeier, 1996; 25% - Stephens & Kavanagh, 1997). Therefore, it appears that individual player’s perceptions, regarding the use of aggressive behaviour in sport, are heavily influenced by the collective beliefs of their teammates.

A major contributor to a team’s collective norms is the coach. Using the Leadership Scale for Sports (LSS; Chelladurai & Saleh, 1980) in combination with the
Team Norm Questionnaire (TNQ; Shields, Gardner, Bredemeier, & Bostrom, 1995)

Shields et al. (1995) concluded that a significant multivariate relationship existed. As a result, specific coaching styles have been significantly shown to affect the type of team norms that develop. Furthermore, the coach’s perceived achievement motivation has also been concluded to influence the collective norms of a team as well as individual legitimacy perceptions (Stephens & Bredemeier, 1996). Athletes who perceive their coach as being ego oriented have displayed a significantly greater self-described likelihood to use aggressive behaviour. In these instances, the coach most likely overvalues winning and as a result the athletes adopt a similar “win at all costs” attitude. This attitude is conducive with using aggressive behaviour in an instrumental fashion to increase the team’s chances for victory. As a result, teams that possess pro-aggressive norms demonstrate a significantly higher tolerance for, and self-described likelihood to, aggress against an opponent.

Another mediating variable that has demonstrated significant influence over the construction of team norms, is the level of team cohesion present. It has been hypothesized that a high level of cohesion must be present in order for collective norms to develop surrounding behaviours that are socially ostracized (Haan, Aerts, & Cooper, 1985). Shields et al. (1995) found a significant relationship between team cohesion as assessed through the Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) and the variables that comprise the TNQ. It was subsequently shown through a canonical correlation that task cohesion played a much more significant role in the formation of these aggressive oriented norms than did social cohesion. Therefore
highly task-cohesive teams, possessing pro-aggressive norms, displayed an increased likelihood of utilizing aggressive behaviour while engaged in a competitive event.

Roles are also developed and allocated through intragroup interactions. It has been stated, that in order to be successful in hockey a team needs particular players to fill critical roles (Smith, 1979b). Teams that advocate the use of aggressive behaviour allocate the role of "enforcer" to their larger and stronger players (Smith, 1979b). The expectations of the team are transmitted to this individual through formal and informal team communication. Therefore, these “enforcers” quickly learn what the team expects from them and perform in the competitive event accordingly. The only hockey study to date that has included this factor was conducted by Widmeyer and Birch (1979). These authors concluded that defensive players committed significantly more aggressive penalties than did their offensive counterparts. It is surprising that this factor has not received adequate attention, as it is common knowledge that certain positions are ascribed certain behavioural requirements. For example, defensive players are responsible for thwarting scoring opportunities using any means necessary. Consequently, at a very superficial level, this position appears to be more conducive with using aggressive tactics. Future inquiries in this area would be wise to include this factor.

2.4 Intergroup Factors

Intergroup factors, refer to the influential variables that emerge as a result of two or more groups interacting with each other. As Sherif and Sherif (1953) have demonstrated, when competition is introduced friendships are destroyed, hostilities created, and aggressive behaviour escalated. Consequently, a variety of intergroup factors appear to act as catalysts for aggressive behaviour within a competitive situation.
This category of influential factors has been overwhelmingly assessed using the archival methodology. Furthermore, these variables have received a considerable amount of attention, and are believed by many to be the most influential factors in facilitating the use of aggressive behaviour.

One of the most extensively examined factors relating to the use of aggressive behaviour, and the most equivocal, is the winning or losing state of a team. Volkamer (1971) examined 1,986 soccer matches and concluded that losing teams received significantly more penalties and warnings than teams that were winning. In a laboratory experiment, Leith (1989) found that losing teams would administer more shocks to their opponents than would winning teams. This experiment illustrates the frustration that losing can elicit and the aggressive manners in which teams are willing to retaliate. In contrast, Cullen and Cullen (1975) found that successful junior hockey teams obtained significantly more penalties (aggression) than did their losing counterparts. And yet another result was obtained by Wankel (1973) and Widmeyer and Birch (1979; 1984) in which "no difference" in the frequency of aggressive penalties was reported between winning and losing teams.

Contemporary scholars have explained these equivocal results by highlighting previous flaws. Early studies only examined absolute winners and losers and did not take into account that a team’s status may change throughout the game. In order to incorporate the dynamic nature of a team’s status, McGuire (1990) examined 9,318 aggressive penalties in relation to the perpetrator’s team status at the time of the infraction. He concluded that no difference existed between losing and winning teams with regards to aggressive penalties. Even though the previously mentioned results
appear to be equivocal, the majority of studies do in fact point the finger at members of the losing team.

Game location has also been examined as an influential determinant of a team's likelihood to demonstrate aggressive behaviour. Several theoretical assumptions, most stemming from the frustration-aggression hypothesis, have formed the basis for these investigations. Widmeyer, Bray, Dorsch, and McGuire (2002) suggested that losing at home may be more frustrating than losing away from home and as a result may subsequently influence the behaviour of the home team. Also, the overwhelming belief that a home field advantage exists might have an influential effect upon how each team approaches the competitive contest. Again, equivocal results have been obtained. LeFebvre and Passer (1974) concluded that a significant difference existed, with visiting teams demonstrating a higher frequency of aggressive penalties. Conversely, McGuire, Widmeyer, Courneya, and Carron (1992) found that game location did not exert a significant influence over a team's likelihood to receive aggressive penalties. Further empirical investigations are needed before the influence of this intergroup variable is completely understood.

A variable that has not received due attention is the frequency of competition between two teams. Due to an increase in travel costs several leagues have adopted unbalanced schedules, with teams in close geographic proximity playing more frequently than teams that are far apart (Widmeyer & McGuire, 1997). Two opposing theoretical frameworks provide the rationale behind investigating this potential mediating variable. First, social contact theory has demonstrated that individuals who interact more frequently (Festinger, Schachter, & Back, 1950) and teams whose members are closer in
spatial location (Peterson & Martens, 1972) display increased levels of "likedness". As a result, one could speculate that teams who play more frequently would also respect each other more and consequently display less aggressive behaviour during their contests together. On the other hand, Sherif and Sherif's (1969) intergroup conflict theory hypothesizes:

when members of two groups come into contact with one another in a series of activities that embody goals which each desires, but which can be attained by one group only at the expense of the other, competitive activity toward the goal changes, over time, into hostility between the groups and their members (p. 239).

Therefore, more frequent meetings between two teams may actually facilitate increased levels of aggression. Widmeyer and McGuire (1997) tested these theoretical assumptions using data obtained from 840 National Hockey League (NHL) games. Using an ANOVA they found that across-competition effects existed for both minor and major penalties. Subsequent post hoc Tukey analyses indicated that a greater number of both types of penalties were found in the later contests; thus, supporting the intergroup conflict explanation. As a result, the unbalanced team schedules may in fact be partially responsible for the increased levels of aggressive behaviour that are currently being witnessed. These results appear to validate a prediction made by Widmeyer and Birch (1984) that "the unbalanced schedules adopted by the NHL during the 1981-82 season may produce the rivalries that promoters are seeking, but may also lead to season-long intimidation and animosity" (p.83).

The importance of the game has also been forwarded as a possible mediating factor with respect to the amount of aggression displayed between two competing teams.
Widmeyer and McGuire (1997) found that game importance played a particularly interesting role in facilitating aggressive penalties between two teams. Intradivisional games, especially in the NHL, are considered to be the most important. These games have become known as “4-point” games because a victory gives two points, while the opposition is denied two points. This intradivisional point separation is what is used to determine which teams enter the playoffs and who receives ‘home-ice advantage’.

Widmeyer and McGuire (1997) also found that the frequency of aggressive penalties increased as did the game importance. However, these authors demonstrated that teams getting closer to the playoffs concurrently displayed fewer non-aggressive penalties. Therefore, there appears to be evidence that players can control the use of norm violating behaviour when faced with critical game situations.

Aggressive behaviours have also been determined to increase as the game progresses. According to Russell and Drewry (1976) and Cullen and Cullen (1975), aggressive penalties in the third period were significantly higher than in the previous two. The increase in penalties was attributed to elevated levels of frustration among players of the losing team when a victory appeared out of reach. Kelly and McCarthy (1979) found a similar, yet insignificant, trend across periods. They noted that the trend of increased aggressive penalties across periods appeared to occur except for when the game started off extremely aggressive. In this instance, the amount of aggression significantly decreased as the game progressed because of what Kelly and McCarthy (1979) have described as “self-regulatory” behaviour.

Finally, the differential in score between two teams has also been hypothesized to influence the facilitation of aggressive behaviour. The belief is that smaller score
differentials will minimize the frequency of aggressive penalties because players become unwilling to put their teams at a disadvantage when the outcome is still in question (Russell, 1974). However, when score differentials are large, individual frustrations may become abnormally high and aggressive penalties become a way of retribution. Several studies have supported these score differential hypotheses (Goginsky, 1989; Harrell, 1980; Wankel, 1973). Furthermore, McGuire (1990), only looking at the aggressive behaviour of the losing team, found that significantly more aggressive penalties were committed when the score differential was three or more goals than when the teams were only separated by one or two goals. As a result, there appears to be evidence that larger score differentials act as a catalyst for the facilitation of aggressive behaviour.

Several intergroup factors have been hypothesized to influence the facilitation of aggressive penalties within the sport of hockey. Numerous empirical investigations, most routed in the frustration-aggression paradigm, have demonstrated the role that these factors play. Consequently, these investigations state that understanding the history between two teams, and by examining their modes of interaction, we may be able to predict the distribution of aggressive penalties across a competitive contest.

2.5 Environmental Factors

Environmental factors refer to those influential variables that are external to the competitive action yet are still a component of the competitive atmosphere (e.g., size of rink, time of day). Very few environmental factors have been considered in the examination of aggressive behaviour within sport. One potential environmental factor that has received some attention is the role of the crowd. The influence of the crowd has been shown to both reduce and increase the frequency of aggressive behaviour. Baron
demonstrated that an audience which appears passive and is perceived as likely to censure aggressive behaviour, can have an inhibiting effect upon a performer's behaviour. On the other hand, the mere presence of an audience has been shown to facilitate physically aggressive behaviour through overt reinforcement and other behavioural cues (Harrell & Schmitt, 1973). Within hockey, Houston and Widmeyer (1987) demonstrated that varying levels of praise for previous aggressive behaviour could significantly predict an individual's current aggressive tendencies. The overall crowd influence governing aggressive behaviour appears to mimic the equivocalness that has been observed in the home vs. away team literature. It would seem more plausible that it is actually the players' perceptions of the crowd that is the true influential variable. Therefore, players that perceive their aggressive behaviour as being rewarded or reinforced would presumably display these behaviours more frequently in the future. On the other hand, those players who perceived a negative response from the crowd would inevitably minimize the occurrence of aggressive behaviour in the future. The crowd may potentially facilitate or inhibit aggressive behaviour; however, the true influential effect may lie entirely within the individual player's perceptions. A plethora of environmental factors may still exist (e.g., temperature, time of day, time of year) and as a result this area of inquiry is deserving of future academic attention.

The area of sport specific aggression has received a considerable amount of attention from academics throughout the years. A variety of influential variables have been thoroughly examined, but have primarily been assessed according to the archival methodology. This methodology, for a variety of reasons, has been unable to incorporate the majority of aggressive behaviours. As a result, there appears to be a great need for
contemporary approaches that possess the ability to overcome these shortcomings, and subsequently conduct an ecologically valid assessment of these factors.

2.6 *Rationale for Current Design*

The bulk of the information that we currently hold as accurate has been obtained using the previously discussed archival methodology. Consequently, the limitations inherent in this approach are also inherent in its results. The conclusions extrapolated from these designs have omitted a significant proportion of aggressive behaviour. As a result, an inaccurate sample (i.e., fewer) of behaviours has been used to conduct statistical analyses. The current investigation proposes that the use of direct observation may increase the relative inclusiveness of these behaviours and subsequently provide a more ecologically valid unit of analysis from which conclusions may be drawn. Consequently, using a previously validated operational list (Kirker et al., 2000), the fourteen behaviours forwarded by Widmeyer and Birch (1984) will be assessed through direct observation.

2.7 *Purpose*

The primary purpose of this investigation was to overcome the "positive misses" limitation inherent in the archival methodology. By including those behaviours that adhere to the appropriate conceptual criteria, irrespective of situational (i.e., score differential) and environmental factors (i.e., crowd), a more ecologically valid picture of aggression within hockey may be produced. Further, this investigation assessed the influence of five previously cited factors (e.g., period, score differential, position, home versus away, status) on this more inclusive sample of behaviours.
2.8 Research Questions

1) The majority of aggressive behaviours will go unnoticed or unsanctioned by game officials.

2) A progressive pattern, in which the number of aggressive acts increases as the game progresses, will emerge.

3) Members of a losing team will commit significantly more aggressive behaviours than will members of a winning team.

4) Defensemen will commit significantly more aggressive acts than will offensive players.

5) There will be no difference between home versus away teams with respect to the frequency at which they exhibit aggressive behaviour.

6) There will be a higher frequency of aggressive behaviours when a large score differential (<3 goals) exists when compared to a small score differential (>2 goals).

III. Methodology

3.1 Participants

The participants that comprised this investigation were male hockey players in a Junior B hockey league. Junior B hockey was used in order to remain consistent with the Katorji and Cahoon (1992) design in which the prevalence of “positive misses” was first empirically assessed. The age of the athletes competing in this league ranged from 16-21 years of age. Information letters concerning the nature and protocol of the study were distributed to each athlete with those under 18 also receiving a letter of information directed to their parents (see Appendixes A, B).
3.2 Measures

The operational definitions used in this investigation were obtained from Kirker et al. (2000) (see Appendix C). This was done in order to ensure consistency between observational studies and also because the list had been previously approved by a panel of experts. Consequently, these definitions are believed to have relatively high face validity. Also, this operational list adheres very closely to the operational definitions outlined in the official National Hockey League (NHL) rulebook. As the NHL represents the pinnacle in the sport of hockey, their operational definitions form the gold standard for what constitutes a rule infraction. Consequently, by utilizing similar definitions we are attempting to maximize the content and construct validity of our investigation.

Each behaviour included in this investigation was coded according to whether or not a penalty was issued by the game official. This was done in order to quantitatively assess the influence of positive misses on the study of aggressive behaviour.

Next, each behaviour was coded according to five previously cited factors. Four of the factors were chosen due to their popularity in the previous literature, while player position was included because of its relative omission. The period in which the infraction occurred was of particular interest. Each behaviour was coded as occurring in the first, second, or third period. Home versus away status of the aggressor’s team was also assessed. Consequently, the individual initiating the act was coded as being either a member of the home or away team. The status of the aggressor’s team at the time of the infraction was also coded. Team status was operationalized as winning, losing, or tied at the time of the infraction. The score differential between the two teams was operationalized as “two or fewer goals” or “three or more” (McGuire, 1990). And
finally, the position of the aggressor was classified as either offensive (i.e., left wing, center, right wing) or defensive (i.e., left defense, right defense, goalie).

3.3 Procedure

Upon approval from the Brock Research Ethics Board (REB# 03 – 037), the convener of a local Junior B hockey league was contacted in order to solicit permission. Next, coaches of teams in this league were contacted and informed as to the purpose of this study (see Appendix D). One team demonstrated interest in this investigation and as a result they were selected. The players were informed as to the purpose and design of the research endeavor but were not told when the games would be videotaped (see Appendix E). This was done to maximize the accuracy of the data collected by minimizing any social desirability effects.

Ten home games were then selected based on researcher availability. Two Panasonic® 1.3 mega pixel palmcorders (Model No. PV-DV702D-K) were used to videotape the competitive action. The action was recorded on Panasonic® Digital Video Cassettes (70.4m) and then converted to a VHS format. The equipment was set up approximately one hour prior to the onset of the competitive event, in a relatively hidden location in order to remain as unobtrusive as possible. Data gathering was meant to be unobtrusive to ensure that the natural behaviours of these players were being assessed.

When analyzing a competitive event, the two cameras were placed according to Figure 8.2. This design was deemed advantageous as it produced the best results during pilot investigations. The two cameras were focused on the competitive action, each taking a different perspective to ensure that all on-ice behaviour was captured. The “action specific” camera followed the puck and captured those players immediately
involved with the play. This is overwhelmingly where the majority of aggressive acts transpire and therefore an entire camera was devoted to this area in order to obtain the most detailed information. The “action general” camera was concerned with the entire end of the rink in which the puck was situated. Consequently, this included those players that were not directly involved with the play. The two cameras were time coded so that behaviours from both locations could be examined simultaneously. Two copies of the “action general” tape and one copy of the “action specific” tape were subsequently dubbed into a VHS format.

3.4 Coding

Prospective coders were recruited from a large fourth year undergraduate sport psychology class. Students were briefed as to the purpose of the study and were offered a half-credit for their participation. Approximately 20 students showed interest in the investigation and were subsequently interviewed. The interview was designed to gain a better understanding of each student’s experience with the game of hockey and their motives for participating in the study. Six students were then selected to undergo an applied component in which they were given a pilot tape, operational list (see Appendix C) and asked to code the appropriate behaviours. From this, two coders were selected, one male (25 years of age) and one female (23 years of age). These individuals were selected because both reported being quite familiar with the game of hockey (i.e., played, watched, refereed) and also came highly recommended from several of their professors. The author also acted as an independent coder, in order to remain consistent with the Katorji and Cahoon (1992) design (i.e., three coders). As the primary objective of this investigation was to assess aggression in an ecologically valid and inclusive manner, each
coder received two weeks of training prior to the onset of this investigation. The training consisted of each coder completing two tapes and lasted approximately eight hours. Reliability analyses (similar ÷ total) were conducted on these templates in order to measure inter-rater progress (i.e., fewer discrepancies). After each tape was completed the researcher and the two coders would meet and talk about where they had the most difficulty. This resulted in two operational modifications. The first was the inclusion of the behaviour “punching”. Punching in hockey oftentimes elicits a minor roughing penalty; however, roughing can be a very all encompassing term. Consequently, punching was added in order to gain more detail with respect to what behaviours were actually being committed. Secondly, the behaviour “instigating” was removed, as it involves a very subjective decision with respect to who started the fight.

The ten home games were taped on alternating Thursday nights starting in November and continuing through January. The tapes were then dubbed into a VHS format on Friday and returned to the researcher for distribution to the coders. Each coder was given a week to complete each tape. As a result, every Monday each coder would return and pick up a tape.

The coders were responsible for identifying the fourteen aggressive behaviours (Widmeyer & Birch, 1984), as defined by the operational list, and recording the individuals involved along with the time of the infraction. They were also instructed to highlight those infractions that were penalized and also record when goals were scored.

Inter-rater reliability was assessed on a game-by-game basis. It was determined by dividing the number of behaviours coded similarly by the total number of behaviours coded (similar + different). This percentage of agreement technique was used because of
the level of measurement in which the data was collected (e.g., nominal, ordinal). The major shortcoming associated with this technique is its inability to account for “chance agreement” or guessing (Goodwin, 2001). This can be overcome using either the Pearson correlation or G-theory techniques; however, both require that the data be in either a ratio or scale level of measurement. Aggressive behaviours that were identified by two or more raters were included in the study. This resulted in the extrapolation of 259 aggressive behaviours across the ten games under investigation. The inter-rater agreement between the three coders was 72.70% which is similar to the reliability (75%) reported by Harrell (1980). However, contemporary investigations stipulate a liberal criterion of 80 % with this type of systematic observation (Goodwin, 2001).

3.5 Assumptions

It was assumed that the cameras would go unnoticed by the players and would therefore not lead to any social desirability effects. As a result, it was assumed that the behaviours being recorded were indicative of these individual’s regular behaviours while in the competitive environment. Also, it was assumed that Widmeyer and Birch’s (1984) results still held true, and the majority (i.e., >80%) of these fourteen acts were still committed with the intention of causing harm. Consequently, these behaviours would then adhere to the conceptual criteria outlined to define aggressive behaviour, and should therefore be included in this investigation.

3.6 Delimitations

Several delimitations were employed in this investigation to properly examine aggressive behaviour within the time constraints provided. First, a single hockey team was followed. This was done for convenience and ethical reasons. Furthermore, only
male hockey players from a Junior B league were considered. Due to the considerable amount of information that was extrapolated from every competitive event, only ten regular season games were utilized. Also, only the fourteen behaviours outlined by Widmeyer and Birch (1984) were assessed. Finally, only five previously postulated factors were re-assessed in this investigation.

3.7 Limitations

Despite all efforts to create a workable design, certain limitations were inherent in this study. Only one team was selected to be the focus of this investigation. As a result, the home versus away results are biased as the home team remained constant. Due to ethical issues (i.e., consent) the players had to be informed about the purpose and design of this investigation. Consequently, there is a potential for social desirability effects to be present. Social desirability may also be present because the cameras may have been seen by the players. Due to the time constraints imposed by both the hockey season and academic calendar, the coders received only two weeks of training. This was later deemed to be inadequate and may partially explain the low reliability scores found in this study. Furthermore, as this design required a significant amount of time, expert coders were not deemed feasible. As a result, amateur coders were utilized for convenience purposes. One of the major limitations of this investigation was its inability to directly assess an individual’s intentions. As was stated above, we are assuming that the previous results surrounding these fourteen behaviours (Widmeyer & Birch, 1984; Widmeyer & McGuire, 1997) still hold true, and that there is good reason to believe these behaviours are intended to cause harm. However, this assumption was never directly
assessed. Finally, because only men's Junior B hockey was examined, the results of this investigation are not generalizable past the present sample.

IV. Results

As all the variables included in this investigation were categorical in nature (i.e., nominal, ordinal) univariate chi-square analyses were conducted to determine if significant differences existed. Also, because multiple assessments were being computed on the same data set, a Bonferroni adjustment was used to control for inflated Type I error. With five statistical tests being conducted, a new alpha level of .01 was employed for each test.

4.1 Assumptions of Chi-square Analyses

A chi-square procedure compares the values that one obtains with a set of generated expected values in order to determine whether the difference is real (i.e., significant) or due to chance (i.e., not significant). Further, this statistical test does not adhere to assumptions pertaining to normality (i.e., skewness, kurtosis) because of the level of measurement in which the data is collected. However, two assumptions are important when computing this statistic (Conner-Linton, 2003).

4.1.1 Independence

The assumption of independence ensures that each observation was made independently. If this assumption is not upheld, one cannot distinguish between actual differences and those that are associated with the variables. In this study the unit of observation was the actual aggressive behaviour. Consequently, because aggressive behaviours are committed independent of each other, that is to say that one behaviour does not necessarily result in another, this assumption was upheld.
4.1.2 Size of Expected Cell Frequencies

In order to run a chi-square procedure properly, one must ensure that all observed cell frequencies are above five. This is because the expected frequencies that are generated through this procedure cannot fall too far below the observed frequencies, but can be far greater (i.e., asymmetric distribution). However, if the observed frequencies are large enough, this would not be the case as the expected frequencies could go equally in both directions. The observed cell frequencies in this investigation were between 54 and 160. Therefore this assumption was also upheld.

4.2 Penalty

In accordance with our primary research question, it was concluded that the majority of aggressive behaviours went unnoticed or unsanctioned by the game official. Of the 259 behaviours that were coded, 179 went unnoticed (69.11%) while 80 (30.89%) behaviours were punished (see Figure 8.3).

4.3 Period

Opposite to our proposed hypothesis, the frequency at which players exhibited aggressive behaviour did not significantly differ across the periods of play [$\chi^2(2) = 8.28$, $p = .016$]. It was observed that fewer hostile acts were committed in the first period ($n = 65$) then were committed in the second ($n = 101$) and/or third periods ($n = 93$); however, this progressive trend was insignificant (see Figure 8.4).

4.4 Status

In this investigation, the frequency of exhibited aggressive behaviour did change according to the status of the aggressor’s team [$\chi^2(2) = 19.47$, $p < .01$]. However, the differences did not emerge as was hypothesized. Losing teams were observed exhibiting
slightly more aggressive behaviour \((n = 110)\) than were winning teams \((n = 95)\); however, a dramatic reduction in the frequency of aggression was observed when the two teams were tied \((n = 54)\) (see Figure 8.5).

### 4.5 Position

The use of aggressive behaviour did not differ according to player position \(\chi^2(1) = .467, p = .494\). Defensive players committed 124 (47.9%) acts while offensive players committed 135 (52.1%) acts. Consequently, the hypothesis that defensive players would commit significantly more acts was rejected in this investigation (see Figure 8.6).

### 4.6 Home versus Away Team

The frequency of aggressive behaviours did not differ according to a team’s home versus away status \(\chi^2(1) = .869, p = .351\). Home teams were observed committing 122 (47.1%) acts of aggression while visiting teams committed 135 (52.9%) acts. This result supports the hypothesis (see Figure 8.7).

### 4.7 Score Differential

In this investigation it was observed that the frequency of aggressive acts did differ according to the score differential \(\chi^2(1) = 14.37, p < .001\). However, significantly more behaviours were committed when the game was close (i.e., 2 or fewer goals) than when the score differential between the two teams was relatively large (i.e., 3 or more). This runs contrary to our hypothesis as well as the bulk of previous literature (see Figure 8.8).

V. Discussion

The primary purpose of this investigation was to overcome the ‘positive misses’ limitation inherent within the archival methodology. This was accomplished using a
videotaped observation design, in which behaviours could be included irrespective of the situational and environmental biases inherent within the competitive atmosphere. This design also attempted to remedy the commonly cited inferential bias, by only focusing on the fourteen behaviours forwarded by Widmeyer and Birch (1984). These behaviours have been shown to be committed by players with the intent to cause harm or intimidation and consequently were included irrespective of the coders' interpretation. Therefore, these behaviours are believed to possess the 'intent to cause harm' and were coded solely based on their operational criteria. Secondary to that, this investigation also assessed the influence of five factors (i.e., score differential, status, period, position, and home versus away) on the frequency and distribution of aggressive behaviour in hockey. These five factors were re-assessed using this more ecologically valid sample in an attempt to reproduce their previously published results.

Those researchers who have utilized penalty measures, have done so under the assumption that the majority of aggressive behaviour is noticed and subsequently penalized. An early investigation conducted by Katorji and Cahoon (1992) helped to empirically solidify this assumption. They found that only 5.2 percent of the aggressive behaviour went unnoticed by the game official. However, contemporary research in this area has since called this archival methodology, along with this assumption, into question (Bar-Eli & Tenenbaum, 1989; Gee & Sullivan, 2004; Kirker et al., 2000; Stephens, 1998a). The results of the current investigation indicate that 69.11 percent of the aggressive acts went unsanctioned; thus, adding credence to the argument surrounding this measures underestimation of "positive misses". This also represents a dramatic improvement with respect to ecological validity. By including these 179 behaviours, as
they adhere to the operational and conceptual criteria, we have provided a more accurate sample of behaviours that is in turn more indicative of how these behaviours truly exist within competition. As a result, those designs that once utilized the archival methodology may have significantly misrepresented the true frequency of these acts and subsequently based their results on only a small proportion of actual aggressive behaviour. This discrepancy may also partially explain some of the differential results obtained through this investigation. However, it should be noted that this investigation experienced relatively poor inter-rater reliability and therefore further empirical analyses are needed to validate the influence of these “positive misses”.

The five factors under examination were assessed in an independent fashion with Bonferroni adjustments. It was concluded that the frequency of aggressive behaviour significantly differed according to the score differential and the status of the aggressor’s team \((p < .01)\). However, the frequency of these behaviours did not significantly differ when compared by player position, period, and the aggressor’s home versus away status.

The results obtained through this investigation reiterate some previous findings while running contrary to others. Consequently, each factor will be discussed separately in relation to previous findings, and explanations will be offered in those instances were a discrepancy exists. However, it should be noted that this investigation in no way shape or form directly tested a theory. Rather theoretical explanations have been offered in a post hoc fashion and merely represent the author’s interpretation of the results. However, this is consistent with how theoretical explanations have been applied to studies in this area (Bar-Eli & Tenenbaum, 1989; Harrell, 1980; McGuire, 1990; Russell, 1974; Wankel, 1973).
By far the most surprising results obtained through this investigation were those concerned with the score differential. It has routinely been found that larger score differentials create an atmosphere that is conducive to the use of aggressive tactics (Goginsky, 1989; Harrell, 1980; McGuire, 1990; Russell, 1974; Wankel, 1973). This has routinely been explained via the frustration-aggression hypothesis. These studies have speculated that once a team feels as though the game is out of reach they may adopt a more aggressive mandate in order to ‘save face’ or ‘level the playing field’ (Harrell, 1980). This however was not the case in this investigation as the frequency of aggressive behaviour was significantly higher when the game was relatively close than when the two teams were separated by three or more goals. These results may be partially explained according to the factors that appear to govern several of the game official’s decisions. As was mentioned earlier, officials perhaps do not want to be the deciding factor in a contest, and may therefore put away their whistles when the score differential is relatively close. This however does not mean that aggressive tactics are not being used in these instances; rather, that the game official’s appear to overlook those infractions that do not dramatically interfere with the flow of the game. Conversely, when the two teams are separated by three or more goals, the officials may be more likely to call penalties. This increased penalization may be in an effort to establish control in this instance, or in a proactive attempt to ensure that a level playing field exists so that losing teams do not give up on the competitive mandate. This may partially explain the results that have been generated using the archival methodology. On the other hand, Smith (1975; 1978a; 1978b; 1979a; 1979b) has demonstrated through a social learning perspective that young hockey players view aggressive tactics as necessary for achieving performance goals.
Consequently, these behaviours appear to be almost universally adopted by hockey players and used in order to obtain a variety of performance advantages (Faulkner, 1974). Therefore, when the game is close (i.e., one or two goals apart), athletes may be reinforced for using these behaviours at a higher frequency in order increase their teams' chances for victory. In other words, coaches may view these penalties as the natural result of an athlete playing with increased intensity. On the other hand, when a large score differential exists, aggressive behaviours may be viewed by coaches as unnecessary and therefore would be far less likely to receive reinforcement. The combination of the above two explanations may account for the results generated by this study.

Team status is another variable that has received a considerable amount of interest. Even though equivocal results have been presented, the majority of studies have found that losing teams commit more aggressive acts (LeFebvre & Passer, 1974; Leith, 1989; Martin 1976; McGuire, 1990; Russell, 1974; Volkamer, 1971). These findings have also been primarily explained through the tenants of the frustration-aggression hypothesis. It has been forwarded that losing within a competitive contest elicits feelings of frustration and therefore heightens the likelihood that members of the losing team will opt to use aggressive behaviour (LeFebvre & Passer, 1974; Leith, 1989; McGuire, 1990; Russell & Drewry, 1976; Volkamer, 1971). These rather consistent results were not supported through this investigation. A significant difference was observed with respect to team status; however, the difference did not lie between winning and losing states but rather in the fact that relatively few behaviours were committed when the game was tied. Therefore, winning and losing teams appear to commit aggressive acts at relatively the same frequency; however, both teams dramatically reduce the frequency of these
behaviours when the contest is tied. These results appear to support the notion that athletes are unwilling to put their team at a disadvantage (i.e., taking a penalty) when the contest is tied (Russell, 1974). From a social learning perspective, athletes may be punished for taking 'bad' penalties when the game is tied. With competitive contests usually only being separated by a few goals, unnecessary advantages given to the opposition may be viewed in a negative light. As a result, relatively few behaviours may be committed in this instance. However, when a score differential develops, especially a relatively small one, both teams appear to adopt the commonly held mindset that aggressive tactics are associated with performance advantages (Faulkner, 1974; Smith, 1979b). As was mentioned above, behaviours are most likely reinforced in this instance as they are indicative of an athlete trying everything to help his/her team.

The period of play has been shown to influence the frequency at which aggressive behaviour is utilized within a hockey contest. It has been posited by several academics that a progressive pattern exists within hockey, with the number of aggressive behaviours increasing as the game progresses (Kelly & McCarthy, 1979; Russell & Drewry, 1976; Wankel 1973). This pattern has received considerable empirical support; however, it did not significantly emerge in this investigation.

Home versus away team status has been assessed with respect to the use of aggressive behaviour (Glamser, 1990; McGuire, 1990). Several theoretical frameworks have been adopted in order to explain the influence of home versus away status on subsequent athlete aggression. The results of these analyses have been equivocal. Higher frequencies of home team aggression have often been explained through the home field advantage literature, while an increase in away team aggression has often been
explained through the frustration-aggression hypothesis. In this investigation there was no significant difference between the numbers of acts committed by the home team when compared to those committed by the visiting team. However, if we view aggressive behaviours as learned responses that are exhibited by athletes in order to receive reinforcement, these results should not be surprising (Faulkner, 1974; Mugno & Feltz, 1985; Smith, 1979a; 1979b). Several of these behaviours have become normalized components of hockey and as a result it is not surprising that they are utilized by athletes irrespective of game location. Furthermore, the frequency at which these acts are employed demonstrates the degree to which these behaviours have been unanimously adopted by players at this competitive level (Smith, 1979a; 1979b). Consequently, these behaviours have become so strongly associated with performance goals that athletes utilize them every time they step onto the ice in the hopes of being rewarded. Moreover, the previous results concerning this factor appear to be more associated with the biases experienced by the officials (i.e., home crowd) than with the actual behaviours of the athletes (Nevill et al., 1996).

Player position is a variable that has received very little empirical attention (Widmeyer & Birch, 1979). This is surprising, as different positions within the sport of hockey appear to demand different body types and behavioural repertoires. With respect to behavioural repertoires, Widmeyer and Birch (1979) found that defensemen committed significantly more aggressive penalties than did their offensive counterparts. Our investigation was unable to reproduce this finding. No significant difference was observed between the number of aggressive acts committed by defensive and offensive players. The difference between these studies can be partially explained according to the
criteria necessary to illicit a penalty. As was stated earlier, penalties appear to be overwhelmingly called if a player is severely harmed or the flow of the game is somehow interrupted. Consequently, behaviours in front of the net, especially those that impede a scoring opportunity, are much more likely to illicit a penalty than those behaviours that occur in the neutral zone. As it is defensive players who normally commit these acts, it is not surprising that Widmeyer and Birch (1979) obtained their results. However, if one includes those infractions that appear to be frequently overlooked (i.e., slashing in the neutral zone), it appears that offensive players commit relatively the same number of aggressive acts as do their defensive counterparts. These acts, for the most part, have little influence over the flow of the game and have subsequently eluded penalty measure designs.

The results of this investigation appear to adhere to the tenants of the social learning theory and not the frustration-aggression hypothesis. Thus, the commonly cited notion that frustration is a natural component of hockey and that these behaviours are an individual’s reaction to this emotion, appears to have relatively little empirical support within this sample. As an aside, one has to only look as far as the European game to realize that the current trend in North American hockey appears to be socially constructed (Smith, 1978a). Aggressive behaviours seem to be learned responses that are maintained through several forms of reinforcement. Several of these are tangible rewards (i.e., praise, team selection, money); however, the most profound may be the fact that these acts go unsanctioned and are for the most part accepted components of the game (Smith, 1979b). Consequently, success within the North American game may be more associated with an individual’s ability to execute these aggressive behaviours than it does with
his/her ability to put points on the board (Faulkner, 1974). Athletes subsequently learn these behaviours at an early age and quickly adopt them into their competitive behavioural repertoires.

Support for the notion that these behaviours are learned across this sample, and therefore not natural components of the game, stems from the observation that athletes appear able to turn on and off these behaviours in accordance with situational contingencies. When the game is tied and the competitive outcome is still very much in question, athletes appear unwilling to put their team at a disadvantage. This may be largely due to the fact that penalties taken when the game is tied can have a variety of negative consequences (i.e., goal scored, player benched). However, in other instances (i.e., small score differential), aggressive behaviours appear to be used in order to obtain a variety of tangible rewards (e.g., performance edge, respect). These behaviours are most likely rewarded in this instance, as they have been linked to a variety of perceived performance advantages (Faulkner, 1974).

Another explanation lies in the fact that previous results were unable to be replicated when a more ecologically valid sample of behaviours was introduced. Therefore, previous results (i.e., penalties) may be explained through the frustration-aggression hypothesis; however, these studies may have only included a small proportion of actual aggressive behaviour. For example, 100 percent of the fighting infractions in this study were penalized and these behaviours appear to have a very strong emotional component. Unfortunately, they represent a large proportion of those acts that were penalized (25%), but a relatively small proportion (7%) of actual on-ice aggression.
Consequently, one can see how the explanations given for certain trends, can differ according to the sample of behaviours under investigation.

The acceptance of aggression as a learned response highlights the important role that game officials can play in the reduction of these behaviours. According to the social learning theory (Bandura & Huston, 1961), punishment is the most profound method by which to reduce the frequency of unwanted behaviours. Consequently, by developing a "no tolerance" attitude towards these behaviours, officials have the power to force teams into a clean competitive mandate. As the results of this investigation have demonstrated, athletes appear unwilling to put their team at a competitive disadvantage (i.e., taking unnecessary penalties when the game is tied). Therefore, the interventions that league administrators adopt must be concerned with heightening the punishment associated with these acts. Some suggestions are: (a) penalty shots for certain acts, (b) five minute penalties instead of two, and (c) automatic goals in some instances. If the punishment is severe enough, it is likely that coaches will also adopt a negative mindset concerning these behaviours, and instruct their athletes to abide by the rules. Interventions can also be focused directly at the level of the athlete. Oftentimes the punishments delegated to on-ice indiscretions are minimal at best. The individual on the receiving end of the act usually suffers far worse than their assailant. Consequently, there appears a need to develop rules that force athletes into being accountable for their on-ice behaviour. By increasing the individual punishment associated with certain behaviours you will decrease the likelihood that athletes will choose that method of retribution. Some suggestions include: (1) suspensions that start once the injured athlete returns, (2) two-
strike rule, and (3) legal action. Punishment presents the most profound avenue through which the frequency of aggressive behaviour may be reduced.

Coaches interested in promoting fair-play among their athletes may also benefit from the understanding that these behaviours appear to be learned responses. As was discussed previously, coaches are the most influential sporting model in the eyes of their athletes (Mugno & Feltz, 1985). Consequently, coaches that model and promote appropriate behaviour are likely to witness such behaviours among their athletes. According to the results provided above, punishing behaviours (i.e., benching) may reduce the frequency of these acts in certain instances. Coaches may also be able to buffer aggressive tendencies in their players by focusing specifically on their athletes’ perceived abilities. Athletes who perceive themselves as possessing adequate skill have reported lower levels of aggressive tendencies (Lemyre et al., 2002). Consequently, coaches may be able to buffer aggressive tendencies in their athletes by adequately preparing them for competition. This is also applicable to those instances that are fuelled by frustration. By preparing athletes to deal with these situations appropriately (i.e., simulating them in practice) coaches can dramatically reduce the likelihood that these instances will erupt in violence.

The primary purpose of this research endeavor was concerned with overcoming the “positive misses” limitation inherent in the archival methodology (Kirker et al., 2000; Stephens, 1998a; Widmeyer et al., 2002). In doing so, it was hypothesized that a more ecologically valid sample of aggressive behaviours would be obtained. A videotaped observation design appears to overcome this limitation. First, the ability to stop, rewind, and pause allowed for behaviours to be assessed several times in order to ensure that the
proper criteria was met before a behaviour was included. This represents a dramatic improvement over the penalty methodology's individual (i.e., referee) perception of events, in real time. Secondly, aggressive behaviours can be coded by several individuals in an independent fashion. This helps to ensure that only those behaviours that fit the operational criteria are being included and that some amount of consistency exists between games. Third, all behaviours, even those deemed "part of the game", can be included and subsequently subjected to data analysis. These normalized forms of aggressive behaviour, which are often overlooked by game officials, appear to represent the majority of aggressive acts (Bar-Eli & Tenenbaum, 1989; Gee & Sullivan, 2004; Kirker et al., 2000). Further, these normalized acts have demonstrated a profound influence over the more hostile and harmful behaviours we routinely witness (Kirker et al., 2000). Consequently, an understanding of the frequency and distribution of these normalized behaviours may put us in a better position to explain and predict the more violent behaviours we routinely witness.

The inclusion of these normalized behaviours also appears to increase the ecological validity associated with direct observation. Similar to the archival methodology, behaviours are being assessed in their natural environment and are facilitated by their natural stimuli. However, unlike the archival approach, a more realistic sample of behaviours is produced that appears to be more indicative of how these behaviours truly exist within the competitive atmosphere. In this case, an additional 179 behaviours, that would have otherwise gone undetected, were included and subjected to data analysis. However, due to the relatively low inter-rater reliability experienced in this investigation, these results need to replicated in the future.
A major methodological innovation, which can be incorporated into the direct observation technique, is the ability to analyze verbal aggression. Kirker et al. (2000) concluded that the most frequent aggressive act (in hockey and basketball) was in the form of negative verbalizations. As a result, there exists a significant reason to believe that verbal aggression may act as a catalyst for the more severe overt acts we routinely observe. Consequently, a comprehensive understanding of its' role within the competitive environment would seem to be invaluable. This of course is a component of the conceptual definition that cannot be assessed using either of the two previously mentioned methodologies.

Direct observation may also represent the foremost approach to studying the methods by which athletes acquire these aggressive tendencies. By focusing on an athlete’s primary social group within the athletic domain, researchers may be able to establish how these socializing agents transmit and reinforce information pertaining to aggressive behaviour. Previous research has demonstrated the profound influence that these socializing agents have on athletes' behavioural repertoires (Mugno & Feltz, 1985; Smith, 1978a; 1978b; 1979a; 1979b) but has been unable to pin point exactly how. An invaluable aspect of the direct observation technique is that even implicit or inadvertent cues can be recorded. Therefore, some coaches may not consciously know they are promoting aggression among their athletes, and therefore this would most likely reflect in any self-report answers they provided.

Several limitations were inherent in this investigation, with the bulk of them being discussed in other chapters. However, the most profound limitation, and the one that deserves the most discussion, is concerned with the relatively low inter-rater reliability.
It should however be noted, that the methodological limitations experienced during this investigation should not deter others from using systematic observation in this area of inquiry. The poor inter-rater reliability in this investigation was primarily the result of inadequate training. Aggressive behaviours in the sport of hockey occur at an alarming rate and oftentimes in a simultaneous fashion. As a result, it takes a well trained eye to be able to pin-point these infractions and ensure that they meet the appropriate operational criteria (Thomas & Nelson, 2001). The coders in this investigation only received two weeks of training, the majority of which was completed independently. Also, as it was the authors first time conducting an observational analysis, improper training techniques can be partially blamed. Investigators should make a concerted effort to train coders in a group environment and ensure that all are on the same page before beginning data analysis. Adequate reliability has been reported using this methodological approach in the past and therefore researchers should not hesitate to use it in the future (Bar-Eli & Tenenbaum, 1989; Coulomb & Pfister, 1998; Harrell, 1980; Kirker et al., 2000).

The other major shortcoming of this investigation was its inability to incorporate previously categorized (McCarthy & Kelly, 1978; Kirker et al., 2000) instrumental acts of aggression (i.e., hooking, holding). This investigation concerned itself with the fourteen behaviours for which intent has been empirically assessed (Widmeyer & Birch, 1984; Widmeyer & McGuire, 1997). These behaviours have been historically categorized as hostile acts of aggression (McCarthy & Kelly, 1978; Kirker et al., 2000). Consequently, future investigations should concern themselves with establishing intent for the other forms of aggressive behaviour. This will inevitably allow us to provide an
even more comprehensive picture of the frequency and distribution of aggressive behaviour within hockey (i.e., ecologically valid). As well, future designs should attempt to assess intent in a direct manner, in order to ensure that these behaviours truly adhere to the conceptual criteria. This investigation assumed that the 'intent to harm' was present among these fourteen behaviours and is therefore still plagued by an inferential bias.

Future investigations should also make a concerted effort to examine aggressive behaviour in a multi-methodological manner (i.e., questionnaires, direct observation). A variety of factors appear to influence the frequency and distribution of aggressive behaviour, and therefore all need to be assessed simultaneously. These self-report measures assess a variety of concepts that are omitted using the other two approaches (e.g., archival, direct observation) and therefore should be used in combination with a more ecologically valid approach. Also, by establishing a more comprehensive behavioural criterion, investigators may now begin assessing the predictive validity of several of these self-report measures. This will provide us with an understanding of how these cognitive constructs relate to an individual’s actual on-ice behaviour. Finally, academics and sporting administrators need to begin working in conjunction with one another. This is a very applicable area of study, and as a result the information generated from this type of research must be made available to those who can put it to use. This type of information may put officials, coaches and sporting administrators in the position to diffuse potentially volatile situations before they arise.
VI. References


http://www.georgetown.edu/faculty/ballc/webtools/ web_chi_tut.html


VII. Tables
Table 7.1

*Frequency Distribution of Hostile Behaviour*

<table>
<thead>
<tr>
<th>Hostile Act</th>
<th>N = 259</th>
<th>%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Slash</td>
<td>87</td>
<td>33.3</td>
</tr>
<tr>
<td>Cross-check</td>
<td>68</td>
<td>26.3</td>
</tr>
<tr>
<td>Punch</td>
<td>48</td>
<td>18.5</td>
</tr>
<tr>
<td>Roughing</td>
<td>17</td>
<td>6.6</td>
</tr>
<tr>
<td>Fighting</td>
<td>14</td>
<td>5.4</td>
</tr>
<tr>
<td>Highstick</td>
<td>9</td>
<td>3.5</td>
</tr>
<tr>
<td>Elbow</td>
<td>7</td>
<td>2.7</td>
</tr>
<tr>
<td>Hit from behind</td>
<td>7</td>
<td>2.7</td>
</tr>
<tr>
<td>Spear</td>
<td>2</td>
<td>.8</td>
</tr>
</tbody>
</table>
VIII. Figures
Figure 8.1. The successful and unsuccessful paths through the frustration-aggression cycle.

\[ \text{Success} \Rightarrow \]
\[ \text{Drive to Goal} \Rightarrow \text{Obstacle to a Goal} \Rightarrow \text{Frustration} \Rightarrow \text{Aggression} \]
\[ \text{Catharsis} \]
\[ \text{Punishment}\Rightarrow \]

Figure 8.2. The two camera direct observation design.

(Camera #1) Action Specific

(Camera #2) Action General
Figure 8.3. The distribution of penalized behaviours.
Figure 8.4. The frequency of aggressive behaviours according to the three periods of play.
**Figure 8.5.** The frequency of aggressive behaviours according to team status.
Figure 8.6. The frequency of aggressive behaviours according to player position.
Figure 8.7. Frequency of aggressive behaviours according to home versus away team status.
Figure 8.8. The frequency of aggressive behaviours according to the score differential.
Appendix A

Informed Consent Form – Athletes over 18
BROCK UNIVERSITY
DEPARTMENT OF PHYSICAL EDUCATION

INFORMED CONSENT FORM

You are being asked to participate in a study entitled “The Direct Observation of Aggressive Behavior in Hockey” being conducted by the Department of Physical Education at Brock University. The study is an observation-based research project on aggressive behaviours in hockey. The purpose of this research is to investigate how different factors contribute to the facilitation of an aggressive behaviour. Prior to the onset of the study you will be asked to fill out three questionnaires that will take approximately 20 minutes to complete. This study will entail the videotaping of approximately 10 of your team’s regular season games. During the course of this research you will not be asked to do anything but participate in your scheduled hockey games.

This study is completely confidential. The information obtained is only for the use of the researchers listed below. By signing this form, you are agreeing that your actions may be used for scientific purposes, including publication in scientific and sport specific journals, so long as your privacy is maintained.

Participation in this project is completely voluntary. If you do not wish to participate, or choose to withdraw from the study, you may do so at any time without repercussion. Information provided by this study will be used to help researchers understand how aggressive actions transpire. There are no known psychological or physical risks associated with participation in this study. If you have any questions or concerns, please feel free to contact the numbers below. Results of this study will be available through either of the researchers listed below by August 31, 2004. Please contact them if you wish to have a personal copy of the results.

This study has been approved by the Brock University Research Ethics Board (File # 03-037). Should you have any questions and/or concerns regarding your participation in this research project, feel free to contact the Director of the Office of Research Services at (905) 688-5550 ext. 4315.

Thank you for your cooperation.

Having read and understood the above, I agree to participate in this study.

Print Participant Name __________________________

Participant’s Signature __________________________ Date ________________

I have explained the above information to this participant.

Researcher’s Signature __________________________ Date ________________

Chris Gee
Appendix B

Informed Consent Form – Athletes under 18
INFORMED PARENTAL CONSENT FORM

You are being asked to allow your son to participate in a study entitled “The Direct Observation of Aggressive Behavior in Hockey” being conducted by the Department of Physical Education at Brock University. The study is an observation-based research project on aggressive behaviours in hockey. The purpose of this research is to investigate how different factors contribute to the facilitation of an aggressive behaviour. Prior to the onset of the study your son will be asked to fill out three questionnaires that will take approximately 20 minutes to complete. This study will also entail the videotaping of approximately 10 of his team’s regular season games. During the course of this research he will not be asked to do anything but participate in his scheduled hockey games.

This study is completely confidential. The information obtained is only for the use of the researchers listed below. By signing this form, you are agreeing that your son’s actions may be used for scientific purposes, including publication in scientific and sport specific journals, so long as his privacy is maintained.

Participation in this project is completely voluntary. If you do not wish for him to participate, or choose to withdraw from the study, he may do so at any time without repercussion. Information provided by this study will be used to help researchers understand how aggressive actions transpire. There are no known psychological or physical risks associated with participation in this study. If you have any questions or concerns, please feel free to contact the numbers below. Results of this study will be available through either of the researchers listed below by August 31, 2004. Please contact them if you wish to have a personal copy of the results.

This study has been approved by the Brock University Research Ethics Board (File #03-037). Should you have any questions and/or concerns regarding your participation in this research project, feel free to contact the Director of the Office of Research Services at (905) 688-5550 ext. 4315.

Thank you for your cooperation.

Having read and understood the above, I agree to participate in this study.

Print Participant Name ____________________________

Parent’s Signature ____________________________ Date ______________

I have explained the above information to this participant.

Researcher’s Signature ____________________________ Date ______________

Chris Gee
Appendix C

Operational Definitions
**Hostile behaviours**

**Hit from behind** – when a player pushes, body checks or hits a player from behind in any manner, or if knocks a player from behind into the boards in such a way that the player is unable to protect himself.

**Punch** – player punches opponent with one hand. If two are used, it is coded as a push to the face instead of punch.

**Slashing** – when a player impedes (or seeks to) a player by ‘slashing’ them with the stick.

**Elbowing** – when a player fouls a player by using their elbow.

**Cross-checking** – when a player uses the stick with both hands to block across the upper body of a player (no part of the stick is on the ground).

**Fighting** – two or more players engage in fisticuffs. Multiple punches must be thrown and the game officials must award those involved a major penalty. If this does not take place, count each punch independently.

**Spearing** – when a player uses the stick to poke or ‘spear’ a player.

**Roughing** – The use of excessive physical force when “taking out” an opponent.

**High Sticking** – when a player contacts a player with a stick carried above shoulder height.

**Kneeling** – when a player fouls a player by using their knee.

**Boarding** – when a player checks (or hits) a player in such a manner that the player is thrown into the boards violently.

**Charging** – when a player checks (or hits) a player with excessive force, while taking more than two steps in that player’s direction.

**Butt-ending** – when a player pokes a player with the point (‘butt-end’) of the stick.

**Head butting** – when a player deliberately strikes a player with their head.
Appendix D

Recruitment Letter
Date
[Will Appear on Brock letter head]

Dear Coach,

We are writing to invite your team to participate in a research project entitled “Direct observation of aggressive behavior in hockey”. Dr. Philip Sullivan and his graduate student Chris Gee, both members of the Department of Physical Education at Brock University, will be conducting the study. The purpose of the study is to directly observe those factors that precede and result from aggressive actions within the sport of hockey.

Your team’s involvement would be greatly appreciated and would dramatically aid in our understanding of the dynamic nature of these aggressive behaviors. Participation in this investigation involves little effort on the part of you or your team members. Your players will be asked to fill out three questionnaires which will take approximately 20 minutes. The first questionnaire will assess your athlete’s motivation for participating in hockey. The other two questionnaires will assess their perceptions regarding aggressive behavior and your team’s norms surrounding the use of aggression and cheating behaviors. The rest of the study involves the videotaping of approximately 10 of your regular season games. The implementation of this study will not, in any way, interfere with the performance of your team. Two cameras will be placed throughout the arena so that different perspectives may be recorded. These cameras will be out of sight and therefore pose no distraction to your players. The strength of this design hinges on its unobtrusiveness. As a result, this study will in no way interfere with your team’s performance.

All information obtained from this investigation is confidential. Only Dr. Philip Sullivan and Chris Gee will have access to the videotapes. If published, player’s names, numbers and your team name will be omitted. The focus of this examination is with the factors that influence aggressive behaviors and not with the individuals that perpetrate them.

Following the completion of this investigation we would be happy to send you a summary of our results. Should you have any additional questions regarding the study, please feel free to contact either Dr. Philip Sullivan at (905) 688-5550 extension 4787 or Chris Gee at (905) 688-5550 extension 4481. Additionally, concerns about your involvement in this study may also be directed to the Research Ethics Officer in the Office of Research Services at (905) 688-5550, extension 3035.

Thank you for your consideration.

Sincerely

Dr. Phillip Sullivan
Chris Gee
Appendix E

General Information Letter
General Information to Participants

You are being asked to participate in a research project entitled “The Direct Observation of Aggressive Behavior in Hockey”. The purpose of this research is to investigate how different factors contribute to the facilitation of an aggressive incident. This study will be carried out through the Department of Physical Education at Brock University. This study will entail the videotaping of your team’s games early in the season. During the course of this research you will be asked to individually fill out three questionnaires (20 min.) prior to one of your games in the absence of your coach. The first questionnaire will assess your motivation for participating in hockey. The other two questionnaires will assess your individual perceptions regarding aggressive behavior and your team’s norms surrounding the use of aggression and cheating behaviors. Upon completion of this, you are asked to simply participate in your scheduled hockey games.

Participation in this study is strictly voluntary. You may choose not to participate or may end your involvement in the study at any time with no repercussions. Your confidentiality as a participant in this study will be maintained at all times as there will be no identifying marks on your questionnaires. The information contained in the “Informed Consent Form” will remain confidential between the participant and the researchers along with all other data collected.

Your involvement in this research entails that 10 of your games be videotaped. You will not receive any compensation for your participation. If you have any concerns or complaints regarding your involvement in this research, please contact Philip Sullivan, Ph.D., at (905) 688-5550, ext. 4787, or via e-mail – psulliva@arnie.pec.brocku.ca, or Chris Gee at (905) 688-5550, ext. 4481 or via e-mail- chrisgee@yahoo.ca

This study has been approved by the Brock University Research Ethics Board (#03-037). Should you have any questions and/or concerns regarding your participation in this research project, feel free to contact the Director of the Office of Research Services at (905) 688-5550 ext. 4315.

Please read and sign the attached “Informed Consent Form”. Thank you for participating in this research project. If you would like a copy of the results of this study upon its completion, please contact one of the researcher noted above.
Appendix F

Research and Ethics Board Approval
DATE: October 22, 2003

FROM: Joe Engemann, Chair
Senate Research Ethics Board (REB)

TO: Dr. Philip Sullivan, Physical Education and Kinesiology
Chris Gee

FILE: 03-037 Gee

TITLE: Direct Observation of Aggressive Behaviour in Hockey

The Brock University Research Ethics Board has reviewed the above research proposal.

DECISION: Accepted