

**EXAMINING THE RELATIONSHIP BETWEEN TEAM BUILDING
AND PHYSICAL ACTIVITY ADHERENCE
IN RURAL YOUTH**

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By

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ABSTRACT

The primary purpose of this dissertation was to investigate the relationship between a team building (TB) intervention and the adherence behaviours of youth participating in a physical activity club. A preliminary study served to assess the appropriateness of a modified version of the Group Environment Questionnaire (GEQ, Carron, Widmeyer, & Brawley, 1985) for a youth sample (N = 203), and the results revealed that the instrument appeared to be appropriate for this population. Participants for the main intervention study (N = 122) were high school students (Grades 9-12) participating in 10 rural, school-based exercise clubs. Individuals in five of the schools (n=65) were exposed to a TB intervention and individuals in the other five schools (n=57) served as the controls. Results were divided into examination of process and outcome variables. In terms of the process variables, results revealed that the five factors (group distinctiveness, group positions, group norms, communication/interaction, individual sacrifices) manipulated in the TB intervention significantly differentiated the two groups, *Wilks' Lambda* (5) = .597, $p < .001$, and in the direction predicted. An examination of the outcome variables revealed that the TB factors added unique variance in predicting task cohesion (ATG-T, $R^2 \Delta = .13$ and GI-T, $R^2 \Delta = .21$). Finally, an examination of adherence outcomes revealed significant differences in attendance with TB group members attending more sessions than control group members, *Wilks' Lambda* (1, 98) = 3.07, $p = .08$, $\omega^2 = .01$. However, no significant difference was found in terms of drop-outs between the groups, $t(8) = .54$, $p > .10$. A secondary analysis also revealed a significant relationship between groups and group task satisfaction, with those in the TB group holding greater perceptions of group task satisfaction than those in the control group, *Wilks' Lambda* (1, 97) = 11.69, $p = .001$, $\omega^2 = .02$. These findings provided preliminary support for TB as an effective group-based intervention to improve activity attendance in this

population. Given this was the first study to examine the relationship between TB and youth adherence in an exercise setting, further research is recommended.

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DEDICATION

This dissertation is dedicated to my family (Brenda, Sydney, Mom, Dad, Steve, Jana, Marti, Tim, Oma, Glen, Vicky, Lori, Wade, Kyra & Mitchell) who are the most important and influential group in my life.

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CHAPTER 1

INTRODUCTION

Adhering to a regular program of physical activity has been associated with a number of physical and psychological health benefits (Bauman, 2004; Hausenblas, Dannecker, & Focht, 2001). Despite considerable evidence highlighting that physical activity is good for health, poor physical activity adherence is a prominent public health concern, particularly among youth. In Canada, a recent nation-wide physical activity survey revealed that only 33% of Canadian youth (13-17 years) meet the recommended guidelines for healthy growth and development (Craig & Cameron, 2004). Further, for the third consecutive year (2005, 2006, 2007) annual report cards by Active Healthy Kids Canada has graded Canadians with an overall grade of D. Given these findings, it may not be surprising that researchers have turned their attention to addressing the issue of youth inactivity.

In the past, research addressing the issue of physical inactivity typically has attempted to isolate individual factors (Giles-Corti & Donovan, 2002). While this research has been informative; for the most part, it has only accounted for a small portion of the variance (e.g., 15-20%) in youth physical activity (Zakarian, Hovell, Hofstetter, Sallis, & Keating, 1994). Given the failure of this approach to account for more explained variance, looking beyond the individual to consider the social influence of others, especially the groups to which they belong, appears appropriate.

Several reasons can be offered to support the utilization of a group focus to improve the physical activity adherence of youth. First, as social animals, most of the behaviour patterns we

call human are a function of group behaviour (Jacobs & Spradlin, 1974). Humans are stimulated by the activity of others and influenced by their example (Latane & Nida, 1980). Further, membership in social groups satisfies basic human needs. Baumeister and Leary (1995) proposed that humans have a fundamental need to belong. Specifically, humans hold a 'pervasive drive' to form and maintain lasting, positive interpersonal relationships (Baumeister & Leary, 1995). Similarly, Ryan and Deci (2000) have identified relatedness with others as one of three essential psychological needs humans seek out.

Past research has consistently demonstrated the relationship between groups and individuals, and it has been suggested that when individuals become members of a group, it can have a powerful impact on the individual (Shaw, 1981). Not surprisingly, this also applies in a physical activity setting, as groups have been identified as one of the three dominant social influences (groups, exercise leader, significant others) to impact an individual's level of physical activity (Carron, Hausenblas, & Estabrooks, 1999).

Second, individuals prefer to be active with others (Beauchamp, Carron, McCutcheon, & Harper, 2007; Bostick, Spink, Bruner, Watson, & Wilson, 2003; Heinzelmann & Bagley, 1970). Early research by Heinzelmann and Bagley (1970) reported that almost 90% of the participants surveyed preferred to exercise with a group or another person. More recently, Bostick and colleagues (2003) reported that only 29.3% of young adults preferred to exercise alone, with the rest preferring being active with others or having no preference.

Finally, there is substantial empirical evidence to support the adherence benefits of group-based intervention approaches in the activity setting, where adherence is defined as maintaining involvement in a self-selected program (Brawley, 1990; Carron, Hausenblas, & Mack, 1996; Meichenbaum & Turk, 1987). A meta-analysis by Dishman and Buckworth (1996)

reported that interventions delivered to groups (i.e., in a group setting) yield much larger adherence effects in comparison to interventions delivered to individuals. This finding has been supported in another meta-analysis by Burke and colleagues (2006), who found exercising in a group context as superior to exercising alone. Taken together, the results from these two meta-analyses highlight the importance of targeting groups when there is an interest in addressing adherence issues in physical activity.

1.1 Team Building

Among group-based approaches, it appears beneficial to implement a psychologically-based intervention that targets known group dynamic principles (Carron, Hausenblas, & Mack, 1996). As noted by Burke and colleagues (2006), exercising in a group where group dynamics principles are addressed provides an optimal context to increase adherence to exercise in comparison with a standardized exercise group (i.e., collective). Among the identified group-based interventions that target specific group dynamic principles, the psychological intervention of team building (TB) has been reported to be effective in improving specific measures of adherence in adult exercise settings (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006).

With its origins in the organizational development (OD) literature (cf. Beer, 1976; DeMeuse & Liebowitz, 1981 for reviews), TB has been defined in many different ways (Hardy & Crace, 1997), with most definitions focusing upon TB as a process intervention (Beer, 1980). More specifically, it is often characterized as a team intervention that enhances team performance by positively affecting team processes (Hardy & Crace, 1997; Tannenbaum, Beard, & Salas, 1992). Newman (1984) has forwarded a common definition of TB as an intervention designed to “promote a greater sense of unity and cohesiveness, and to enable the team to function together more smoothly and effectively” (Newman, 1984, p. 27). Further, the use of TB

interventions has moved beyond the boundaries of OD, as it has been applied in a number of other domains including health care (Applebaum, 1991; Boss, 1991; Corrigan, 1998), military (Hughes, Rosenbach, & Clover, 1983; Patten & Dorey, 1977), education (Abelson & Woodman, 1983; Buck, 1977), physical education (Ebbeck & Gibbons, 1998; Gibbons & Black, 1997), sport (Bloom & Stevens, 2002; Bloom, Stevens, & Wickwire, 2003; Dunn & Holt, 2004; Holt & Dunn, 2006; Newin, Bloom, & Loughead, 2008; Prapavessis, Carron, & Spink, 1996; Schinke, Draper, & Salmela, 1997; Senecal, Loughead, & Bloom, 2008; Smith & Smoll, 1997; Stevens & Bloom, 2003; Voight & Callaghan, 2001), and exercise (Carron & Spink, 1993; Estabrooks & Carron, 1999; Spink & Carron, 1993; Watson, Martin Ginis, & Spink, 2004) with a considerable amount of success.

1.1.1 Team Building Approaches

To attain the desired benefits of making a group more effective, four common approaches have been used in the TB literature (Beer, 1976), either alone or integrated with others (Buller, 1986). The focus of each of the four approaches is as follows; (a) goal setting, (b) interpersonal relations, (c) role expectations, and (d) managerial grid, which examines production and personnel (Beer, 1976).

1.1.1.1 The Goal Setting Model. One approach to TB involves group members developing individual and group goals and the actions required to achieve them with the help of a consultant (Beckhard, 1966). The establishment of goals has been found to influence both individual and group behaviour. An individual's participation in goal setting for the group enhances the commitment to those goals (Likert, 1961). At the group level, undertaking goal setting directs and coordinates group effort (Beer, 1976). Moreover, an individual's commitment to pursue certain goals is reinforced by the norms of the group (Lewin, 1947b). This approach would

typically be used when the group's goals are not clear or the actions required to achieve the goals are not clearly identified.

1.1.1.2 The Interpersonal Model. A second approach to TB involves a focus on striving to build an interpersonally competent group. The underlying assumption of this approach is that an interpersonally competent group is an effective one (Argyris, 1962). It is proposed that an environment in which there is mutual support, and open communication will foster the development of trust, confidence, cooperation and group cohesiveness. Increased interpersonal perceptions (i.e., co-operation, cohesion) are then proposed to lead to higher commitment to group goals and enhance group effectiveness (Seashore, 1954). This approach would work well in situations when there is a requirement to improve poor personal relationships or poor communication among members.

1.1.1.3 Role Expectations Model. The assumption underlying this TB approach is that groups are composed of a set of overlapping or interdependent roles (Bennis, 1966). A role is characterized as a set of behaviours a group member feels obligated to perform (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). It is proposed that if group members have a clear understanding of their roles and those of others, ambiguity and any potential conflict may be reduced leaving more energy to devote toward task relevant behaviour (Bennis, 1966). Intervention strategies for this approach often revolve around activities focusing on role perceptions and clarification (e.g., group members preparing and sharing personal descriptions of their roles within the group and how it fits into the objectives of the organization) (Dayal & Thomas, 1968). This approach would typically be used in situations where group members were unsure or not happy with their assigned roles within the group.

1.1.1.4 Managerial Grid Model. In the final TB approach, which is based on the work of Blake and Mouton (1968), the focus switches to the leader of the group. It is a systematic approach in which the leader surveys members of the group to identify potential barriers to the group's effectiveness and evaluate what other group members are doing to reduce or enhance group effectiveness. In addition, each group member provides information regarding an ideal culture for the group. Using this information, the leader helps members come to a consensus as to the current and ideal group functioning. Once any discrepancies are resolved, areas of improvement are identified and plans to address these areas at an individual and group level can be prepared (Beer, 1976). This approach would work well in situations where group effectiveness is being impeded by ineffective procedures or in cases where a readily identifiable group culture is missing.

1.1.2 Team Building Approaches in Sport & Exercise

For the most part, TB interventions in the sport and exercise setting have focused on interpersonal relations and have been of two types – direct versus indirect. The direct type is one in which the TB intervention specialist works directly with the participants to enhance the group's dynamics (see Yukelson, 1997). Alternatively, the indirect type is one in which the TB intervention is filtered through the coach/exercise instructor (i.e., interventionist does not have contact with the participants) (Carron, Spink, & Prapavessis, 1997). In the latter case, the TB interventionist assists the coach/exercise leader to develop a TB protocol based on group dynamic principles to be implemented with their respective activity group. While a direct TB approach has been found to be effective in sport (e.g., Stevens & Bloom, 2003), the indirect approach has featured prominently in the exercise setting. The indirect TB approach has been consistently associated with enhanced adherence in adult exercise samples (Estabrooks &

Carron, 1999; Spink & Carron, 1993; Watson et al., 2004). In terms of specific measures of adherence, participants exposed to a TB intervention recorded higher levels of attendance (Estabrooks & Carron, 1999; Watson et al., 2004) and were late less often and dropped out less (Spink & Carron, 1993) than participants in standard exercise groups.

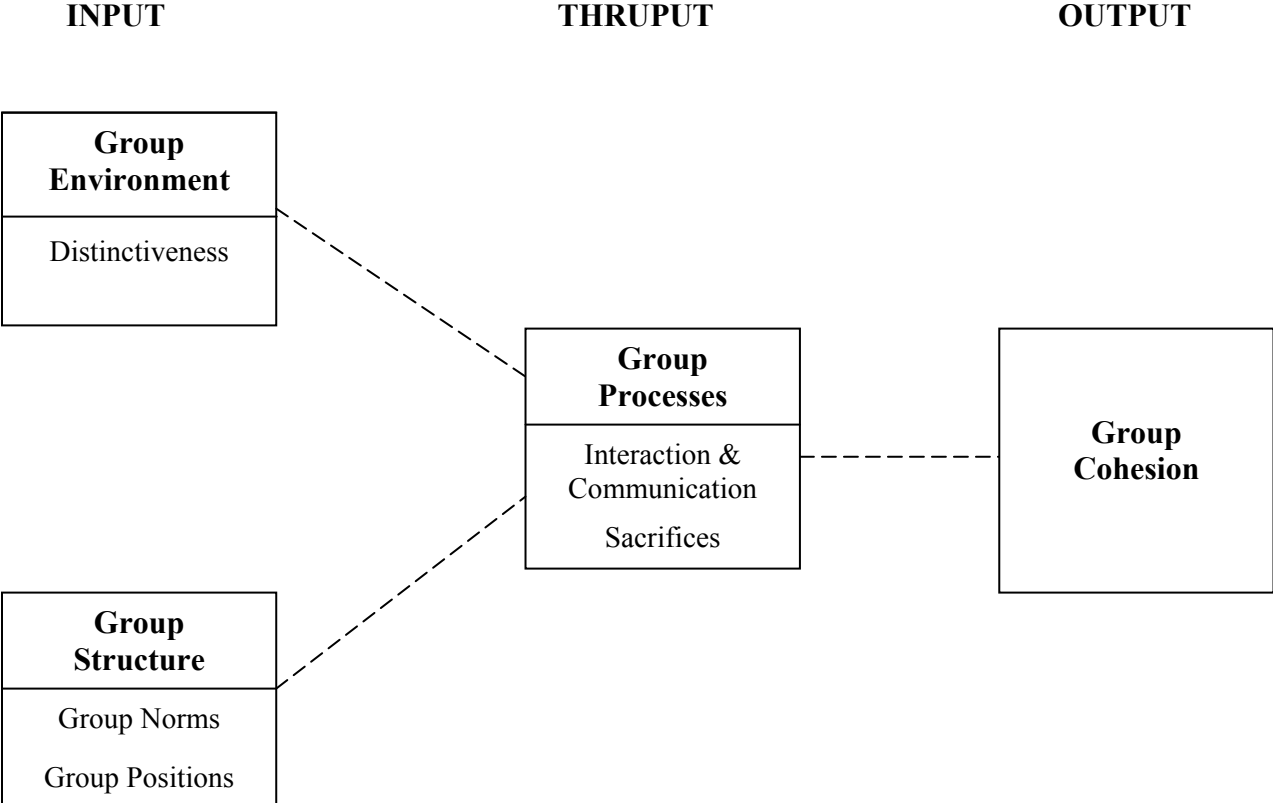
1.1.3 TB Conceptual Framework

In the exercise setting, Carron and Spink (1993) have developed a conceptual framework for TB (see Figure 1). The TB model presents the group in the form of a linear model containing inputs, throughputs, and outputs. Consistent with the definition of TB by Newman (1984), the construct of group cohesion is featured and is considered to be the desired output or product of three different categories: group environment, group structure, and group processes. Two of these categories, group environment and group structure, are identified as inputs in the model. The group environment and group structure are proposed to influence group processes (the throughput), which in turn, contribute to the development of cohesion (output).

While Carron and Spink's (1993) TB intervention framework has been associated with adherence benefits, the theoretically driven model has not been investigated in a youth activity setting. Given the potential of TB to impact adherence behaviour, and the noted absence of studies examining youth activity behaviour in the TB literature, examination of a TB intervention targeting this demographic appears worthwhile.

In addition to examining adherence, there also is a need to evaluate the implementation of the TB protocol. In the past, a failure to include and report the evaluation of TB protocols has led to a lack of rigor and co-ordination of efforts to gain a better understanding of the effectiveness of TB (DeMeuse & Liebowitz, 1981). For the most part, TB interventions have not undergone

Figure 1: TB Conceptual Framework (Carron & Spink, 1993)



rigorous evaluations to test interrelationships among key constructs (cf. Brawley & Paskevich, 1997). Thus, it may be fruitful to systematically evaluate the strength of relationship of each of the five TB factors within Carron and Spink's (1993) model with the potential group mechanism (e.g., cohesion) identified in the model.

1.2 Cohesion

Recognizing that cohesion is a key construct in the constitutive definition of TB advanced by Newman (1984), as well in the TB model presented by Carron and Spink (1993), an overview is necessary to provide an understanding of the construct of cohesion, including its definition and present conceptualization.

The construct of cohesion is derived from the Latin word *cohaesus*, meaning to “stick together tightly” (Merriam-Webster, 2007). As noted by Dion (2000), the historical roots of group cohesion research can be traced back to the late 19th and earlier 20th centuries in the areas of psychology (Freud) and sociology (Durkheim). More modern psychological research into cohesion began in the late 1930's and early 1940's. Social psychologist, Kurt Lewin, is credited with laying the foundation for the concept of group cohesion (Dion, 2000).

Since Lewin's seminal research, cohesion has been operationalized in many different ways. Unfortunately, this multitude of definitions has served to confuse rather than clarify. As noted by Mudrack (1989), who discussed the problems created by the large number of definitions put forth to describe cohesion, “The history of research into group cohesiveness has been dominated by confusion, inconsistency, almost inexcusable sloppiness with regard to defining the construct” (Mudrack, 1989, p.45).

However, a definition of cohesion initially proposed by Carron (1982) has been identified by group dynamics theorists as being acceptable (e.g., Cota, Evans, Dion, Kilik, & Longman,

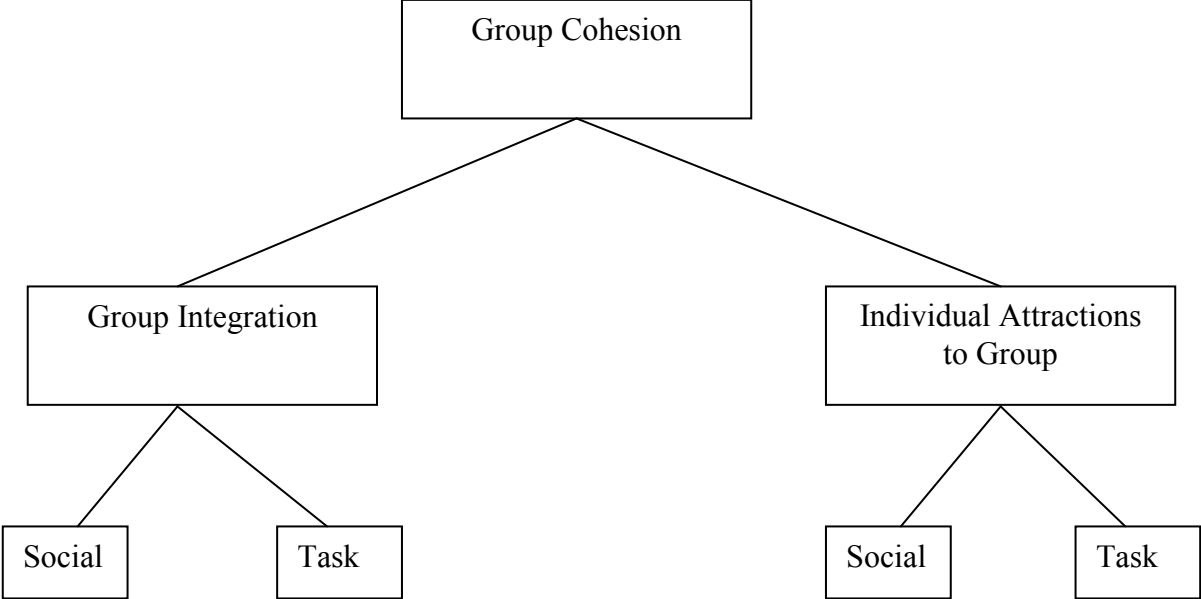
1995; Mudrack, 1989). Cohesion was defined as “a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its goals and objectives” (Carron, 1982, p. 124). Carron and colleagues (1998) subsequently modified this definition of cohesion to include an additional affective component. Cohesion is now commonly defined as “a dynamic process that is reflected in the tendency of a group to stick together and remain united in the pursuit of its instrumental objectives and /or for the satisfaction of member affective needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). The definition reflects the multidimensional, dynamic, instrumental, and affective nature of the construct (Carron & Hausenblas, 1998).

1.2.1 Conceptualizing Cohesion

In an effort to operationalize a measure of group cohesion, Carron, Widmeyer, and Brawley (1985) proposed a conceptual model of cohesion in sport teams (see Figure 2). Carron and colleagues' (1985) conceptual model incorporated two major distinctions: individual/group and task/social dimensions. The first important dimension (i.e., individual/group) captured the need to distinguish between a member's perceptions of the group as a totality (group integration) and a member's personal attractions to the group (individual attractions to the group) (Carron et al., 1985). Within this dimension, the category of group integration represents perceptions of the closeness, similarity, and bonding within the group as a whole (Carron et al., 1985).

Alternatively, the category of individual attractions to group represents the individual's motives to remain in the group. The motives may include personal feelings about involvement in the group or the individual's role within the group (Carron et al., 1985). Both individual and group orientations of cohesion are important. Further, each orientation of cohesion can be broken down

Figure 2: Conceptual Model of Group Cohesion (Carron, Widmeyer & Brawley, 1985)



into task and social dimensions which capture the second dimension in the model (i.e., task versus social). The task dimension reflects the perceived attainment of the group's goals and objectives such as group performance, productivity, and achievement (Carron et al., 1985). The social dimension focuses on the development and maintenance of relationships within the group such as mutual friendships, closeness, and affiliation (Carron et al., 1985). Arising from the two major dimensions, Carron and colleagues (1985) identified four constructs: group integration-task (GI-T), group integration-social (GI-S), individual attractions to group-task (ATG-T), and individual attractions to group-social (ATG-S).

Cohesion has featured prominently as a factor associated with adherence in the exercise setting. More specifically, adult participants' perception of the amount of cohesion in their exercise groups has been associated with a number of adherence variables including attendance behaviour (Carron, Widmeyer, & Brawley, 1988), drop-out behaviour (Carron, Widmeyer, & Brawley, 1988; Spink & Carron, 1994), and lateness (Carron et al., 1988; Spink & Carron, 1992). While these relationships have been established in adult groups, there is an absence of research in the youth setting.

While cohesion is largely absent in the youth activity literature, it has been identified in other areas as an important process positively influencing the health behaviour of youth. Family cohesion has been found to be associated with a number of health-promoting behaviours including decreased adolescent alcohol usage (Bray, Gerald, Getz, & Baer, 2001), decreased mental health service usage (van der Linden, Drukker, Gunther, Feron, & van Os, 2003) as well as being associated negatively with internalizing (withdrawal, anxiety, and depression) and externalizing (delinquency and aggression) adolescent problem behaviours (Barber & Buehler, 1996). In terms of cohesion in other environments outside of the family, school cohesion has

been found to moderate the effect of deteriorating family and peer environments on a youth's adaptation (Botcheva, Feldman, & Leiderman, 2002). Specifically, the level of mutual support, belonging, and connectedness of the school was found to offer a protective effect on an adolescent experiencing low family and peer support (Botcheva et al., 2002).

Given the connection of cohesion to other health-promoting behaviours with youth, one wonders whether a similar relationship would emerge between cohesion and adherence in a youth activity setting. Support for conducting a group-based intervention targeting cohesion to improve youth adherence has been proposed previously (Annesi, 1999; Spink & Carron, 1993). Reflecting on this evidence, a group-based activity intervention targeting cohesion would be well justified to promote youth adherence.

1.3 Group Task Satisfaction

In addition to adherence outcomes, a TB intervention may influence other factors, including satisfaction of the needs of its members (Brawley & Paskevich, 1997). In the past, it has been suggested that group members will be more interested in belonging to a group if they are satisfied (Reimer & Chelladurai, 1998). Further, the group-based psychological intervention of TB has been linked with increased perceptions of individual satisfaction within university aerobic and aqua fitness classes (Carron & Spink, 1993). While the research by Carron and Spink (1993) identified the link between TB and individual satisfaction, other research has linked group constructs such as cohesion to satisfaction with the group (Spink, Nickel, Wilson, & Odnokon, 2005; Widmeyer & Williams, 1991). However, to-date, the relationship between TB and group satisfaction has not been examined. Given the group nature of a TB intervention, it may be just as important to consider a participant's satisfaction with the group's functioning as with individual satisfaction.

1.4 Rural Youth

The population selected for examination in this dissertation was rural youth. The reasons for selecting this population are as follows. First, targeting this segment of the population for an activity intervention would appear to be important as rural residents have been found to be less healthy (i.e., more obese, less active) than residents in urban areas (Bruner, Lawson, Pickett, Boyce, & Janssen, in press; Davis, Boles, James, Sullivan, Donnelly, Swirczynski, & Goetz, 2008; Ministerial Advisory Council on Rural Health, 2002; Morgan, 2002; Plotnikoff, Bercovitz, & Loucaides, 2004). Within this rural segment, youth may be a particularly vulnerable subgroup worthy of examination as they are faced with a number of unique challenges including social isolation, fewer physical activity opportunities and weaker infrastructure for transportation and information, which may compromise healthy lifestyle behaviours such as physical activity (Felton, Dowda, Ward, Dishman, Trost, Saunders, & Pate, 2002; Quine, Bernard, Booth, Kang, Userwood, Alpherstein, & Bennett, 2003; Skatrud, Bennett, & Loda, 1998; Slama, 2004).

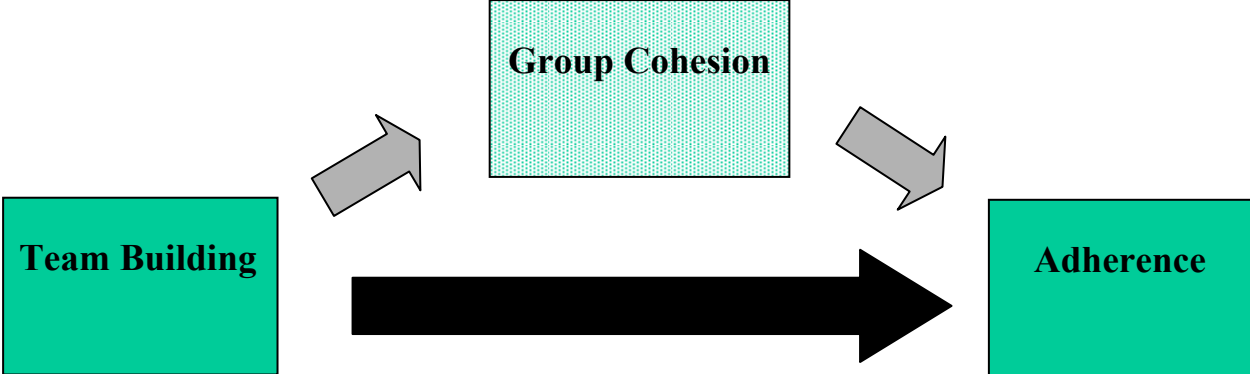
Additional support for targeting rural youth can be gleaned from their lack of attention in the literature (Groft, Hagen, Miller, Cooper & Brown, 2005), and the recommendations being made to design and target youth in rural areas with physical activity promotion interventions to address discrepancies in health status and behaviours (Bruner et al., in press; Davis et al., 2008; Paxton, Estabrooks, & Dzewaltowski, 2004). Furthermore, from a conceptual perspective, Baranowski and colleagues (1998) have stated that it is likely that different individuals change their physical activity behaviour for different reasons. As a result, a better theoretical understanding of different influences on physical activity behaviour in differing groups such as rural youth would appear important.

Reflecting on the unique challenges of rural youth (i.e., social isolation, fewer physical activity opportunities and weaker infrastructure for transportation and information), a group-based school intervention would appear to address many of the noted obstacles facing rural youth. Offering a school-based physical activity intervention also aligns with literature highlighting the important role of schools in rural communities (Miller, 1995).

1.5 Statement of the Problem

When considering the present body of evidence, an argument can be put forth to support Cartwright's (1951) early notion that using the group as an agent of change for individual behaviour may be a useful strategy to pursue. While the group-based approach of TB has been linked to multiple individual adherence behaviours in an adult population, these relationships have not been examined within a youth population. Furthermore, TB interventions within exercise settings have not addressed calls within the TB (Brawley & Paskevich, 1997) and health intervention literature (Glasgow, 2002; Weinstein, 2007) to evaluate the interventions to gain an understanding of *how* and *why* they do or do not work. Without evaluation, valuable information regarding the proposed mechanisms within the interventions may be lost (Glanz, 2002). Further, this failure to evaluate also may hinder the creation of more effective interventions in the future (Glasgow, 2002). Thus, the purpose of this thesis was to investigate the relationship between a group-based school TB intervention and exercise adherence in a rural youth population. Specifically, the thesis aimed to achieve two objectives: (1) to investigate the relationship between TB and the primary outcome of exercise adherence as well as the secondary outcome of group task satisfaction over the course of the intervention (see Figure 3), (2) to evaluate the relationship between the TB conceptual model (Carron & Spink, 1993) and the proposed intervention mechanism of group cohesion (see Figure 3).

Figure 3: TB Intervention Model



1.6 Thesis Structure

This dissertation involves three separate manuscripts resulting from two separate, but connected investigations. Each of the manuscripts will be presented separately in the next three chapters, and each will include an introduction, method, results, and discussion section.

Chapter 2 - Pilot Investigation of Modified GEQ

At the present time, no instrument exists to assess cohesion within a youth group exercise setting. A pilot investigation was conducted to examine the appropriateness of the wording of a modified version of the GEQ to assess cohesion within youth exercise groups.

Chapter 3 – TB Process

Following the identification of an appropriate measure of cohesion, a TB intervention targeting youth physical activity adherence was conducted. The first part of the TB intervention study involved an evaluative component. The purpose was to determine whether the facets of a TB program were associated with the proposed key mechanism of cohesion.

Chapter 4 – TB Outcomes

The second part of the study had two overall purposes. The first purpose was to examine whether a TB intervention program would increase the perceptions of group cohesion and adherence of rural youth participating in an exercise club. A secondary purpose was to examine the impact of a TB program on group task satisfaction.

Chapter 5 – General Discussion

The dissertation will conclude with a general discussion section.

CHAPTER 2

PILOT INVESTIGATION OF MODIFIED GEQ

2.1 Introduction

The history of group cohesion has been plagued with an inability to define group cohesion precisely and consistently (Mudrack, 1989). Over the years, cohesion has been operationalized and evaluated in a number of different ways (see Dion, 2000 for a review). It has been suggested that many of the inconsistencies associated with the definition and measurement of cohesion may be attributed to a lack of conceptual clarity (or lack of a theoretical foundation) (Carron et al., 1985). Carron and colleagues (1985) contended that prior to the development of an instrument to accurately measure cohesion there must be a clear understanding of the meaning of the construct. To address this issue, Carron and colleagues (1985) proposed a conceptual model of cohesion in sport teams (Figure 1).

Based on Carron and colleagues' (1985) conceptual model depicted in Figure 1, two measures of cohesion have been developed to assess perceptions of cohesion in a physical activity setting - the Group Environment Questionnaire (GEQ, Carron et al., 1985) and the Physical Activity Group Questionnaire (PAGEQ, Estabrooks & Carron, 2000). The first instrument, the GEQ, was originally developed for sport teams. However, the GEQ has been modified and successfully used in exercise settings (Carron & Spink, 1993; Carron et al., 1988, Study 1; Spink & Carron, 1992; 1993; 1994). Additional support for the GEQ's subscale validity involving sports teams, exercise classes, and physical activity groups has been identified in a number of cohesion reviews (Cota, Evans, Dion, Kilik, & Longman, 1995; Dion, 2000).

In terms of the other instrument, the PAGEQ was developed by Estabrooks and Carron (2000) to measure older adults' perception of group cohesion in an exercise setting. Initial testing

of the PAGEQ has found the instrument to be a reliable measure of cohesion, exhibit concurrent validity and offer initial support of its predictive validity (Estabrooks & Carron, 2000). While the initial findings from the PAGEQ appear promising in older adult populations, the instruments applicability in other settings remains in question.

Given that both of these instruments were designed to assess cohesion in exercise settings, and both appeared to have some success in this regard, there is some support for the suggestion that the original conceptualization that underpinned both measures (i.e., Carron et al., 1985 conceptual model) might be employed again in other areas. Although the GEQ was developed, and psychometrically tested with male and female athletes between the ages of approximately 18 to 30 years, the developers (Carron et al., 1985) have acknowledged its limitations and suggested that the instrument may need to be modified if used in other contexts such as youth (Carron et al., 1998).

In modifying the GEQ for other contexts, Carron, Widmeyer, and Brawley (1998) offered specific guidelines toward the revision and pilot testing of the instrument. First, they suggested pilot testing all the items of the GEQ to determine if they are applicable to the sample and the situation. If any items are deemed inappropriate, they recommended using a similar sample to construct relevant items that may better represent the GEQ item in question. Once all the items have been deemed suitable, they should be included in the revised GEQ, and pilot tested again to ensure their meaningfulness with the target sample (Carron et al., 1998).

Several strategies can be undertaken when pilot testing an instrument. Researchers may elect to evaluate an instrument in a field setting or in a laboratory-based setting. While pilot testing an instrument in a similar setting may be ideal, the absence of real physical activity clubs involving youth (as would be used in this study) led to the exploration of suitable alternatives in this study.

One such alternative involves the creation of a hypothetical group-based scenario (cf. Eisler & Spink, 1998; Gammage, Carron, & Estabrooks, 2001) for youth to use as a framework when evaluating the appropriateness of the items. Creating a group-based scenario offers the participants an opportunity to evaluate the language of the instrument in a context-specific hypothetical situation. In the absence of ongoing youth exercise clubs in rural settings, group-based scenarios appear appropriate to evaluate the wording of a group measure to assess cohesion.

Therefore, this study served as a pilot investigation examining the appropriateness of modifying items in the GEQ for youth in a group exercise setting. Following the recommendations of Carron and colleagues (1998), two independent pilot studies were conducted using group-based scenarios to evaluate the appropriateness of the measure. Specifically, the first pilot assessed the construct relevance and applicability of the original items modified for a youth exercise setting and the second pilot ensured any modifications appropriately reflected the youth exercise context.

2.2 Method

2.2.1 Participants

Pilot Study 1 included a sample of 208 youth (14-19 years of age) from two schools in rural Saskatchewan. Five youth who did not complete the pilot questionnaire as instructed were excluded from the pilot sample (N=203). The remaining 203 participants (M= 15.51 years, SD= 1.10) were from grades 9 to 12. Pilot Study 2 included a sample of 48 youth (13-16 years of age, M=14.44 years, SD=.65) from one rural Saskatchewan school.

2.2.2 Procedure

The pilot study utilized the protocol outlined below by Carron and colleagues (1998) to evaluate the appropriateness the original GEQ items in a youth setting. This was done by constructing a questionnaire to assess cohesion in a youth sample as follows:

1. The 18 items of the original GEQ were used in the questionnaire.
2. To capture the appropriate context of youth physical activity, the wording of items was revised from the original in the following manner. Minor changes were made to the items to reflect a hypothetical group and a physical activity club¹ setting rather than sport setting. For example, the item “Some of my best friends are on this sport team” was modified to read “By the end, some of my best friends would be in this physical activity club” (See Appendix A).
3. Pilot testing of the revised questionnaire was conducted to determine which items were not understood and which items did not appear appropriate in this population. Any items deemed inappropriate were deleted and replaced with new items, which were more context-specific or better represented the age of the population.
4. The reliability of the modified measure of cohesion was then examined.

Group-Based Scenario. Participants were presented with a written group-based scenario involving a physical activity club (Appendix A). The scenario asked the participants to imagine that they had become a member of a physical activity workout club with 10 other people where the club met three times a week for a period of eight weeks and was led by a knowledgeable instructor. Each of the proposed workout sessions lasted approximately 60 minutes and incorporated a wide variety of activities to target the areas of resistance training, cardiovascular fitness, flexibility, and core

¹ The focus of the Physical Activity Club was planned, structured activity, which is typically considered “exercise” (Casperson, Powell, & Christensen, 1985). Thus, while the Club was labeled ‘Physical Activity’ the behaviour of interest was exercise.

strength. These characteristics were selected because they would be the ones that would frame the real intervention.

By way of introduction to the hypothetical group setting, participants were asked to think about being part of a physical activity club, and within that club, working with their physical activity club instructor to: (1) devise strategies to assist group members to accomplish their individual and group fitness goals in a united way and (2) develop strong feelings about their experiences in the club. These two specific instructions were guided by the earlier work of Eisler and Spink (1998), who provided similar comments to participants to prompt thought around task and social cohesion.

Following these instructions, participants were asked to answer each of the 18 questions on the modified GEQ on a scale from 1 to 9, with 1 representing strongly disagree and 9 representing strongly agree. If the participants felt that they could not assign a value to any item, they were requested to put an X beside one of two reasons: (1) Don't understand or (2) Does not apply.

2.2.3 Data Analysis

Analysis of the data followed a sequential process. The first step involved the identification of any items marked "Don't understand" or "Does not apply" by any participant. For any item that was identified by 10% or more of the participants as "Don't understand", the following procedures were implemented: (a) the wording of the item was examined to assess for appropriate context and content for this age group, (b) determining whether individuals who identified this item also identified other "Don't understand" items, (c) assessing whether the mean and standard deviation of this item for those who answered it, differed significantly from items that were not identified as "Don't understand". A similar procedure was repeated for any item that was identified by 10% or more of the participants as "Does not apply".

For any items where the wording was found to be inappropriate, or there was covariance with other identified items, or the means and standard deviations were significantly different from the non-identified items, the items were reworded or deleted. All other items were retained.

If items were replaced or reworded, a second pilot study was conducted to ensure the appropriateness of the modified GEQ for the youth context. Once appropriate item wording had been established, bivariate correlations were computed for the 18 questionnaire items. In addition, Cronbach's (1951) alpha was calculated for each of the four dimensions of group cohesion.

2.3 Results

An examination of the modified GEQ items in Pilot Study 1 revealed that one question (Question 11) was identified by more than 10% of the participants (21.2%) as 'Didn't Understand' (see Table 1 for a summary). Subsequent examination of covariance revealed that 16 of 43 participants also had responded 'Didn't Understand' to other questionnaire items. Further examination of the demographics of the 16 participants indicated that nearly all (15) were in grades 9 and 10. In terms of the means and standard deviations of the items, the mean and standard deviation of the identified item ($M=4.75$; $SD=2.12$) fell within the range of the other items ($M=4.7-6.9$; $SD 2.2-2.4$).

None of the modified GEQ items exceeded the 10% identification threshold for 'Not Applicable'. In line with Carron et al.'s (1985) recommendations, the question was reworded. Original Item: Q11. Members of our physical activity club would rather not socialize than get together as a group (GI-S).

Table 1 Pilot 1 GEQ Item Summary

Item	GEQ Subscale	Response (%)	Didn't Understand (%)	Not Applicable (%)
1. I would not enjoy the social interaction occurring in this physical activity club.	ATG-S	200 (98.5%)	0 (0%)	3 (1.5%)
2. I would not be happy with the amount of physical activity I get.	ATG-T	196 (96.6%)	5 (2.5%)	2 (1.0%)
3. I would not miss the members of this physical activity club when the program ends.	ATG-S	196 (96.6%)	0 (0%)	7 (3.4%)
4. I'd be unhappy with my group's level of commitment to exercise.	ATG-T	192 (94.6%)	3 (1.5%)	8 (3.9%)
5. By the end, some of my best friends would be in this physical activity club.	ATG-S	193 (95.1%)	3 (1.5%)	7 (3.4%)
6. This club would not give me enough opportunities to improve my personal fitness.	ATG-T	199 (98.0%)	0 (0%)	4 (2.0%)
7. I would enjoy other social events more than the social activities that would be associated with this physical activity club.	ATG-S	190 (93.6%)	9 (4.4%)	4 (2.0%)
8. I would not like the approach to exercising done in this physical activity club.	ATG-T	183 (90.1%)	18 (8.9%)	2 (1.0%)
9. For me this physical activity club would be one of the most important social groups to which I belong.	ATG-S	203 (100%)	0 (0%)	0 (0%)
10. Our physical activity club would be united in trying to reach its goals for fitness.	GI-T	194 (95.6%)	9 (4.4%)	0 (0%)
11. Members of our physical activity club would rather not socialize than get together as a group.	GI-S	157 (77.3%)	43 (21.2%)	3 (1.5%)
12. We would all take responsibility if one of our exercise sessions for the club goes poorly.	GI-T	198 (97.5%)	2 (1.0%)	1 (.5%)
13. Members of our physical activity club would rarely socialize together.	GI-S	200 (98.5%)	1 (.5%)	2 (1.0%)
14. Members of our physical activity club would not agree about the difficulty level at which we attempt to exercise.	GI-T	188 (98.5%)	13 (6.4%)	2 (1.0%)
15. Members of our physical activity club would like to spend time together after the program is over.	GI-S	198 (97.5%)	0 (0%)	5 (2.5%)
16. If members of our physical activity club have problems during workouts, all our members would want to help them so we could make progress together.	GI-T	202 (99.5%)	0 (0%)	1 (.5%)
17. Members of our physical activity club would not stick together outside of our workout sessions.	GI-S	196 (96.5%)	2 (1.0%)	4 (2.0%)
18. After and during workouts, members of our physical activity club would not communicate freely about what is to be done in the workouts and exercise sessions.	GI-T	192 (94.6%)	8 (3.9%)	2 (1.0%)

Revised Item: Q11. Outside of our workout sessions, members of our physical activity club would rather go out on their own than get together as a group (GI-S).

A second pilot study was conducted to examine the questionnaire that included the revised item. A sample of grade 9 and 10 students was selected for the second pilot investigation as the grade 9 and 10 students appeared to experience the greatest difficulty with the item in the initial investigation.

The results of the second pilot study revealed that the language on the reworded item was deemed appropriate as none of the second pilot participants identified the question as ‘Didn’t Understand’.

Upon completion of the two pilot studies, bivariate correlations were calculated for the 18 questionnaire items using the data from the bigger sample, which included participants in grades 9-12 (see Table 2). An examination of the values revealed that the majority of the items within each task factor were significantly correlated ($p < .001$). The correlations for the social cohesion subscales were lower, particularly on the ATG-S subscales ($r = .1-.3$).

In addition, Cronbach’s (1951) alphas were calculated for each dimension of cohesion using the pilot study one data. The values were: ATG-T (.72), ATG-S (.58), GI-T (.62), GI-S (.66). These internal consistency values are slightly lower than the values reported in other exercise settings: ATG-T (.77), ATG-S (.62), GI-T (.71), and GI-S (.77) (Carron & Spink, 1992) and ATG-T (.73), ATG-S (.63), GI-T (.74), GI-S (.70) (Courneya & McAuley, 1995). However, the pattern of the reliabilities is similar with the lowest reliability typically being ATG-S. All four dimensions were deemed reliable as the alphas fell within, or were above the .50 to .70 range suggested for adequate internal consistency (Nunnally & Bernstein, 1994).

Table 2 Pilot 1 GEQ Interitem Correlations

	ATG-T (Q2) ²	ATG-T (Q4)	ATG-T (Q6)	ATG-T (Q8)	ATG-S (Q1)	ATG-S (Q3)	ATG-S (Q5)	ATG-T (Q7)	ATG-S (Q9)	GI-T (Q10)	GI-T (Q12)	GI-T (Q14)	GI-T (Q16)	GI-T (Q18)	GI-S (Q11)	GI-S (Q13)	GI-S (Q15)	GI-S (Q17)
ATG-T (Q2)	1																	
ATG-T (Q4)	.385**	1																
ATG-T (Q6)	.442**	.301**	1															
ATG-T (Q8)	.632**	.268**	.423**	1														
ATG-S (Q1)	.326**	.214**	.120	.232**	1													
ATG-S (Q3)	.369**	.334**	.257**	.252**	.318**	1												
ATG-S (Q5)	-.025	-.097	.044	-.032	.087	.325**	1											
ATG-S (Q7)	.210**	.249**	.137	.271**	.216**	.209**	.111	1										
ATG-S (Q9)	.160*	.082	.148*	.207**	.086	.260**	.174*	.329**	1									
GI-T (Q10)	.274**	.137	.260**	.358**	-.009	.129	.160*	.182*	.273**	1								
GI-T (Q12)	.250**	.037	.131	.332**	.040	.107	.057	.244**	.259**	.396**	1							
GI-T (Q14)	.265**	.148	.139	.150*	.057	.143	.170*	.266**	.156*	.027	.113	1						
GI-T (Q16)	.206**	.139	.157*	.153*	.086	.298**	.119	.269**	.418**	.441**	.468**	.029	1					
GI-T (Q18)	.221**	.152*	.183*	.193*	.178*	.254**	.056	.240**	.047	.072	.196**	.188*	.194**	1				
GI-S (Q11)	.194*	.161*	.270**	.304**	.078	.214**	-.015	.063	.063	.078	.074	.067	.058	.139	1			
GI-S (Q13)	.254**	.096	.224**	.316**	.146*	.160*	.128	.132	.126	.229**	.097	.252**	.095	.124	.355**	1		
GI-S (Q15)	.151*	.135	.185**	.242**	.041	.306**	.216**	.177*	.318**	.358**	.335**	.031	.482**	.087	.151	.198**	1	
GI-S (Q17)	.226**	.159*	.196**	.356**	.170*	.377**	.151*	.167*	.268**	.172*	.229**	.145	.233**	.212**	.397**	.268**	.357**	1

* p<0.05
**p<0.01

² The correlations for the GEQ pilot questionnaire items are organized into the four cohesion dimensions. For example, ATG-T Q #2 denotes ATG-T dimension, Question #2 on the pilot GEQ measure. Please refer to Appendix A for the item questions.

2.4 Discussion

The two pilot investigations provided preliminary evidence that the Modified GEQ items were appropriate for a youth sample participating in a physical activity setting. Specifically, the language on the revised item was found to be understandable and applicable based upon the perceptions of the youth sample.

Although, the four GEQ subscales were found to be reliable, some methodological and measurement concerns could be raised by the low alpha values associated with some of the subscales (i.e., ATG-S, GI-S, GI-T) when compared to previous findings (Carron & Spink, 1992; Courneya & McAuley, 1995). These lower values may be a function of the hypothetical groups used in this study, which may have compromised the participants' abilities to properly evaluate the group and social orientations of group cohesion despite efforts to address this limitation (i.e., researcher highlighted to the participants that they should try very hard to envision being in the hypothetical group and try to imagine developing a strong sense of belonging with the physical activity club as well as working with the instructor and other fellow members to reach the groups' goals).

Acknowledging this limitation, the study has several unique features. First, this study is the first to our knowledge to systematically evaluate the appropriateness of a modified version of the GEQ for youth in an exercise setting utilizing the specifications outlined by its creators, Carron and colleagues (1998). Second, the study employed the youth sample as active agents in the pilot design prior to the forthcoming intervention. Despite the inconvenience of time and added expense, researchers advocate the importance of pilot testing adapted surveys with the selected population to ensure it 'works' as intended (cf. Oppenheim, 1992).

The findings from the preliminary study raised some concern for the reliability of the social cohesion measures. Given the emphasis of past TB interventions on task components (i.e.,

Carron & Spink, 1993, Spink & Carron, 1993), and the reported reliabilities of the task cohesion subscales, this intervention will focus on task cohesion.

The pilot investigation yielded an appropriate measure to assess youth perceptions of task cohesion within a group-based exercise setting, and it will be used to assess cohesion in the following intervention. The remainder of the dissertation will describe a field experiment examining a TB intervention in a rural youth setting. The results from the intervention will be presented in two parts. The first part will report the processes of the intervention (Study 2a) and the second will report on the specified intervention outcomes (Study 2b).

Before reporting the results for the processes and the specific outcomes of the intervention, an overview of the overall intervention will be presented.

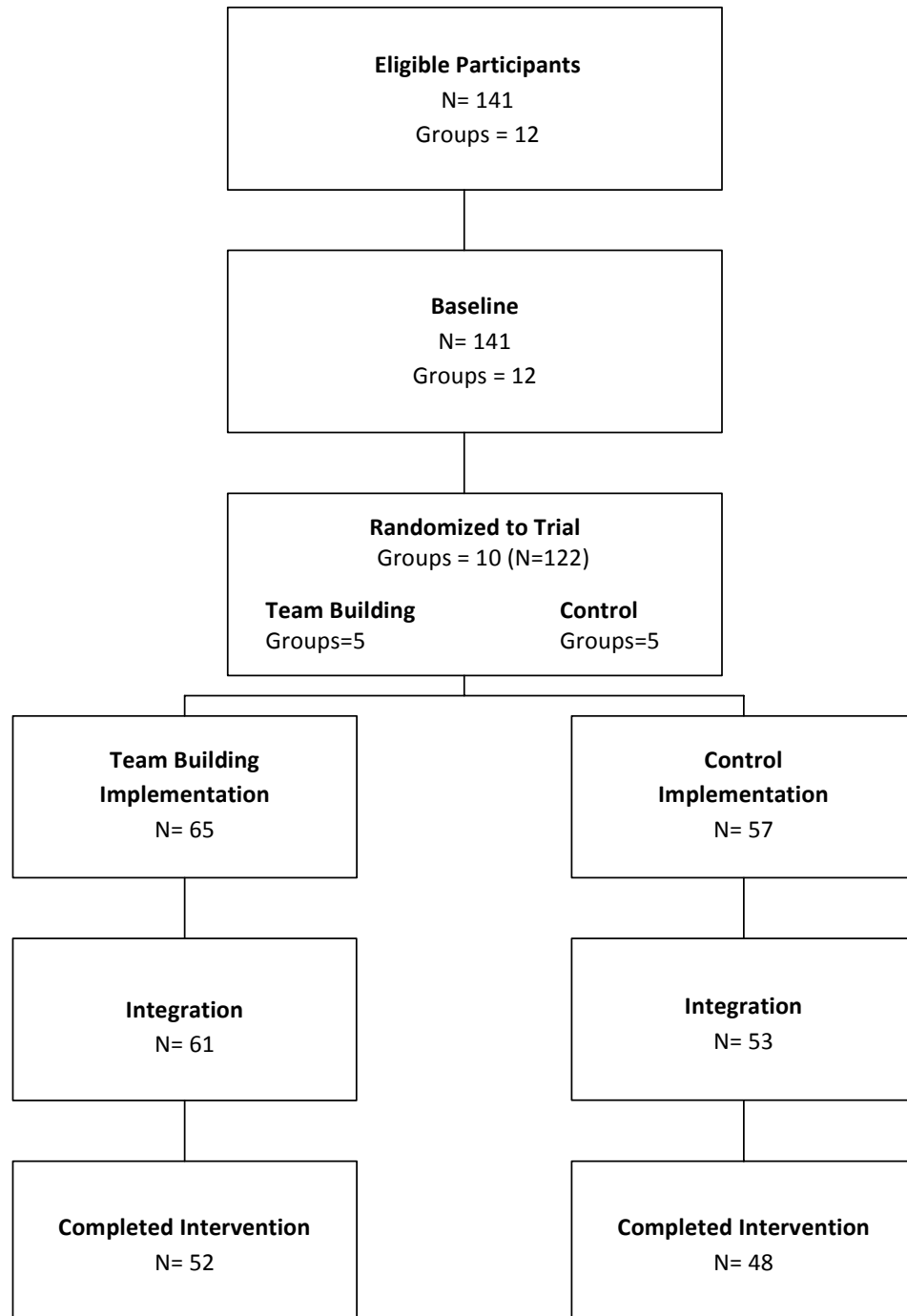
2.5 Overview of Intervention

The intervention study was a quasi-experimental field experiment employing a 2 (between group: TB-Control) by 2 (time: pre-post intervention) factorial design.

The first step in the study was the recruitment of leaders, in the form of teachers working at rural high schools in Saskatchewan. Teachers were recruited using several strategies that included flyers distributed at three regional track meets, an email to regional track coaches, and a presentation at a year-end athletic board meeting. A total of twelve teachers (9 males and 3 females) from 12 different schools volunteered to direct an exercise club outside of school hours. Each teacher was then responsible for recruiting the participants from their respective schools. Recruitment by the teachers resulted in 141 youth (13-18 years) signing up and returning the appropriate consent forms to participate (see Figure 4).

After participant recruitment, leaders completed an initial individual 1-hour training session conducted at their respective schools by the author. The purpose of this initial training

Figure 4: TB Intervention Flow Chart



session was to instruct the leaders in the implementation and delivery of a standardized exercise program (Appendix D). This exercise program was developed by the author in partnership with Jason Weber, the Director of the Human Performance Center at the University of Saskatchewan. At the orientation session, the leaders were provided with a series of exercises that they were to deliver over 24 sessions (i.e., 24 sessions represents the length of the intervention study).

In addition to identifying the exercises and being instructed on how to do them, the leaders were provided with a format for each session that was standardized as follows - warm-up exercises (10 minutes), energy systems exercises (20 minutes), dynamic strength training exercises (20 minutes), and cool down exercises (10 minutes). Within one week of receiving the training, the leaders initiated the exercise clubs in their respective schools using the prescribed exercises and session format. The standardized exercise program was delivered in each school's gymnasium or an adjacent room over a 60-minute session that met three times per week.

After delivering the first 6 sessions (labeled Baseline – Phase 1), a pre-test assessment was administered to the participants by the author and trained research assistants (Figure 4), and the schools were randomly assigned to the intervention or the control condition (Figure 4). Of the 12 original schools, two were eliminated from the randomization. One was excluded because the leader withdrew from the study during the baseline period and the other was excluded because of an inconsistency in protocol administration during the baseline period (i.e., the leader did not show up for all sessions). The randomization procedure (selecting from an envelope) resulted in 5 schools being assigned to TB condition and 5 schools being assigned to the control condition. A comparison of school demographics (see Table 3) between conditions revealed no significant differences in terms of: (i) eligible participants at the school, $t(8) = 1.41, p > .05$; (ii) school size, $t(8) = 1.07, p > .05$; (iii) distance from an urban center, $t(8) = -2.16, p > .05$; and

Table 3 School Demographic Table

School	Condition TB=1 Control= 2	N	Eligible Gr.9-12 Participants	School Size	Distance from urban center	Annual Household Income (2000) (\$40, 251- SK ave.)
1.	1	19	170	265	27 km	52, 760
2.	1	15	51	183	183 km	57, 526
3.	1	13	350	350	112 km	37, 174
4.	1	10	350	350	19 km	58, 683
5.	1	8	52	130	84 km	20, 711
6.	2	13	75	200	121 km	30, 391
7.	2	18	60	166	144 km	48, 573
8.	2	10	104	212	35 km	44, 487
9.	2	6	64	245	48 km	31, 494
10.	2	10	175	209	117 km	37, 556
Overall (N=10)		12.2	145.1	231.0	89	41935.5
TB (N=5)		13	194.6	255.6	85	45370.8
Control (N=5)		11.4	95.5	206.4	93	38500.2

(iv) annual household income in the school community, $t(8) = .85, p > .05$. In total, 122 youth ($M = 15.5$ years) were randomly assigned by school to the TB ($n = 65$) or control ($n = 57$) conditions (Figure 4). A comparison of participant demographics between conditions (see Table 4) revealed no significant differences in: (i) age, $t(120)=1.20, p > .05$, (ii) sex, $\chi^2(1)=3.43, p > .05$, (iii) baseline physical activity level, $t(120)=-1.61, p > .05$, (iv) preference for being active with others, $\chi^2(2)=2.70, p > .05$, (v) preference for being active in a group, $\chi^2(2)=0.03, p > .05$, (vi) present involvement in a team sport, $\chi^2(1)=0.001, p > .05$, (vii) involvement in a team sport in the past year, $\chi^2(1)=0.04, p > .05$, (viii) residence, $\chi^2(2)=0.32, p > .05$, and (ix) transportation to the physical activity club, $\chi^2(2)=0.79, p > .05$.

After randomization, the leaders in the control condition were contacted by telephone by the author. The call was made in an attempt to control for possible attention-placebo effects. As such, the leaders were asked to discuss how the club was progressing and to see if there were any problems where the author might be of assistance. No problems were reported at this time. The control leaders were instructed to continue to conduct their remaining 18 sessions using the exercise protocol that they had been trained to use for the first six sessions. In addition, leaders in the control condition also were told that site visits would be conducted wherein individuals would be coming to their class to monitor the implemented exercise protocol. The control leaders were not informed about the TB session or protocol.

The five exercise leaders randomized to the TB condition also were contacted by phone and were invited to attend a 3-hour TB workshop. Leaders were informed that the session would focus on TB principles that they could implement with their respective clubs. To maximize attendance at the workshop, a free meal was promised for all those who attended. All five leaders

Table 4 Sample Demographic Table

Demographic Variable		Total Sample (N =122)	Team Building (n=65)	Control (n=57)
Age		15.51 (1.07)	15.40 (1.10)	15.63 (1.03)
	13 years	2 (1.6%)	1 (1.5%)	1 (1.8%)
	14 years	21 (17.2%)	14 (21.5%)	7 (12.7%)
	15 years	39 (32.0%)	22 (33.8%)	17 (29.8%)
	16 years	33 (27.0%)	14 (21.5%)	19 (33.3%)
	17 years	27 (22.1%)	14 (21.5%)	13 (22.8%)
Sex				
	Male	58 (47.5%)	36 (55.4%)	22 (38.6%)
	Female	64 (52.5%)	29 (44.6%)	35 (61.4%)
Baseline Physical Activity Level				
	KKD	9.08 (8.43)	7.93 (7.36)	10.38 (9.39)
Residence				
	In the community	64 (55.7%)	36 (58.1%)	28 (52.8%)
	In another community	4 (3.5%)	2 (3.2%)	2 (3.8%)
	On a farm	47 (40.9%)	24 (38.7%)	23 (43.4%)
Enjoy being active with others				
	Yes	111 (92.5%)	58 (90.6%)	53 (94.6%)
	No	1 (0.8%)	0	1 (1.8%)
	No Preference	8 (6.7%)	6 (9.4%)	2 (3.6%)
Enjoy being active with others in a group setting				
	Yes	109 (90.8%)	58 (90.6%)	51 (91.1%)
	No	2 (1.7%)	1 (1.6%)	1 (1.8%)
	No Preference	9 (7.5%)	5 (7.8%)	4 (7.1%)
Presently involved in a team sport				
	Yes	88 (73.3%)	47 (73.4%)	41 (73.2%)
	No	32 (26.7%)	17 (26.6%)	15 (26.8%)

Table 4 (continued)

Demographic Variable		Total Sample (N =122)	Team Building (n=65)	Control (n=57)
Involvement in team sport in past year				
	Yes	113 (94.2%)	36 (93.8%)	53 (94.6%)
	No	7 (5.8%)	4 (6.3%)	3 (5.4%)
Transportation to Physical Activity Club				
	Walk	46 (40.0%)	25 (40.3%)	21 (39.6%)
	Bike	4(3.5%)	3 (4.8%)	1 (1.9%)
	Drive/Ride	65 (56.5%)	34 (54.8%)	31 (58.4%)

agreed to attend the session. A detailed description of the TB workshop methodology is provided in the section that follows in Study 2a (3.2.3.1.2 Unique Features of Intervention). Following the workshop, the TB leaders returned to their school to implement the TB protocol over the next five class sessions (titled Implementation - Phase 2). After the TB protocol was implemented, the leaders used the final 13 sessions to reinforce the TB protocol that had just been implemented (titled Integration - Phase 3).

Figure 4 provides an overview of the number of participants beginning each of the three intervention phases (Baseline, Implementation, and Integration) for the TB and control groups. As can be seen in Figure 4, 100 participants (TB-52, Control-58) completed the Integration Phase.

As mentioned above, while one intervention was conducted, the results are presented in two parts - the Processes (Study 2a) and the Outcomes (Study 2b) that resulted from the intervention. In Study 2a, the measures used to assess the process components of the intervention are presented and include the five TB factors (group distinctiveness, group norms, group positions, communication/interaction, personal sacrifices) and the proposed group mechanism of task cohesion (see Figure 5a). In terms of analysis, a discriminant function analysis and MANOVA were conducted to determine whether the TB and control groups could be differentiated by the five group factors. Collectively, these analyses acted as a manipulation check of the efficacy of the intervention. The TB factors that emerged from these two analyses were then entered into a regression to determine which factors uniquely contributed to the prediction of the proposed group mechanism, task cohesion.

Study 2b reports on the pre-post intervention measures of adherence (attendance, lateness, and dropout), group task satisfaction, and the proposed mechanism of task cohesion

(ATG-T, GI-T) (see Figure 5b). Analyses of adherence (i.e., attendance and lateness), group task satisfaction and task cohesion (i.e., ATG-T, GI-T) were done using 2 (TB/Control) x 2 (pre-post intervention) repeated measures ANOVA and MANOVA while dropout was assessed using an independent samples t-test.

One final note, the Study 1 questionnaire was pilot tested at one of the ten intervention schools. The author acknowledges the possibility that anywhere from 0 - 10 intervention participants at this school may have been exposed to the task cohesion survey items prior to the intervention.

Figure 5a: TB Intervention Design and Timing of Process Measures (Study 2a)

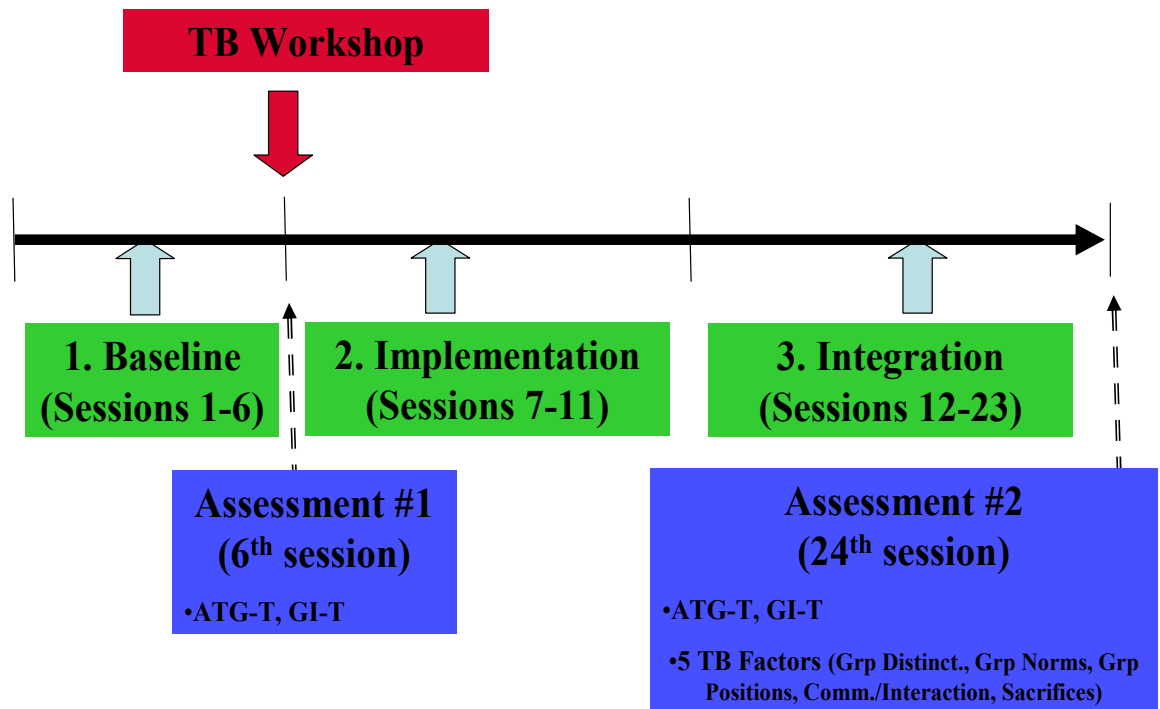
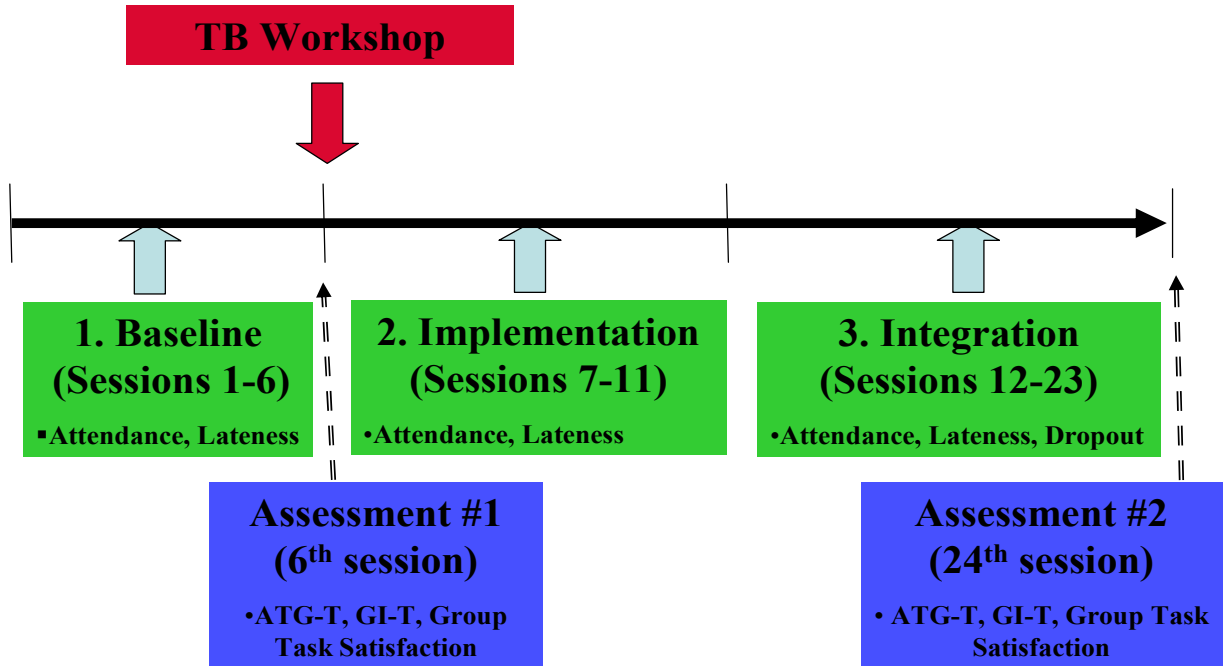


Figure 5b: TB Intervention Design and Timing of Outcome Measures (Study 2b)



CHAPTER 3

TB PROCESS

3.1 Introduction

A growing body of evidence has highlighted the benefits of group-based interventions in enhancing individual adherence in activity settings (Burke et al., 2006; Dishman & Buckworth, 1996). Among identified group-based intervention strategies, team building (TB) within a group has been found to be effective in promoting exercise adherence in different populations including the elderly (Watson et al., 2004) and young adults (Carron & Spink, 1993; Spink & Carron, 1993).

While recognizing that TB is associated with adherence outcomes in the activity setting is important, from the perspective of an interventionist, understanding how it works is equally important. This is especially true in the physical activity area where Baranowski and colleagues (1998) have observed that physical activity intervention programs may have an effect, but researchers rarely know *why* it happens.

Alongside inadequate evaluation, Baranowski and colleagues (1997) suggested that interventions are not substantially effecting changes in the mechanism variables bringing about behaviour change. To address this issue, Baranowski and colleagues (1997) proposed that health promotion researchers should be more focused on understanding the underlying mechanisms that affect the behaviour. To-date, within the TB activity literature, little research has addressed these important issues.

This paucity of research examining potential mechanisms within TB is surprising given the suggestion of Brawley and Paskevich (1997) over a decade ago about the need to evaluate TB programs. They identified a number of reasons to systematically evaluate TB including the

fact that TB interventions are typically time intensive and a systematic evaluation would help practitioners to select optimum intervention designs to maximize impact. Second, they suggested that the evaluation of TB research is necessary to clarify relationships (i.e., key mechanisms) between the independent variables and dependent variables within TB interventions. In the past, a failure to specify relationships has been identified as a critical problem limiting the generalizability of findings and effects directly caused by TB interventions (Brawley & Paskevich, 1997).

Further support for the importance of process evaluation in interventions can be gleaned from the health education and behaviour literature. Glasgow (2002) argues that it is critically important to identify how health behaviour interventions work, both to increase our understanding of theoretical mechanisms and to create more efficient and effective interventions. A comment echoed by Weinstein (2007), who suggested that few applied studies provide any information about why they succeed or fail. In the same vein, Glanz (2002) discussed the need for high-quality evaluation to occur to ensure that valuable information is not lost. Finally, Linden and Satin (2007) argued that the failure to test critical mechanisms identified in models that are proposed to contribute to the salient outcome is doing a disservice to model development.

In an exercise setting, Carron and Spink (1993) have developed a conceptual framework that has been endorsed by others for its more systematic and scientific approach to TB interventions (Brawley & Paskevich, 1997). The framework presents the group in the form of a linear model containing inputs, throughputs, and outputs. Within the model, the salient construct is identified as group cohesion and it is considered to be the desired output or product of three categories: group environment, group structure, and group processes. The group environment

and group structure (inputs) are proposed to influence group processes (the throughput), which in turn, contribute to the development of cohesion (output).

Within the three categories in the TB conceptual model, a number of factors have been identified as contributing to the enhancement of cohesion within an exercise setting. These include highlighting group distinctiveness within the environment; group norms and group positions within group structure; and communication/interaction and individual sacrifices within group processes (Carron & Spink, 1993). While each of the five TB factors identified above have been viewed as contributing collectively to the cohesion of a group, the factors have not been systematically evaluated with regard to understanding the strength of relationship of the factors to the potential group mechanism the intervention targets (i.e., cohesion).

The purpose of this study was two-fold. As the conceptual model of TB outlined by Carron and Spink (1993) is predicated upon a number of established factors, the examination and evaluation of these factors following an intervention becomes important (cf. Glasgow, 2002, Weinstein, 2007). Thus, the first purpose was to investigate whether the TB factors targeted in the intervention would differentiate individuals participating in a TB versus a control condition. This purpose was grounded in the suggestion of researchers to evaluate the processes driving interventions (Weinstein, 2007). Based upon the evidence of other TB activity interventions, it was hypothesized that exercise club participants exposed to the TB intervention program would identify the presence of the five TB factors within their group to a greater extent than those participants in the control condition.

Given the call in the literature to evaluate the effectiveness of the targeted mechanisms involved in an intervention (cf. Baranowski et al., 1998), the second purpose was to examine the relationship between the five TB factors and the critical mechanism of task cohesion. The focus

on task cohesion flows from the fact that TB has been substantively and empirically linked with task cohesion in past exercise settings (Carron & Spink, 1993; 1995; Spink & Carron, 1993). Specifically, exercise participants exposed to a TB intervention have expressed significantly higher perceptions of individual attractions to group task (ATG-T) than participants in control conditions (Carron & Spink, 1993; 1995; Spink & Carron, 1993). From a practical perspective, an examination of the effectiveness of specific TB factors also would be in line with Brawley and Paskevich's (1997) suggestion to systematically evaluate TB approaches that influence task-related teamwork and interactive processes.

Based on the assumption that TB should be positively associated with task cohesiveness, a second hypothesis predicted that the five TB components would be positively associated with task cohesion.

3.2 Method

3.2.1 Sample

Participants were the 100 youth (13-18 years) identified in the preceding section titled "2.5 Overview of Intervention" who completed the intervention (see Figure 4).

3.2.2 Design

A quasi-experimental³ field experiment employing a 2 (between group - TB/Control) by 2 (time - pre-post intervention) factorial was used in this intervention.

³ The intervention was classified as quasi-experimental as schools (sites) rather than individuals were randomized to the two treatment groups.

3.2.3 Procedure

This study was approved by the University Institutional Ethics Review Board (Appendix B) and the relevant school boards (Appendix C). Parental consent was required for participants under the age of 18 years.

3.2.3.1 Common Elements of Protocol

The basic protocol including a description of the recruitment of the teachers (i.e. leaders), and participants, the standardized exercise program, randomization, and three phases of the intervention are outlined in a preceding section titled “(2.5) Overview of Intervention”.

3.2.3.2 Unique Features of Intervention

As outlined previously, following the sixth session the five leaders randomized into the TB condition attended a 3-hour TB workshop. The workshop was based on one previously developed and used by Carron and Spink (1993), and included four stages - introduction, conceptual, practical, and an intervention stage. The last stage entailed the leader delivering what had been provided in the first three stages to those participants in his/her activity club. A description of each of the stages in this TB intervention follows.

Introductory Stage. The first stage provided the leaders with a rationale for introducing the TB program in their physical activity club. This procedure involved identifying the strong link between cohesion and adherence in previous research. Specific research evidence outlining the individual adherence benefits (i.e., reduced lateness and dropout; Spink & Carron, 1993) associated with increased group cohesion was provided as well as the link between TB and increased cohesion (Carron & Spink, 1993). The introductory stage, including both the presentation of research findings and an ensuing discussion about the benefits of cohesion, lasted approximately 20 minutes.

Conceptual Stage. In the second stage, a TB conceptual model (Carron & Spink, 1993) was introduced as a frame of reference for the instructors (Figure 1). The TB model was based on a conceptual framework wherein the group was viewed as a linear model containing inputs, throughputs, and outputs. The key output in the framework was cohesion, which is considered to be the product of two inputs - group environment and group structure, and one throughput - group processes. Within each of the inputs and throughput, specific factors were identified that have previously emerged as being associated with the output of enhanced group cohesiveness (e.g., *distinctiveness* for group environment; *group norms* and *group positions* for group structure; and *individual sacrifices* and *interaction/communication* for group processes).

For each of these five factors (e.g., group distinctiveness, group norms, group positions, individual sacrifices, and communication/interaction), leaders were presented with an accompanying rationale (i.e., research-based generalization) as to why the factor was included in the TB model. For instance, the justification for including group distinctiveness presented to leaders suggested that stronger perceptions of cohesiveness develop when something in the group environment is somehow made distinct, which leads members to develop a stronger sense of “we” and more readily distinguish themselves from nonmembers of the group (i.e., “they”) (Tajfel & Turner, 1979).

Presenting a conceptual framework when moving from theoretical constructs (e.g., cohesion) to practical applications (e.g., TB in exercise classes) was deemed beneficial for three primary reasons: (1) communication is facilitated with exercise leaders, leading to the complex concepts (e.g., cohesion, groups) being more readily simplified, explained and understood; (2) the interrelatedness of the various individual components of the TB model can become apparent;

and (3) the focus for possible interventions are more readily identified (Carron & Spink, 1993). The presentation of the conceptual stage lasted approximately 20 minutes.

Practical Stage. Past research has shown that when individuals are given control over outcomes, the selectivity, intensity, and duration of behaviour are enhanced (de Charms, 1976). In keeping with de Charm's (1976) suggestion and Carron and Spink's (1993) protocol, this particular stage of the conceptual model involved the leaders as active agents in developing practical strategies to be implemented in their TB programs. Specifically, the leaders brainstormed as many TB strategies as possible to be used in their clubs. When doing so, instructors were encouraged to use the five identified factors in the conceptual model (e.g., distinctiveness, norms, positions, sacrifices and interaction and communication) as frames of reference.

From the list of strategies generated during the brainstorming segment of the TB workshop, each instructor developed a personalized TB protocol that emphasized the specific strategies he or she felt would be most effective with his/her club. While leaders had the freedom to develop any strategies they deemed appropriate, under the factor of group norms, they were asked to ensure that they included one specific norm - the importance of attendance. A complete list of all the specific strategies suggested by instructors to enhance group cohesiveness in fitness classes are presented in Table 5.

Prior to departing the workshop, each leader met individually with the intervention specialist to discuss his or her individualized TB protocol. At that time, specific feedback and comments were provided to each leader's protocol to ensure that the specific strategies selected were in line with the five group factors discussed. Each leader then provided the TB interventionist with a copy of the final TB protocol that would be implemented. The leaders were

Table 5 TB Intervention Strategies Identified by the Leaders

Category	Intervention strategies used
Group Environment Distinctiveness	Develop a group name Have group music Handout bracelets for the group ☺ Hand stamp for attending each session Make up codes names for participants Group water bottles
Group structure Group norms	Buddy system for attendance Have a window of time to start Attendance sign-in book with time Minigroup competition for lateness and attendance Point system for attendance/punctuality Secret weekly workout partner – “Guardian Angel” to monitor work ethic or attendance
Group positions	Participants have a ‘home’ or set pattern/formation for warm-up and/or cool down Students draw a number which represents the order of participants for warm-up and cool down. The participants maintain the order but they rotate through leading the exercises Ab buddies Rotate/switch participant leaders for warmup and/or cool down
Group processes	
Interaction/ Communication	Encouragement on performing activity Offering peer/partner feedback on effort or exercise technique Pair up with different participants for each activity Offer fitness tips
Individual sacrifices	Arranging for an alternative ride to/from school Talk to group members outside of the club (e.g. in the hallway, in the community) Dominant person letting someone else take the lead or have first choice of the equipment Negotiate start time or finishing time of the workout sessions Secret ballot- write down sacrifices participants have made for the group and sacrifices they have noticed other members have made for the group

informed that site visits would be conducted to monitor the protocol that each had developed. In addition, the leaders were told not to discuss their protocol with any others until the study had been completed. The practical stage of the workshop lasted approximately 1-1/2 hours.

Intervention Stage. The final stage of the TB program took place away from the workshop in the actual club setting. In an effort to enhance the fidelity of the TB intervention protocol for the study, delivery of the intervention components following the baseline (Phase 1- Sessions 1-6), was divided into two distinct phases: Phase 2-Implementation (Sessions 7-11), Phase 3- Integration (Sessions 12-23) (see Figure 5a). In the Implementation Phase, the leaders were told to introduce the five TB factors on consecutive days as follows: Day 1- group distinctiveness, Day 2- group positions, Day 3- interaction and communication, Day 4- group norms and Day 5- individual sacrifices. Further, the leaders were told to focus on the specific TB factors during the 10 minute warm-up and 10 minute cool-down segments of the workouts. This step was done to ensure the protocol was delivered consistently. Also, by using class time for the delivery of the TB factors, contact time with participants remained consistent across both conditions.

In the remaining 13 sessions of the Integration Phase, the leaders were instructed to reinforce the TB factors delivered during the implementation phase. In an effort to encourage compliance to program delivery and reinforcement of TB factors, leaders were informed that site visits would be conducted to monitor the protocol that each had created.

3.2.4 Measures

An overview of the timing of the process measures is outlined in Figure 5a.

3.2.4.1 TB Factors. To evaluate the five TB factors at the end of the intervention (i.e., session 24), participants were asked to indicate their perceptions of recall for each of the TB components within the activity club. Specifically, participants were asked to circle a number from 1 (strongly disagree) to 7 (strongly agree) assessing their perception of the presence of each of the five TB factors within the club (see Appendix E). The five TB factors, which were presented as single items, were developed for this study and included the following: (1) A distinctive environment was developed within the physical activity club; (2) A set of accepted standards for group behaviour was developed within the physical activity club; (3) Well recognized positions within the group were developed within the physical activity club; (4) Members of the physical activity club interacted and communicated with everyone in the group; (5) Members of the physical activity club made personal sacrifices to be a member of the group.

3.2.4.2 Cohesion. Perceptions of cohesion were assessed using the two task cohesion subscales (ATG-T, GI-T) of the Group Environment Questionnaire (GEQ, Carron et al., 1985) examined in the Pilot Study (see Appendix F). The four ATG-T and five GI-T items were scored on a 9-point Likert scale (1 = strongly disagree to 9 = strongly agree). The items for each factor were summed with higher scores representing greater task cohesion. The task dimension of cohesion was selected as it has been the focus of past TB interventions (Carron & Spink, 1993; Spink & Carron, 1993). In addition, Mikalachki (1969) highlighted that task rather than social cohesion would be the greatest when the task of the group encouraged participants to organize around the task requirements. The original GEQ instrument has been tested and found to be both a reliable and valid instrument (Carron et al., 1985). The original GEQ task cohesion subscales of ATG-T

and GI-T had reliability coefficients of .75 and .70, respectively (Carron et al., 1985).

Subsequent analysis by Carron and colleagues (1985) found the task subscales of the measure to have good content, construct, concurrent, and predictive validity.

3.2.4.3 TB Manipulation Check

In an effort to monitor the implementation of the standardized exercise program and TB protocol, visits to each of the 10 sites were conducted by two researchers (the author and a research assistant) during the integration phase. The order of site visits was randomly selected from an envelope. At each site visit, the two observers used a master sheet containing 17 of the 25 TB strategies generated by all of the leaders in the TB workshop. By way of explanation, eight of the TB strategies proposed were excluded from the master sheet as it was assumed by the author that they could not be directly observed in class (e.g., arranging for alternative ride to/from club, talk to group members outside of club, dominant person letting someone else lead or have first choice of the equipment).

During the site visits, each researcher independently observed and recorded the presence of the TB items outlined on the master sheet (e.g., switching partners with each activity). Following each session, the two researchers met to discuss and compare their observations. After the discussion and resolution of differences, the observations recorded for each site were compared with the TB protocol that each leader had developed during the TB training session.

In an effort to triangulate the researchers' observations, an assessment of the study participant's perceptions of the TB protocol items was conducted at the conclusion of the intervention (session 24). The participants completed a TB questionnaire assessing whether they had observed the presence of TB strategies during the tenure of the club (e.g., group name). Specifically, the participants were asked to indicate whether they had observed the presence of

any of the 25 TB strategies within their exercise club. If any of the 25 items were perceived as present, participants were asked to indicate the level of presence on a scale from 1 (rarely present) to 7 (always present) (Appendix E).

3.2.5 Data Analysis

To address the first hypothesis examining processes within the intervention, a discriminant function analysis (DFA) was conducted wherein the five TB processes were entered as predictors of group membership (TB, control). In an effort to further identify whether any of the five TB factors independently differentiated TB and control participants, a MANOVA also was conducted. Within the MANOVA, intervention condition (TB or control) served as the independent variable and the five TB factors as the dependent variables.

To address the second hypothesis examining processes, two hierarchical regressions (one for each of the task cohesion factors - ATG-T and GI-T) were planned wherein experimental group was entered at the first step, baseline values of task cohesion (ATG-T, GI-T) were entered at the second step, and the identified TB factors were entered at the third step to predict post intervention perceptions of task cohesion (ATG-T, GI-T).

3.3 Results

3.3.1 Data Screening

Prior to data analysis, all ATG-T (pre, post), GI-T (pre, post), and the five TB factors were examined for accuracy of data entry, missing values, and fit between their distributions and the assumptions of multivariate analysis. An examination of the standardized z-scores for the variables revealed five values were in excess of 3.29 standard deviations (Tabachnick & Fidell, 2007). Each of these potential outliers was checked from the original questionnaire to ensure

there was not a transposition error. No transposition errors were found, and the five outliers were brought to within 3.29 standard deviations (SD) of the grand mean for the item. This adjustment retains, rather than removes the raw score, so that it is deviant, but not as deviant as it was previously (cf. Tabachnick & Fidell, 2007).

An examination of missing values for each variable revealed that $\leq 5\%$ of the values were missing. In each instance where a participant's variable score was missing, the participant's questionnaire was directly examined to ensure there was not a transposition error. If one item was missing for a scale, a mean derived from the remaining items on the scale was inserted for the item. There were seven such instances found and corrected in the exploration of the data.

The multivariate assumptions of normality, linearity and homoscedasticity/homogeneity of variance were evaluated visually and empirically. Histograms provided a visual inspection of the distribution of the variables. Subsequent examination of skewness and kurtosis revealed that all the variables, apart from ATG-T, were normally distributed. ATG-T was found to have a slight negative skewness. Tabachnick and Fidell (2007) recommend a square root and reflected transformation to potentially address this violation of normality. While the transformation did improve the normality of the variable at pre and post, subsequent analysis on the variables indicated no differences between the raw and transformed values, thus, the raw values were retained.

An examination of the Normality P-P plots and the residuals scatterplots indicated that the variables met the assumption of linearity. An assessment of the residual scatterplots also revealed that the assumption of homoscedasticity (the standard deviations of errors of prediction are approximately equal) for the regression dependent variables (ATG-T, GI-T) was met. The assumption of homogeneity of co-variance for the five TB factors entered in the discriminant

function analysis also was met, as the variances did not exceed the recommended 10:1 ratio between groups (Tabachnick & Fidell, 2007). Finally, an examination of the significant bivariate correlations among the five TB factors ($r = .11$ to $r = .41$) and the task cohesion subscales ($r = .28$ to $r = .55$) provided evidence that multicollinearity was minimal (Tabachnick & Fidell, 2007) (see Appendix G).

An examination of the task cohesion subscales revealed alphas ranging from .68 to .78 for ATG-Task (pre-post testing) and from .59 to .65 for GI-Task (pre, post testing). Given that all the alphas fell within, or were above the .50 to .70 range suggested by Nunnally and Bernstein (1994) for adequate internal consistency, all were deemed appropriate for use in subsequent analyses.

3.3.2 Comparability of TB and Control Conditions at Baseline

A comparison of the TB and control groups at the conclusion of the baseline period revealed no differences in terms of either measure of task cohesion, ATG-T, $t(98) = 1.49, p > .05$; GIT, $t(98) = .89, p > .05$.

3.3.3 Main Analysis

Due to the exploratory nature of this study, the adoption of a more liberal alpha level was deemed appropriate to protect against possible Type II error (Franks & Huck, 1986). As this was the first study examining TB in a youth exercise setting, an alpha level of .10 was set for the main analyses used in this study.

Results from the DFA revealed that the five factors assessed at the conclusion of the intervention significantly discriminated between those in the TB versus the control groups, $Wilks' \Lambda(5) = .598, p < .001$. The canonical correlation was .634 indicating that the five

factors accounted for 40.2% of the variance. An examination of the standardized discriminant function coefficients (see Table 6) revealed that the TB factor of group distinctiveness was the strongest predictor of group membership. Overall, a total of 79.8% of the participants were correctly classified. Of those placed in the TB group, 84.6% were correctly classified and of those placed in the control group 74.5% were classified correctly.

Consistent with the findings of the DFA, the results from the MANOVA revealed an overall significant omnibus effect, $F(5, 93) = 12.52, p < .001$. Subsequent step down post hoc tests revealed that four of the five TB factors significantly differentiated participants in the two conditions: Group distinctiveness, $F(1, 97) = 54.28, p < .01$, group norms, $F(1, 97) = 11.07, p < .01$, individual sacrifices, $F(1, 97) = 11.62, p < .01$ and communication/interaction, $F(1, 97) = 3.46, p < .07$. Examinations of the group means for the four TB factors indicated that the TB group means were higher, and in the direction hypothesized, when compared with the control group means (see Table 6). To test the final hypothesis that TB would be positively associated with task cohesiveness, the four TB factors identified in this analysis were included as the final step within the planned hierarchical multiple regression analysis outlined next.

3.3.3.1 Attraction to Group - Task (ATG-T)

Results from the hierarchical regression analysis revealed that the group significantly predicted ATG-T, $F(1, 97) = 6.71, p < .01$, and accounted for 7% of the total variance. An examination of the beta weight for group ($\beta = .26$) indicated that the ATG-T scores were significantly higher in the TB group compared to the control group. The addition of baseline ATG-T at the second step added significant variance over and above the group,

Table 6 Discriminant Function Analysis of TB Factors by Group

TB Factor	TB Mean (SD)	Control Mean(SD)	Standardized Discriminant Function Coefficients
Group distinctiveness	6.2 (.94)	4.1 (1.81)	.95
Group norms	5.4 (1.14)	4.5 (1.69)	.12
Group positions	5.1 (1.49)	4.8 (1.67)	-.26
Communication/ Interaction	6.2 (1.01)	5.8 (1.10)	-.08
Individual sacrifices	5.9 (1.37)	4.8 (1.76)	.30

F change (1, 96) = 8.85, $p < .01$, and accounted for an additional 8% of the total variance. The beta value for baseline ATG-T ($\beta = .28$) indicated that higher ATG-T baseline scores were associated with higher follow up values for ATG-T, after controlling for group. The final step of the regression, which involved the addition of the four identified TB factors to the predictive equation, significantly improved the prediction of ATG-T at the conclusion of the intervention, F change (4, 92) = 4.19, $p < .01$, and accounted for an additional 13% of the total variance.

The overall model was significant, F (6, 92) = 5.91, $p < .001$. An examination of the beta weights for the full model revealed that communication/interaction ($\beta = .29$, $p < .01$) was the most significant predictor of ATG-T, with those reporting more communication/interaction also reporting greater perceptions of ATG-T (see Table 7).

3.3.3.2 Group Integration Task (GI-T)

The regression analysis examining GI-T revealed that the group predicted GI-T, F (1, 96) = 3.38, $p < .07$, accounting for 3% of the variance. An examination of the beta weight for group ($\beta = .18$) indicated that the GI-T scores were significantly higher in the TB group compared to the control group. The addition of the baseline perceptions of task cohesion (i.e., GI-T) significantly improved the prediction of the model, F change (1, 95) = 21.6, $p < .001$, accounting for 18% more variance. An examination of the beta weight for baseline GI-T ($\beta = .43$) revealed that there was a significant positive relationship between baseline perceptions of GI-T scores and follow up GI-T scores, after controlling for group.

The inclusion of the four TB factors on Step 3 further improved the prediction of GI-T. The R^2 improved significantly from 21% to 42%, F change (4, 91) = 8.12, $p < .001$. The overall model was significant, F (6, 91) = 10.98, $p < .001$. Examination of the beta weights for the full model revealed that communication/interaction ($\beta = .30$, $p < .01$) was the most significant

Table 7 Summary of Hierarchical Multiple Regression Analyses of Group, Baseline ATG-T, and the Four TB Factors Predicting ATG-T

Variables Entered	<u>R</u>	<u>R²</u>	<u>R² Change</u>	Sig <u>F</u> change	Sig <u>F</u> model
1. Group	.26	.07	.07	.011	.009
2 ATG-T Baseline	.38	.15	.08	.004	.000
3. Group Distinctiveness, Group Norms, Communication/interaction, Individual Sacrifices	.53	.28	.13	.004	.000

Overall Model – $F(6, 92) = 5.91, p < .001$

Note-Beta weights for the predictors in the overall model are as follows:

Group = .08
 ATG-T Baseline = .15
 Group Distinctiveness = .04
 Group Norms = .14
 Communication/interaction = .29
 Individual Sacrifices = .10

predictor of GI-T, with those reporting more communication/interaction also reporting greater perceptions of GI-T. In addition, group norms ($\beta=.17$, $p <.05$) and individual sacrifices ($\beta=.16$, $p <.08$) emerged as other significant predictors. Those participants reporting greater perceptions of group standards for behaviour and personal sacrifices being taken to be a member of the group also reported greater perceptions of GI-T (see Table 8).

3.3.3.3 Team-Building Manipulation

A comparison between the site visit observations recorded and the TB protocols formulated by the leaders revealed that 89% of the leader-identified TB protocol strategies were being implemented as intended with values ranging from 75% to 100% across the TB sites (see Table 9). In addition, an assessment of the study participants' perceptions of the TB protocol components (averaged across the five TB sites) revealed that 87% of the TB protocol strategies were perceived to be present in their groups by the participants (see Table 9). Further, when TB protocol strategies were viewed as present by the participants, they were perceived with an average frequency of 5.60 (1.02) (see Table 9). In practical terms, this average would indicate a high degree of presence of the items as a 1 denotes 'rarely present' and a 7 'always present'. In addition, it was noted that all sites had implemented the standardized exercise program correctly in terms of content and duration as specified in the program booklet.

Table 8 Summary of Hierarchical Multiple Regression Analyses of Experimental Group, Baseline GIT, and the Four TB Factors Predicting GI-T

Variables Entered	<u>R</u>	<u>R²</u>	<u>R² Change</u>	<u>Sig F Change</u>	<u>Sig F model</u>
1. Group	.18	.03	.03	.069	.069
2. Baseline GIT	.46	.21	.18	.000	.000
3. Group Distinctiveness Group Norms, Communication/interaction, Individual Sacrifices	.65	.42	.21	.000	.000

Overall Model – $F(6, 91) = 10.98, p < .001$

Note-Beta weights for the predictors in the overall model are as follows:

Group = -.09
 Baseline GI-T = .26
 Group Distinctiveness = .14
 Group Norms = .18
 Communication/interaction = .30
 Individual Sacrifices = .16

Table 9 TB Site Visit Protocol

Site	TB Component	TB Strategy	TB Protocol			Researcher Observations		Participant Observations	
			Protocol	R1 ⁴	R2	Score	identified ⁵ (%)	Mean (SD)	
1	Group Environment	Handstamp	1	1	1	1	15/15 (100%)	6.13 (.64)	
	Group Norms	Group music	1	1	1	1	13/15 (86.7%)	6.61 (1.12)	
	Group Positions	Switch leaders in warm-up/cooldown	1	1	1	1	15/15 (100%)	6.07 (1.03)	
	Interaction / Comm.	Ab buddies	Guardian Angel	1	1	1	1	14/15 (93.3%)	6.23 (1.01)
		Encouragement on performing activity	Peer/partner feedback on effort & technique	1	1	1	1	7/15 (46.7%)	3.14 (1.77)
				1	1	1	1	15/15 (100%)	5.93 (.87)
	<i>TB Site Subtotal</i>		7	7	7	7	13/15 (86.7%)	5.15 (1.34)	
							88%	5.6 (1.11)	
	2	Group Environment	Group water bottles	1	1	1	1	10/11 (90.9%)	6.33 (.30)
		Group Norms	Group music	1	1	1	1	10/11 (90.9%)	5.10 (1.45)
Group Positions		Point system for attendance - paired up	NV ⁶	NV	NV	NV	10/11 (90.9%)	7.0 (.0)	
Interaction & Comm		Switch/rotate leader	Pair up with different participants	1	0	0	0	7/11 (63.6%)	6.72 (.47)
		Encouragement on performing activity		1	1	1	1	10/11 (90.9%)	5.55 (1.75)
<i>TB Site Subtotal</i>			5	4	4	4	10/11 (90.9%)	4.70 (1.25)	
						80%	5.9 (.87)		
3	Group Environment	Theme song/group music	1	1	1	1	11/11 (100%)	5.91 (1.14)	
	Group Norms	Group name	1	1	1	1	11/11 (100%)	5.91 (1.14)	
		Buddy system for attendance	Weekly reward for hardest working participant-	1	1	1	1	4/11(36.6%)	5.00 (.00)
		e.g., bracelet, music selection		NV	NV	NV	NV	9/11 (81.8%)	5.56 (1.13)

⁴ R1 and R2 denotes ‘Researcher 1’ and ‘Researcher 2’, respectively.

⁵ (%) identified was calculated as the total number of participants perceiving a specific TB strategy at each site divided by the total number of participants at the site multiplied by 100.

⁶ TB protocol strategies marked ‘NV’ represents items that were ‘Not Visible’ and could not be observed by the researcher during the site visit.

Table 9 (continued)

Site	TB Component	TB Strategy	TB		Researcher Observations			Participant Observations		
			Protocol	Score	R1	R2	Score	identified (%)	Mean (SD)	
3	Group Positions	Switch leaders for warm-up/cooldown	1	1	1	1	1	7/11 (63.6%)	5.57 (.98)	
		Participants have a set formation for warm-up/cooldown	1	1	1	1	1	7/11 (63.5%)	6.28 (.95)	
	Interaction & Comm.	Pair up with different participants	1	0	0	0	0	7/11 (63.6%)	5.57 (.97)	
		Encouragement on performing activity	1	1	1	1	1	10/11 (90.9%)	6.10 (.87)	
		Peer partner feedback	1	1	1	1	1	8/11 (72.7%)	5.00 (.47)	
	<i>TB Site Subtotal</i>		8	7	7	7	7	88%	5.65 (.85)	
	4	Group Environment	Group name	1	1	1	1	1	9/9 (100%)	6.00 (1.32)
			Theme song (Group music)	1	1	1	1	1	7/9 (77.8%)	4.00 (1.29)
		Group Norms	Code names	NV	NV	NV	NV	NV	9/9 (100%)	6.00 (1.00)
			Attendance Sign-In Book	1	1	1	1	1	9/9 (100%)	5.78 (1.99)
Group Positions		Mini group competition	1	1	1	1	1	7/8 (87.5%)	6.50 (.76)	
		Rotate leaders for warm-up/cooldown	1	1	1	1	1	9/9 (100%)	5.78 (1.99)	
		Each person draws a number- order of participants	1	1	1	1	1	8/9 (88.9%)	6.25 (1.16)	
Interaction & Comm.		Peer/partner feedback on technique and/or effort	1	1	1	1	1	9/9 (100%)	5.11 (.78)	
		Encouragement on performing activity	1	1	1	1	1	9/9 (100%)	5.33 (1)	
<i>TB Site Subtotal</i>		8	8	8	8	8	100%	5.64 (1.25)		
5	Group Environment	Group music	1	1	1	1	1	6/6 (100%)	5.67 (.516)	
		Weekly reward for hardest working participant	NV	NV	NV	NV	NV	5/6 (83.3%)	2.80 (1.92)	
	Group Positions	Encouragement on performing activity	1	1	1	1	1	6/6 (100%)	6.67 (.52)	
		Peer partner feedback on effort/and or technique	1	1	1	1	1	6/6 (100%)	5.33 (.82)	
		Offering Fitness Tips	1	0	0	0	0	4/5 (80%)	5.50 (1.29)	
	<i>TB Site Subtotal</i>		4	3	3	3	3	75%	5.19 (1.01)	
	Overall							89%	5.6 (1.02)	

3.4 Discussion

3.4.1 Contribution to Literature

This study is the first, to my knowledge, to evaluate the key processes involved in an established TB intervention (i.e., Carron & Spink, 1993; Spink & Carron, 1993; Watson et al., 2004) in an exercise setting. Specifically, the study examined whether targeted TB factors would differentiate participants in TB and control groups as well as examine the relationship between TB factors and cohesion. The analysis revealed that four of the five factors differentiated the groups including group distinctiveness, communication/interaction, norms, and sacrifices. Among the TB factors, group distinctiveness emerged as very salient. One explanation to account for this finding may be the high degree of visibility of this TB factor. Similar to previous research exploring group distinctiveness in other settings (cf. Cialdini, Borden, Thorne, Walker, Freeman, & Sloan, 1976), strategies to enhance the distinctiveness of each group were often visible and tangible. An examination of the list of proposed TB strategies created by the instructors and observed by the researchers and participants (e.g., group music, group water bottle – see Table 5) support visibility as a possible explanation for the emergence of group distinctiveness. In addition to group distinctiveness, further analysis revealed three other important TB factors (communication/interaction, group norms, and personal sacrifices) within the intervention.

An examination of the relationships between the TB factors and the construct of task cohesion (ATG-T, GI-T) found the process of communication/interaction to be an important predictor of both ATG-T and GI-T. The emergence of communication/interaction as a key factor contributing to cohesion is supported within both the group and sport literature. For some time,

researchers have postulated that an understanding of the communication/interaction dynamics of the group may provide important offerings to the functioning of a group (cf. Festinger, 1950). Increases in communication/interaction among group members have been found to be important for individual member's accomplishment of personal objectives and the group as a unit (Zander, 1982). In addition, communication/interaction has been identified as a group process that fosters similar beliefs and attitudes among group members (Carron, 1988) and helps to draw members together (Plutchik, 1981). As such, the present findings offer further support of the important antecedent role of communication/interaction to foster cohesion.

Due to the exploratory nature of this study, comment on two of the other factors that emerged as significant predictors ($p < .10$) of GI-T, individual sacrifices and group norms, appears appropriate. It was found that participants in the TB groups who perceived group members making sacrifices for the group and adhering to accepted standards of behaviour were more likely to perceive group integration toward the task. Support for their emergence as important processes can be drawn from the sport and exercise literature where both constructs have been identified previously as playing integral roles in the development of cohesion (Eys, Hardy, & Patterson, 2006; Prapavessis & Carron, 1997).

The emergence of these two rather broad processes prompts other questions. In terms of sacrifices, for instance, future research may wish to investigate if the most salient sacrifices were the observable sacrifices within the club (e.g., dominant person letting others lead activity or have first pick of the equipment) or less visible sacrifices outside the club (e.g., arranging for alternative ride to the club) (cf. Prapavessis & Carron, 1997). In terms of group norms, efforts may be directed toward understanding the critical factors (e.g., precedents set overtime, explicit statements, critical events) contributing to the development and establishment of norms within

the exercise groups (cf. Feldman, 1984). Through such efforts, researchers will be better positioned to provide an optimal setting to foster the development of group norms and enhance perceptions of cohesion among the group (Eys et al., 2006).

The absence of the fifth TB factor, group positions, also deserves comment. Group positions were operationalized as group members consistently occupying specific geographical positions. In other exercise studies (e.g., Carron & Spink, 1993), stability of group positions within an exercise session may have been more attainable and visible (e.g., participants were frequently situated in a designated small floor area in the room facing the instructor).

Aside from opportunities in the warm-up and cool down segments, the structure of the standardized exercise program in this study may have constrained the development of stable positions. Within the program, participants were frequently asked to engage with partners in a variety of activities (e.g., walk-jog, circuit training) that took them away from set positions within the gymnasium. Perhaps the nature of the activities engaged in during the class precluded the establishment of group positions commonly found in typical exercise or aerobic classes. This explanation also serves to reinforce the suggestion that group factors may be context specific (Brawley & Paskevich, 1997; Prapavessis, Carron & Spink, 1996; Sherif & Sherif, 1969).

3.4.2 Contribution to Theory

In addition to the contribution to the TB literature, the present findings represent an important contribution to theory. As McGrath (1984) highlighted, the purpose of any conceptual framework is to direct the exploration of relationships among variables. Following these recommendations, and that of others (i.e., Brawley & Paskevich, 1997), this study critically examined the proposed relationships that are postulated to enhance the relationship between the TB intervention and the proposed salient mechanism of task cohesion (cf., Glasgow, 2002;

Linden & Satin, 2007; Weinstein, 2007). By doing so, the study also provided insight into the relations among these variables that are important and warrant future consideration (McGrath, 1984). For example, the emergence of group distinctiveness may stimulate investigations into understanding how best to foster group distinctiveness within a youth exercise setting.

3.4.3 Limitations

Given that this was a field study, it is not without its limitations. As it has been suggested that multi-item measures may yield a more accurate and reliable measure in comparison to single items (Sloan, Aaronson, Cappelleri, Fariclough, Varrcchio, & The Clinical Significance Consensus Meeting Group, 2002), one of the limitations of this study may involve the single-item assessment of the five TB factors. While this may have been a limitation, it is worth noting that single item measures have been found to possess high reliability and validity as well as increased feasibility and practicality in the assessment of other psychosocial constructs (e.g., satisfaction, self-esteem, stress, health-related quality of life) (Crane, Van Rompaey, Dillingham, Herman, Diehr, & Kitahata, 2006; Dolbier, Webster, McCalister, Mallon, & Steinhardt, 2005; Elo, Leppanen, & Jahkola, 2003; Robins, Hendin, & Trzesniewski, 2001). Further, the single items used in this study appeared to be clear enough to capture what was intended by the measure as suggested by the participants' high perceptions of the TB items (87%), as well as the items being related to other constructs as predicted.

A second limitation was the absence of baseline measures for the TB factors. Baseline measures could potentially offer important information regarding the initial level of the five factors at the onset of the intervention. In addition, the baseline measures could provide a basis to monitor the magnitude of change of each of the five factors between the TB and control conditions.

3.4.4 Strengths

While acknowledging these limitations, the study also possesses a number of strengths. This study represents the first, to the author's knowledge, to systematically evaluate perceptions of the five TB factors in an exercise setting. In addition, the study addressed the relative absence of evaluation in the TB activity literature (Brawley & Paskevich, 1997) through its examination of the relationship of the TB factors to the proposed group mechanism of cohesion. Furthermore, the TB manipulation results indicating the presence of the TB protocols items as observed by the study participants were novel. The study participants offered a unique evaluation of their perceptions of the proposed TB strategies throughout the intervention.

The TB evaluation produced some encouraging findings in relation to the five TB factors and the proposed group mechanism of cohesion. Given that the efficacy of the intervention should be evaluated from both a process and outcome perspective (cf. Baranowski et al., 1997), it is of equal importance to examine the relationships between the TB intervention and selected outcomes (adherence, group task satisfaction), which is reported in the next section.

CHAPTER 4

TB Outcomes

4.1 Introduction

It has been known for some time that groups can be used to change individual behaviour (Cartwright, 1951; Lewin, 1947a), and exercise behaviour is no exception in this regard. There is a growing body of evidence that supports the effectiveness of group approaches in increasing individual adherence to being active (Burke et al., 2006; Dishman & Buckworth, 1996). While this group-based research has been conducted with adult samples (Estabrooks & Carron, 1999; Rejeski, Brawley, Ambrosius, Brubaker, Focht, Foy, & Fox, 2003; Spink & Carron, 1993; Watson et al., 2004), there do not appear to be any studies examining the effects of group behaviour on individual exercise adherence behaviour in a youth population.

There are several reasons why the examination of a group-based intervention to enhance activity adherence in a youth setting might be warranted. First, studies have found key group characteristics such as cohesion to be important in influencing the health behaviour of youth in other settings (Barber & Buehler, 1996; Botcheva et al., 2002; Bray et al., 2001; van der Linden et al., 2003). Second, a majority of youth are not as active as they should be (Cameron, Craig, & Paoline, 2005), and it has been suggested that interventions targeting youth must become more effective (Baranowski, Anderson, & Carmack, 1998). Third, researchers have called for the examination of group-based interventions as another means of enhancing the adherence of youth in exercise settings (Annesi, 1999; Carron & Spink, 1993).

As noted above, cohesion has been identified as one key group factor impacting health behaviour in youth (Barber & Buehler, 1996; Botcheva et al., 2002; Bray et al., 2001; van der Linden et al., 2003). As exercise is an important health behaviour, it may not be surprising that

group cohesion also is associated with exercise adherence behaviour (Burke et al., 2006; Estabrooks, 2000). Perceptions of group cohesion have been associated with an array of adherence behaviours including increased attendance (Carron et al., 1988), decreased lateness (Carron et al., 1988; Spink & Carron, 1992), and a reduction in dropout behaviour (Carron et al., 1988; Spink & Carron, 1994).

If one is interested in interventions that may help youth become more active, the association of cohesion with exercise adherence prompts the question of how one might enhance cohesion. A review of group-based interventions by Burke and colleagues (2006) identified team building (TB) as one effective intervention to enhance cohesion and individual adherence. In these instances, TB is defined as a psychological intervention program designed to promote increased cohesiveness and enable the group to function together more effectively (Newman, 1984).

TB has been found to positively influence perceptions of cohesion and adherence in adult exercise samples (Spink & Carron, 1993, 1994). In terms of adherence, participants exposed to a TB intervention reported higher levels of attendance (Estabrooks & Carron, 1999; Watson, Martin Ginis, & Spink, 2005) and were late less often and dropped out less (Spink & Carron, 1993) than participants in standard exercise groups.

The implementation of a TB program also has been shown to result in other positive individual outcomes in the exercise setting such as enhanced member satisfaction. Carron and Spink (1993) reported that those in a TB condition reporting significantly higher levels of individual satisfaction than participants in a control condition. Given that individual and group satisfaction have been differentiated (Chelladurai & Reimer, 1997), and group outcomes are often derived from the effort and work of other members, it follows that satisfaction with the

group also might be associated with an intervention focusing on the group. As it has been established that cohesion relates to both group satisfaction (Spink et al., 2005) and TB (Carron & Spink, 1993; Spink & Carron, 1993), an examination of the relationship between TB and group satisfaction appears warranted.

The purpose of this research study was two-fold. The first purpose was to examine whether a TB intervention program would increase the adherence and perceptions of cohesion of rural youth participating in an exercise club. The focus on youth living in a rural setting was consistent with the suggestion that there is a need to develop activity promotion interventions to target this demographic (Paxton et al., 2004).

Drawing on the extant literature, two hypotheses were examined. First, it was predicted that youth participants exposed to a TB intervention program would increase their levels of task cohesion as compared to participants not exposed to such an intervention. The focus on task cohesion can be supported from both a substantive and empirical perspective. From a substantive perspective, the factors of TB in activity settings typically revolve around the task dimensions of the class. Empirically, previous research in an exercise setting has revealed that a TB protocol typically has its greatest effect on task cohesion. In two previous studies using a similar protocol, participants in exercise classes exposed to TB reported perceiving greater task cohesion than individuals not exposed to the protocol (Carron & Spink, 1993; Spink & Carron, 1993).

The second hypothesis predicted that those exposed to the TB intervention would exhibit better levels of adherence (i.e., attendance, lateness, withdrawal) than participants not exposed to such an intervention. This hypothesis was based on previous studies that have found a relationship between exposure to TB and increased adherence (Estabrooks and Carron, 1999; Spink & Carron, 1993; Watson et al., 2004).

A secondary purpose of this study was to examine the impact of a TB program on group task satisfaction in an exercise program. Based upon previous group research examining individual satisfaction (Carron & Spink, 1993), it was predicted that exercise club participants exposed to a TB intervention program would exhibit greater levels of group task satisfaction.

4.2 Method

The present study's participants, design, and procedure are part of the TB intervention that has been reported in the previous study. The reader is referred to Study 2a for a detailed description of each methodological component. The remainder of the method section will outline the unique features of the outcomes component of the intervention study.

4.2.1 Measures

An overview of the timing of the outcome measures is outlined in Figure 5b.

4.2.1.1 Adherence. Exercise adherence was evaluated in terms of attendance, lateness, and dropout behaviour from the club. The assessment of three measures of adherence was consistent with the suggestion that the construct of adherence is multidimensional (Steers & Rhodes, 1978). Further, given that the physiological benefits of being active are commonly viewed as being associated with frequency and duration of the activity (Health Canada, 2002), measures such as attendance, lateness and withdrawal were deemed worthy of examination. In addition, these measures have been used in previous studies (Carron & Spink, 1993; Spink & Carron, 1993).

Exercise adherence data were collected throughout all three phases of the program: Baseline (1 to 6 sessions), Implementation (7 to 11 sessions), and Integration (12 to 23 sessions). Adherence data were not collected on Day 24 as this was the final testing day and all participants were personally contacted to request attendance at this final assessment session.

4.2.1.1.1 Attendance. Exercise leaders were provided with a daily attendance sheet for their class and instructed to record with a check mark whether participants were present or missed the entire session (see Appendix D).

4.2.1.1.2 Lateness. Leaders were instructed to mark the participant as late on the attendance sheet if a participant arrived after the official starting time of the session. This was done by recording an “L” on the attendance sheet (see Appendix D).

4.2.1.1.3 Dropout behaviour. Participants who missed the final 9 consecutive sessions (> 50% of the sessions during the integration stage) were operationalized as a dropout. This operational definition was based on one that has been used previously in the group exercise environment (Spink & Carron, 1993).

4.2.1.2 Cohesion. Perceptions of cohesion were assessed using the two task cohesion subscales (ATG-T, GI-T) of the Group Environment Questionnaire (GEQ, Carron et al., 1985) outlined in Study 2a. To capture the change in cohesion before and after the intervention, cohesion was assessed twice - once at the conclusion of the baseline phase (6th session) and again at the end of the integration stage (24th session). Assessment at the 6th session was deemed appropriate as it provided a measure of baseline cohesion before the intervention was introduced and this time period was deemed long enough for perceptions of cohesion to develop (cf. Spink & Carron, 1994). In terms of the final assessment of cohesion, the 24th session was selected as it marked the conclusion of the intervention.

4.2.1.3 Group Task Satisfaction. Group task satisfaction was measured using one modified scale from Reimer and Chelladurai’s (1998) multidimensional Athlete Satisfaction Questionnaire (see Appendix H). The scale used was team integration, which is defined as satisfaction with members’ contributions and coordination of their efforts toward the group’s

task. The four-item scale has previously demonstrated good reliability ($\alpha = .88$) and construct validity (Reimer & Chelladurai, 1998).

For this study, the wording of the four scale items was modified slightly to reflect the exercise setting context. For example, the original scale item “Team member’s dedication to work together toward team goals” was revised to “Physical activity club member’s dedication to work together toward club goals”. Participants were asked to evaluate the extent to which they were satisfied with how the group members worked together during the exercise club sessions. Each item was scored on a 7-point Likert scale (1 = not at all satisfied to 7 = extremely satisfied). The four items were summed, with higher values representing greater group task satisfaction. Group task satisfaction was assessed twice – during the 6th and 24th session.

4.2.1.4 Baseline Demographics. Prior to randomization (i.e., 6th session), baseline demographic information, including age and preference for being active with others in a group setting, was obtained.

4.2.2 Data Analysis

To investigate the first hypothesis examining the relationship between TB and the multidimensional construct of adherence, a series of analysis were conducted. Two, 2 (TB, control) x 2 (time – pre-post intervention), ANOVAs were planned to investigate the relationship between TB and the adherence outcomes of attendance and lateness. Differences in dropout percentages were examined using an independent sample t-test.

To examine the relationship between TB and the development of task cohesion (ATG-T, GI-T) over the course of the intervention (i.e., the second hypothesis), a 2 (TB, control) x 2 (time – pre-post intervention) repeated measures MANOVA was conducted. To address the secondary hypothesis, a 2 (TB, control) x 2 (time – pre-post intervention) repeated measures ANOVA was

conducted to determine the influence of a TB program on group task satisfaction in a group exercise setting.

4.3 Results

4.3.1 Data Screening

Prior to data analysis, ATG-T (pre, post), GI-T (pre, post) and Group Task Satisfaction (pre, post) were examined for accuracy of data entry, missing values, and fit between distributions and the assumptions of multivariate analysis. Data screening of the task cohesion variables (ATG-T, GI-T) was reported in Study 2a. An examination of group task satisfaction (pre, post) variables utilizing the screening criteria outlined by Tabachnick and Fidell (2007) revealed no potential outliers, and missing values occurred in less than 5% of the variables. In any instance in which a participant's variable score was missing, the participant's questionnaire was directly examined to ensure there was not a transposition error. There were no cases in which a transposition error was found.

The multivariate assumptions of normality, linearity and homoscedasticity/homogeneity of variance were evaluated visually and empirically. Utilizing the data screening criteria described previously for ATG-T and GI-T in Study 2a, group task satisfaction met the assumptions of normality, linearity and homogeneity of variance.

4.3.2 Scale Reliabilities

4.3.2.1 Cohesion. –As reported in Study 2a, the task cohesion measures were found to be reliable.

4.3.2.2 Group Task Satisfaction. The reliability of the 4-item group task satisfaction subscale was assessed and found to be acceptable for use in the main analyses ($\alpha = .82, .85$; for pre and post testing, respectively).

4.3.3 Baseline Demographics

An examination of age between the groups revealed that the TB ($M = 15.4$ years) and control ($M = 15.6$ years) groups were comparable, $t(120) = 1.20, p > .05$. Similarly, there were no differences in preference for being active in a group setting between the two conditions (TB- 90.6%, Control- 91.1%), $\chi^2(2) = .03, p > .05$.

4.3.4 Protocol Compliance. – The protocol compliance has been reported previously in Study 2a.

4.3.5 Main Analyses

As this TB intervention has not been implemented previously in a youth setting, the study was cast as exploratory. Given the preliminary nature of this study and the fact that the analysis of interest in this study was the interaction (group x time), which is often small in the social sciences (Frazier, Tix, & Tix, 2004), the adoption of a more liberal alpha level was deemed appropriate to protect against possible Type II error (Franks & Huck, 1986). As such, an alpha level of .10 was set for the main analyses examining the outcomes used in this intervention.

4.3.5.1 Adherence

The planned analysis involved the independent evaluation of the three adherence measures. Analyzing the adherence measures separately was consistent with previous research suggesting that measures of adherence should be viewed as independent of one another (Steers & Rhodes, 1978). As there was poor compliance by the leaders in recording the participants who

were late, this measure was not analyzed. Thus, analyses were conducted only for the measures of dropout and attendance.

4.3.5.1.1 Dropout. All participants who started the exercise program completed the baseline period. At the conclusion of the integration stage (session 23), 22 of the 122 participants were classified as dropouts (see Figure 4). A nonparametric comparison between the 22 dropouts and the 100 adherers revealed no significant demographic differences in terms of age, Mann-Whitney U Test, $z = -1.255, p > .05$, sex, Mann-Whitney U Test, $z = -1.845, p > .05$, or preference for being active in a group setting, Mann-Whitney U Test, $z = -.089, p > .05$. The 22 dropouts included 13 participants in the TB clubs and 9 participants in the control clubs (Figure 3). As dropout behaviour is typically expressed in terms of group size (e.g., 50% dropout from a class of 20), group data by exercise club was used to assess dropout differences (Spink & Carron, 1993). Dropout rates ranged from 10-27% in the TB clubs and between 0-50% in the control clubs. A t-test for independent means revealed that there was no significant difference between the TB (24.3%) and control conditions (19.2%) in terms of percentage dropout by club, $t(8) = .54, p > .10$.

4.3.5.1.2 Attendance. To assess changes in attendance during the integration stage, a 2 (group) x 2 (time) repeated measures ANOVA was conducted with the 100 participants who had completed the program. Prior to this analysis, a t-test for independent means was conducted on attendance during the implementation phase (Phase 2) to determine whether there were any differences in attendance when the intervention was being introduced. The t-test revealed that the means for the TB ($M = 78.8\%$) and control ($M = 71.2\%$) groups were not significantly different in terms of attendance during the implementation phase, $t(98) = 1.48, p > .10$.

The results from the ANOVA for attendance revealed a significant interaction between groups (TB versus control) and time (pre versus post intervention i.e., baseline versus integration phase) for attendance, $F(1, 98) = 3.07, p < .08$. An examination of the simple main effects revealed that while attendance in the TB ($M = 89\%$) and control groups ($M = 84\%$) were not significantly different during baseline, $F(1, 94) = .93, p > .10$, attendance during the integration phase was significantly higher in the TB ($M = 74\%$) than the control condition ($M = 60\%$), $F(1, 94) = 9.05, p < .01$ (see Figure 6). The calculation of an effect size yielded an omega squared value of 0.01, which represents a small effect (Keppel, 1991).

4.3.5.2 Cohesion

It was hypothesized that exercise club participants exposed to a TB intervention would demonstrate a significantly greater change in levels of task cohesion over the intervention than the control condition. Results from a 2 X 2 MANOVA revealed no significant differences in the interaction between group membership and perceptions of ATG-Task and GI-Task over time, $F(2, 96) = 1.09, p > .10$. Although the multivariate analysis did not statistically differentiate cohesion between the TB and control groups over time, an examination of the group means for both measures at before and after the intervention indicated that the TB groups maintained their perceptions of ATG-Task and GI-Task over time while the control group means declined (See Table 10).

4.3.5.3 Group Task Satisfaction

The secondary hypothesis proposed that exercise club participants exposed to a TB intervention would report higher levels of group task satisfaction. The results of a repeated

Figure 6: TB Intervention Attendance

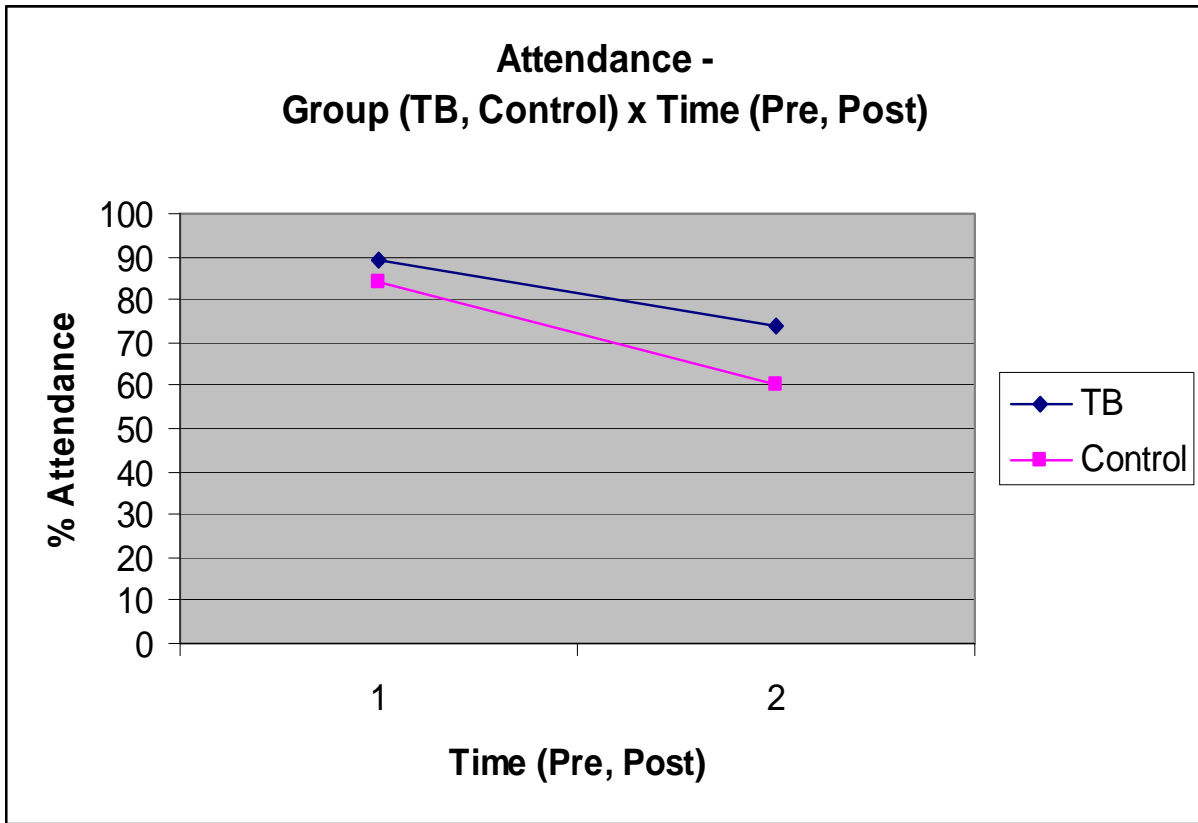
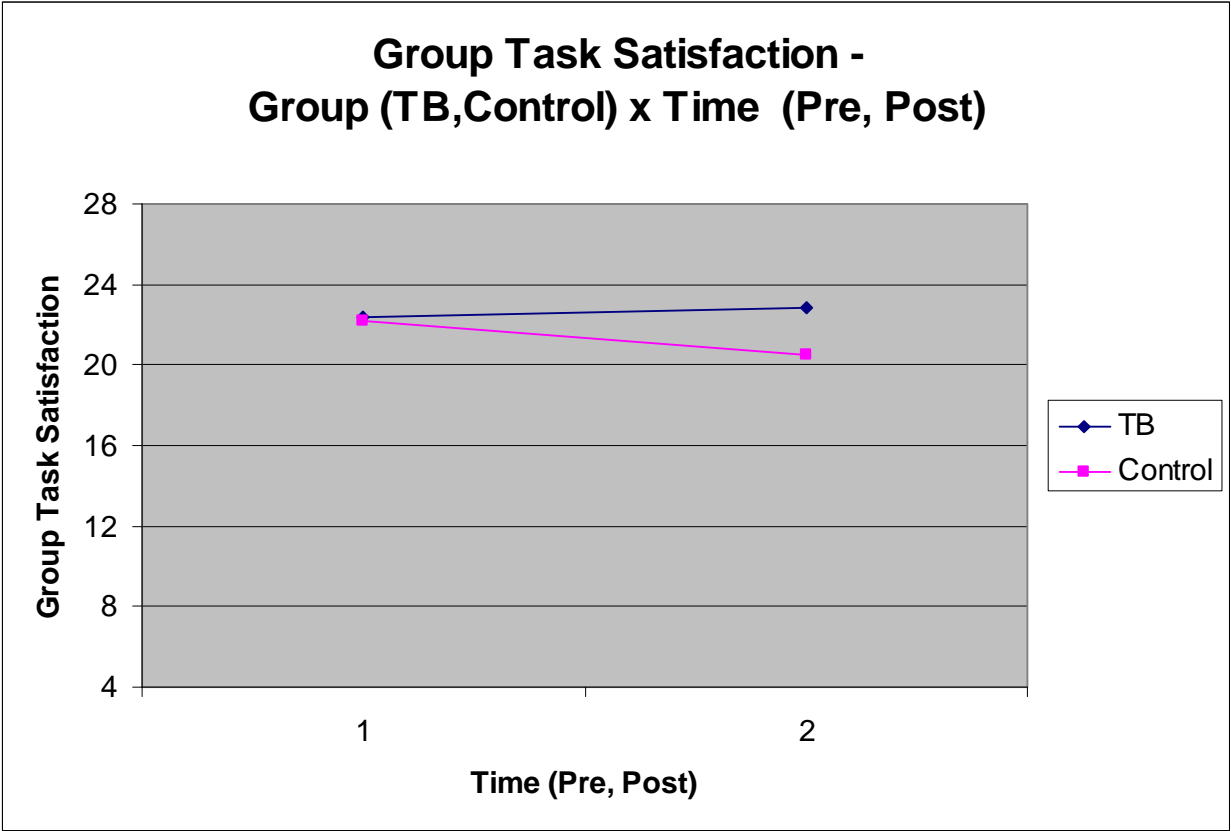


Table 10 Pre and Post Cohesion and Group Task Satisfaction Means for the TB and Control Groups

<i>Group</i>	<i>n</i>	Attraction to Group – Task				Group Integration - Task				Group Task Satisfaction			
		Pre		Post		Pre		Post		Pre		Post	
		<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
TB	52	31.5	3.1	31.4	4.1	32.5	5.3	32.7	6.5	22.3	3.2	22.9	3.0
Control	48	30.4	4.4	28.8	5.3	31.3	6.7	30.3	7.0	22.2	3.5	20.5	4.2

measures ANOVA revealed a significant group X time interaction, $F(1, 97) = 11.69, p < .001$. Simple main effects revealed that the group task satisfaction means for the TB and control groups were not significantly different prior the intervention, $F(1, 94) = 0.03, p > .10$; however, at the end of intervention, means for the TB group were significantly higher than the control group, $F(1, 94) = 12.20, p < .01$ (See Table 10). Further, results from the simple main effects revealed that this difference resulted from the TB group maintaining its level of group task satisfaction from pre-intervention to post intervention, $F(1, 50) = 1.22, p > .10$, while group task satisfaction in the control condition declined significantly from pre-intervention to post intervention, $F(1, 47) = 16.64, p < .001$. (see Figure 7). The effect size for this analysis was 0.02, suggesting a small effect (Keppel, 1991).

Figure 7 TB Intervention Group Task Satisfaction



4.4 Discussion

4.4.1 Contributions to Literature

Previous research has demonstrated a relationship between TB and several measures of adherence in adult exercise settings (Carron & Spink, 1993; Spink & Carron, 1993). The present study found support for the TB-adherence relationship in a youth population for one specific measure of adherence. Specifically, participants in the TB group attended a significantly higher percentage of workout sessions during the Integration phase of the intervention than participants in the control condition. These findings are consistent with those of Estabrooks and Carron (1999), who found that older adults in a TB group attended more than 90% of their classes as compared to those in the control group who attended 65% of their classes. The findings also parallel the results of Watson, Martin Ginis, and Spink (2004) who reported that attendance in an ongoing exercise class for the elderly increased by over 22% during a 12-week TB intervention. The current attendance results also are consistent with those of Annesi (1999), who found that young adult participants in a brief group-based exercise intervention attended significantly more workouts sessions than those in a control condition.

While the attendance results of this study supported the TB – adherence relationship, the relationship between TB and the other measure of adherence analyzed, dropout behaviour was not supported. Past research has revealed that participants exposed to a TB intervention were less likely to drop out than participants who were not exposed to the intervention (Spink & Carron, 1993), a finding that was not replicated in this study.

Several possibilities may exist to explain why the current dropout results differ from those previously reported. One explanation may be that the social stigma associated with dropping out in this study may have been heightened by the context. Specifically, as this study

was conducted in a school setting, the presence of fellow exercisers (classmates) and the exercise leader (a teacher at the school) outside of the exercise club setting may have created pressures to maintain membership in the group. This contrasts with research conducted in other settings where differences in dropout rates were evident (e.g., private facilities; Spink & Carron, 1993). In these studies conducted in private settings, it would be much easier for exercisers to avoid other participants, if they so chose, once they had withdrawn from the exercise program.

Another possible explanation may be aligned with the suggestion that the decision to withdraw from a group has been reasoned to be more difficult and likely requires greater deliberation over a longer period of time (Steers & Rhodes, 1978). Past exercise interventions examining dropout typically have been much longer (e.g., 50% longer; Spink & Carron, 1993). Given the short duration of this study (24 sessions), it is possible that the participants in either condition may have still been in the deliberation stage of deciding whether to drop out, and this state of deliberation could have been heightened by the fact that this was a school setting with a teacher as leader.

Given the findings in the previous chapter indicating a relationship between four of the five TB factors (group distinctiveness, group norms, communication/interaction, sacrifices) and task cohesion (ATG-T, GI-T), the failure to find a relationship between TB and cohesion (Carron & Spink, 1993; Spink & Carron, 1993) is unexpected. One possible explanation to account for the failure to find a significant increase in cohesion may involve a possible ceiling effect.

Given the “group” nature of the standardized exercise component introduced in the baseline stage, it is plausible that elevated levels of group cohesion developed early in the formation of all groups, and these may have contributed to a ceiling effect that prevented any significant gains in cohesion from occurring later in the study. Specifically, the standardized

exercise component used in this study was organized in such a way that participants often worked together toward achieving the exercise tasks in each session. For example, participants were often paired up during dynamic strength training (e.g., partner tubing) and energy systems activities (e.g., walk and jog), thus increasing the opportunities for interaction around the task to occur, and inter alia, increasing the opportunities for cohesion to develop. Examination of baseline values for ATG-Task and GI-Task provide some support for this suggestion. Cohesion values in this study at baseline were comparable to the ATG-Task mean values and actually slightly higher than the GI-Task mean values reported by adult exercisers near the conclusion of two previous TB interventions using a similar protocol (Carron & Spink, 1993; Spink & Carron, 1993).

A second potential contributor to the potential ceiling effect (and enhanced baseline cohesion levels) may have been the school intervention setting. The relatively small size of the participating rural schools ($M = 231$ students) may have afforded the youth participants greater opportunities for communication and interaction throughout the day fostering higher overall baseline levels of cohesion. Anecdotally, there also was a considerable amount of excitement among the students, teachers, and community members surrounding the exercise clubs within these rural schools, which may have directed further energy toward the group. As such, this energy and the novel presence of the researchers (cf., Groft et al., 2005) within the ‘hub of activity’ of the rural communities (cf. Miller, 1995) may have contributed to an elevation in distinctiveness of the clubs and an enhanced perception of cohesion among members of the exercise clubs.

A third potential contributing factor to the ceiling effect may have been the inadvertent use of TB activities by the control group leaders. While not receiving the TB intervention,

control group leaders may have been inadvertently implementing TB activities (i.e., switching partners, promoting encouragement) within their respective groups.

While changes in group cohesion scores between the groups were not significant, it is worth noting that the group means for ATG-Task and GI-Task were in the predicted direction. Further, an examination of the group means would suggest that individuals exposed to a TB protocol maintained perceptions of task cohesion over time while the perceptions of task cohesion declined for those in the control group setting. While not statistically significant, the direction of the group means is important and suggestive of the possible importance of TB in maintaining versus enhancing cohesion in a group.

The fact that differences in adherence were not matched by predicted differences in cohesion deserves a comment. First, it is worth noting that a similar result has been reported previously in a TB intervention. Watson et al. (2004), who used a similar TB intervention targeting cohesion, also found significant improvements in class attendance that were not matched by significant changes in cohesion over the course of the intervention. Interestingly, those researchers also suggested that a possible ceiling effect in cohesion (i.e., owing to the use of intact groups in their study) may have accounted for the failure to find significant cohesion differences over time.

However, notwithstanding the reporting of this null finding elsewhere, the fact remains that changes in adherence were associated with the TB intervention. Given that changes in adherence did not appear to be associated with significant changes in cohesion prompts the question of what other mechanisms might have impacted the changes in attendance? One possibility to examine in this regard in future studies might be group task satisfaction. As found in the current study, those individuals in the TB condition reported higher levels of satisfaction

with the task aspects of the group than those in the control condition. Given that satisfaction also has been associated with various measures of adherence in an exercise setting (Remers, Widmeyer, Williams, & Myers, 1995), clarifying the relationship among TB, group satisfaction, and exercise adherence may be an important direction for future research.

The finding that a significant interaction occurred between the groups over time for group task satisfaction extends previous findings identifying a link between TB and an individual measure of satisfaction (Carron and Spink, 1993) to a measure of group task satisfaction. The results also lend support to past research in the sport setting, which has demonstrated a link between perceptions of the group and group task satisfaction (Spink et al., 2005). It also is worth noting that the group task satisfaction means demonstrated a pattern similar to that of cohesion. Specifically, group task satisfaction was maintained (versus being enhanced) within the TB condition while satisfaction means in the control group showed a significant decline over the period of the study.

4.4.2 Contributions to Theory

Findings from this study contribute to the advancement of theory. While previous group research has identified a relationship between the TB and the primary outcome of adherence (Estabrooks & Carron, 1999; Spink & Carron, 1993), the present study's design endeavored to provide a more rigorous assessment of the TB intervention's effect on the outcome of adherence. Further, the pre-post design permitted the evaluation of the theoretical constructs of cohesion and group task satisfaction over the course of an intervention. This design built upon early group theory by Lewin (1935), who highlighted two key processes of a group: (1) maintenance (cohesion); and (2) locomotion (outcome). The TB intervention supported Lewin's early notion of maintenance as cohesion in the TB groups remained stable throughout the course of the

intervention. In addition, the emergence of group task satisfaction within the TB groups, introduced a new potential ‘maintenance’ mechanism warranting future consideration.

4.4.3 Limitations

This field study was not without its limitations. Similar to other previous group-based field studies, the researchers were constrained by the existing situation (e.g., number of sites, participants available, etc.). The small number of sites in the study (N = 12) prevented the inclusion of one other possible control group – a no-treatment control group (i.e., group members would not receive the standardized exercise program). Such a design would permit an examination of the structure of the exercise program on youth exercise adherence and perceptions of cohesion as well as address the possible explanation (i.e., a ceiling effect) provided to account for the cohesion findings over the course of this intervention.

Although this was a potential limitation, an attempt was made to limit the impact of not having these control groups. First, both the TB and control participants received identical contact time in terms of the orientation to the study, the standardized exercise program and the site visit evaluations. Second, class time was used to deliver the TB intervention so that contact time between the leaders and the participants was consistent across conditions. Third, while differences did exist in contact time associated with leader training for the TB component, an attempt was made to minimize this possible attention discrepancy by contacting the control site leaders after the baseline period to discuss how the program was progressing.

The low number of participants at each of the 10 sites also precluded the use of a multi-level approach to examine any possible effects associated with the nesting of individuals within the

exercise clubs (cf. Spink et al., 2005)⁷. Empirically, a multi level approach would permit an examination of the effect of interdependence on group member's perceptions (cf. Spink et al., 2005). Without an evaluation of the group member's interdependency, the assumption of independence may be violated. During statistical analysis, a violation of this assumption may lead to spurious findings resulting from an underestimation in standard errors (Raudenbush & Bryk, 2002). From a substantive perspective, an examination of interdependence among the members could determine whether the homogeneity of response was enhanced for those individuals in groups exposed to the TB intervention.

Another possible limitation pertains to the length of the intervention. Previous TB exercise interventions have been 50% longer in duration (36 TB sessions versus 18 TB sessions). The shorter length of the intervention may have contributed to finding of nonsignificance for dropout behaviour and perceptions of cohesion. An extended future design may have afforded the necessary time for significant differences to emerge between the groups. The directionality of the cohesion scores between the TB and control participants would support this supposition.

4.4.4 Strengths

While acknowledging these limitations, the study also has a number of strengths. This study is the first, to my knowledge, to examine the effects of TB on the exercise behaviour of youth in an exercise setting. Second, the study protocol is unique as it involved the implementation of two separate, but key components: a standardized exercise component and a TB component. The inclusion of a standardized exercise program for both the TB and control

⁷ The author recognizes the potential for nesting of participants within exercise clubs. However, the low number of participants at the 10 sites did not meet the recommended sample necessary to estimate the intercept or slope parameters for each site (Patterson & Goldstein, 1991), so analysis was conducted at the individual level.

groups represented an improvement in design from previous research and permitted a clearer examination of the effects of the TB protocol on adherence measures. This builds on past research wherein the best that could be said was that adherence effects were associated with a combination of TB protocol and the exercise program (Spink & Carron, 1993). A third strength of the study involved the assessment of task cohesion (ATG-Task, GI-Task) at baseline and follow-up. The multiple measurements allowed a comparison of baseline compatibility between the TB and control groups and provided some insight into the direction cohesiveness takes in exercise groups following the introduction of TB program.

4.4.5 Future Directions

Several future directions emanate from the findings. As cohesion did not change across time between the two groups, researchers may wish to examine how the structure of the exercise sessions relates to the development of cohesion. Future research also may wish to assess other measures of adherence such as perceived effort in youth activity settings. Given the importance of intensity in being active enough for health benefits (Health Canada, 2002), the effort put forth by participants in each workout session may be an important consideration for future investigations. Finally, as it has been suggested that the natural living environment (rural to urban) may offer valuable information about the effects of context on activity behaviour (Sjolie & Thuen, 2002), the need for replication of this study in an urban environment is warranted.

CHAPTER 5

GENERAL DISCUSSION

Low levels of physical activity remain a prominent health concern in Canada, particularly among youth. Statistics from a nation-wide physical activity survey revealed that only 33% of Canadian youth (13-17 years) meet the recommended guidelines for healthy growth and development (Craig & Cameron, 2004). With a growing body of research supporting the importance of physical activity to present and future health (cf. Bauman, 2004 for a review), enhancing the level of physical activity in youth to recommended levels has become a Canadian health priority (e.g., Healthy Active Kids Report, 2007). Further, when considering intervention possibilities, the move from an individual to a group focus deserves attention. Given that much of human behaviour takes place in group situations, and involves group interaction (Paulus, 1980), it is an approach deemed promising in relation to targeting youth physical activity behaviour. Further, group-based interventions such as TB have been found to have a number of benefits including enhanced adherence in adult populations (Estabrooks & Carron, 1999; Spink & Carron, 1993; Watson et al., 2004).

The purpose of the intervention study conducted in this dissertation was to examine the relationship between a TB intervention and the adherence behaviours of youth participating in a physical activity club. Overall, the results of this intervention provided support for utilizing a group-based TB approach to promote exercise adherence, specifically program attendance, in a youth settings. These findings are encouraging and support the noted benefits of TB in other settings involving youth, such as sport (e.g., Bloom & Stevens, 2003) and physical education (e.g., Ebbeck & Gibbons, 1998).

One of the unexpected results of this intervention study was the failure to find a relationship between the TB and control conditions for changes in cohesion given that past group-based research in exercise has consistently reported task cohesion (ATG-T) to be associated with TB (Carron & Spink, 1993; Spink & Carron, 1993). While some possibilities have already been posited in this dissertation as to why this may have occurred (i.e., possible ceiling effect), another plausible explanation may concern the fact that cohesion was assessed over time in this study whereas it was only assessed at the conclusion of other similar interventions reported in the literature (Carron & Spink, 1993; Spink & Carron, 1993).

In an effort to gain a more correspondent comparison of the present study findings with past research, an additional post hoc analysis was conducted in the present study to determine if the past findings could be replicated. Specifically, a secondary post hoc analysis involving an independent sample t-test was conducted, and revealed a significant difference in perceptions of ATG-T at follow up between groups; $t(98) = 2.58, p < .01$, with TB group members perceiving greater levels of ATG-T than control group members. Thus, when cohesion at the end of the intervention was analyzed independently, the current findings were consistent with the results of previous TB research, which also only assessed cohesion at the end of the intervention (Carron & Spink, 1993; Spink & Carron, 1993).

A consistent finding in the sport and exercise psychology literature is the relationship between cohesion and adherence (Carron et al., 1988; Spink & Carron, 1992). Cohesiveness, as it relates to adherence, has been associated with reduced withdrawal, absenteeism, and lateness (Carron et al., 1988; Spink & Carron, 1992). While the majority of this research has involved an adult population, it would be remiss if it was not pointed out that the absence of changes in

cohesion in the current dissertation does not imply that cohesion was not related to adherence in this youth sample.

To address this, the results from a secondary post hoc analysis revealed participants' perceptions of the cohesion to be significantly linked to adherence. A multiple regression was conducted wherein baseline values of task cohesion (ATG-T and GI-T) were found to significantly predict a participant's attendance during the intervention (Phase 2 & Phase 3), $F(2, 119) = 6.97, p < .001$, regardless of condition. These findings support previous research by Spink and colleagues (1994), who found early perceptions of cohesion to predict adherence. More importantly, the additional analysis establishes a link between the proposed mechanism targeted in the intervention, task cohesion, and the intervention's desired outcome of adherence.

Researchers in health education and behaviour have suggested that researchers and practitioners carefully evaluate the processes of interventions (Baranowski & Jago, 2005; Glanz, 2002; Glasgow, 2002). However, the reality is that few applied studies provide any information as to why the interventions have succeeded or failed (Weinstein, 2007). The situation is no different in the area of TB in sport and exercise psychology, as similar calls by Brawley and Paskevich (1997) to evaluate processes of TB interventions have, for the most part, been ignored. The present dissertation attempted to address this concern by examining the processes associated with a TB intervention. Specifically, the study examined the five targeted TB factors proposed in Carron and Spink's (1993) TB conceptual model. Results of this investigation found that the five TB factors collectively differentiated participants in the TB and control groups. This finding provides initial support for the identification of the five factors highlighted within the intervention and the implementation protocol utilized.

5.1 Contributions to TB Literature in Exercise Settings

In concert, the results of the pilot and intervention study contribute to the literature in a number of ways. This research represents the first, to my knowledge, to evaluate the TB building factors and processes in an exercise setting. From a research and practitioner point of view, the detailed methodology and process evaluation also offered several methodological improvements (i.e., standardized exercise program, 3-phase approach, manipulation checks by participants and researchers) to guide researchers and practitioners in the implementation of future interventions.

In terms of outcomes, the research extends previous relationships established between the group-based intervention of TB and positive outcomes in adults (attendance, satisfaction) to a youth sample. Also, the quasi-experimental field study design addressed calls in the health behaviour literature to conduct more experimental research (Weinstein, 2007).

5.2 Contributions to Group Literature

Over 50 years ago, Dorwin Cartwright (1951) mused about changing individual behaviour and suggested that individual change would be strongly associated with an individual's group memberships. He proposed three different ways that groups could achieve change in people: (1) the group as a medium of change, (2) the group as a target of change, and (3) the group as agents of change. The TB intervention conducted in this dissertation would be housed within Cartwright's (1951) first view of the group (i.e., a medium of change), as change in individual behaviour (i.e., adherence to activity programs) was deemed to be a function of developing both belongingness and attractiveness to the group. For the most part, this was achieved as participants in the TB groups reported a greater sense of cohesion (albeit it was only a trend) and reported significantly higher levels of group task satisfaction than members in the

control condition. In sum, it appears as if Cartwright's (1951) notion of using the group to change individual behaviour may be an effective way to improve the adherence of youth to activity programs.

5.3 Contributions to Theory

The results from this dissertation also contribute to theory development. First, the findings examining the change of cohesion over the intervention are noteworthy. Based upon previous group research in an exercise setting, it was hypothesized that cohesion would increase over time from the baseline to the follow-up of the intervention. The findings from this study suggest that a group-based intervention targeting group dynamic principles would maintain its level of group cohesion. Second, the emergence of group task satisfaction is of considerable theoretical interest. In the past, satisfaction has been argued to be one the most important outcomes of an exercise program (Yardley, 1987), and a desirable outcome of TB (Carron & Spink, 1993). The group task satisfaction finding of this dissertation offers support to a previous suggestion that satisfaction may be an important, potential precursor to adherence (Remers et al., 1995).

5.4 Limitations

The findings of these studies must be observed in the context of potential limitations. The first limitation involves the recruitment constraints of field intervention research. Despite interest from approximately 20 rural schools, only 12 school sites committed to participate in the physical activity intervention, which was reduced further to 10 with the attrition of two sites during the baseline period. The small number of initial intervention sites prevented the inclusion of an additional control group, a no-treatment control, which would not receive the standardized

exercise program. As the study was conducted in rural schools, another limitation pertains to the generalizability of the study findings to other youth settings. Given that each context may have its own unique features (Baranowski et al., 1997), replication of the findings in other youth settings (e.g., urban school, sport settings) is recommended. Moreover, the exercise preferences of the sample also may limit the generalizability of the results. As noted previously, over 90% of the participants in both conditions preferred to be active with others in a group setting. Given that exercise preferences have been implicated in another activity study examining psycho-social correlates (Wilson & Spink, 2007), prompts the question of whether preference for being active with others or alone might interact with a TB protocol? This awaits further research.

With any experimental or quasi-experimental design, there are a number of potential threats (e.g., history, maturation, testing, instrumentation, etc.) that might challenge the internal validity of the study. The use of a nonequivalent control group design in this study would account for the obvious threats such as history, testing, maturation, and instrumentation (Campbell & Stanley, 1963). However, one threat to internal validity associated with this type of design is the possibility of an interaction of selection to the groups with one of the other threats (e.g., history, maturation, etc.). However, this was deemed not to be issue as pre-testing on the participants revealed few initial differences between participants in the two conditions.

Another possible limitation may be associated with the fact that the leaders' behaviours were not monitored when the TB intervention was being introduced to the participants (i.e., Implementation Phase). While assessment of leader behaviour during this phase of the intervention would have helped to verify that the TB factors were being delivered as expected, observations by the researchers during the site visits and the responses by participants at the end

of the intervention (see Table 9) indicating the presence of the manipulated factors within the TB groups, support the implementation by the leaders of the TB protocol as expected.

One final limitation relates to the lower Cronbach's alpha levels of the two task cohesion measures. The lower alpha values provide the possibility that measurement error may have contributed to a failure to find differences in changes in cohesion. Ongoing research by Eys and colleagues (2007) examining the GEQ factors in a youth population suggest that using only positively worded items may improve the internal consistency of the GEQ factors. Any reductions in measurement error resulting from an improvement in the internal consistency in the task cohesion scales may increase the detection of differences in cohesion.

5.5 Strengths

Despite these limitations, the current dissertation studies have a number of strengths. First, the studies were theoretically driven. Research based upon theory is important in the construction of knowledge, as theory serves to organize and give meaning to facts and guide future research (Lerner, 2002). Second, while the study's theoretical framework had been successfully implemented in several exercise studies with young and older adult populations, it had yet to be examined in a youth population. These studies represent the first to investigate the relationship between a TB intervention and the adherence behaviour of youth participating in an exercise setting. Similarly, the key processes identified in the model have not been evaluated to-date. Evidence presented within the intervention provided support for the conceptual framework and its generalizability to a youth population. In addition, the studies supported two meta-analyses (Burke et al., 2006; Carron et al., 1996) identifying the adherence benefits of implementing a psychologically-based TB intervention that targets group dynamic principles.

From a methodological perspective, the development of a specific intervention phase enhanced the fidelity of the intervention (Baranowski & Jago, 2005). Specifically, the second phase (implementation) provided rigor and a structured sequence for the TB instructors to implement the indirect TB protocols. These efforts are an improvement on past research in which trained TB instructors in exercise (e.g., Carron & Spink, 1993) and sport (e.g., Prapavessis et al., 1996) were not instructed to follow any standardized protocol to regulate the delivery of the TB intervention components. In the absence of a standardized protocol, it is more difficult for researchers to assess the fidelity of the intervention that is being introduced, particularly if each TB instructor has the freedom to dictate the implementation and timing of the TB factors. In addition, the detailed three phases (i.e., baseline, implementation, integration) should assist researchers and practitioners with replication, which is one shortcoming noted in past TB research (Brawley & Paskevich, 1997).

Another methodological contribution was the implementation of a standardized exercise program, which permitted a “truer” examination of effects of TB on youth adherence. Previous TB research (e.g., Spink & Carron, 1993) has not utilized a standardized exercise program, and as such, could only report the benefit of combined TB and exercise programs on adherence. In contrast, the present research attempted to isolate the effects of TB by implementing a specific activity program for all groups (TB & control), and, as such, be in a better position to monitor and evaluate the ‘dose-response’ of the intervention.

Further, the research design in the current intervention included two assessment points (pre-post intervention), which permitted an examination of possible change in the variables of interest. The pre-post design also permitted an examination of relationships between key proposed mechanisms (i.e., cohesion) and outcomes (i.e., attendance) within the intervention.

Adopting such a methodology supported calls by others (e.g., Baranowski et al., 1997) to examine relationships between key mechanisms and behaviours to improve the effectiveness of physical activity interventions and provide a strong foundation for future intervention designs.

5.6 Future Directions

A number of future directions emerge from the study findings. One area of investigation involves the further examination of the TB-cohesion relationship. Previous suggestions by Baranowski and colleagues (1997) have highlighted the importance of examining the relationship between interventions and theoretical mediators. In this vein, the current findings may suggest that the TB intervention enhanced the mediator, but ‘not enough’. Based upon these findings, future research should aim to strengthen the relationship between the TB factors and cohesion.

Another appropriate approach may involve evaluating the TB factors at multiple time points over the course of the intervention. This strategy would permit an evaluation of the changes in perceptions of the five TB factors during the intervention.

In addition, other TB factors could be considered, as Brawley and Paskevich (1997) suggested that TB factors may change across groups and contexts. More specifically, several additional TB factors (e.g., togetherness, co-operation, leadership, role clarity and acceptance and goals) as proposed by Prapavessis, Carron, and Spink (1996) in a TB sport conceptual framework, could be examined to determine if they are applicable in a youth activity setting. In an effort to identify the most salient TB factors to target and evaluate in an intervention, it also could be useful to implement TB inventory checklists for instructors and participants as proposed by Brawley and Paskevich (1997).

It also may be beneficial to conduct qualitative research around the TB components to gain a deeper understanding of each of the factors. For example, group distinctiveness emerged as an important TB factor differentiating participants' cohesion in the intervention process evaluation. Conducting qualitative interviews may assist in the formulation of common characteristics or themes within group distinctiveness (e.g., visibility, creativity) that led to its emergence. Garnering such information may assist future researchers and practitioners to strengthen the TB-cohesion relationship (i.e., identifying salient TB strategies proposed by youth to target group distinctiveness) and overcome any potential ceiling effects with a group-based activity design.

Given that the proposed mechanism did not emerge as expected, other potential mediators in the TB-adherence relationship might be considered. The results from this intervention would suggest that one potential mediator to examine might be group task satisfaction, given that a TB-group task satisfaction relationship emerged in this study. When this is coupled with the fact that satisfaction has been associated with adherence in an exercise setting (Remers et al., 1995), suggests that group task satisfaction may deserve attention as a potential mediator in the TB- adherence relationship. Future research also may wish to examine the five TB factors manipulated in this intervention as potential mediators of the TB-adherence relationship. Given the possibility that cohesion may be a marker for the factors manipulated in the TB intervention, the more direct test of the actual TB factors might reveal that these factors are mediating the relationship between TB and adherence. This awaits future research.

Further research also is necessary to understand the changing motivations of youth as groups evolve. Group theory suggests that individuals initially may be motivated to join groups for task oriented reasons and then become motivated to stay for social reasons (Sherif & Sherif,

1969). Given the short duration of the intervention and the focus on task-oriented TB components to promote cohesion, future research may wish to assess a longer TB intervention that focuses on both task and social cohesion.

In line with group theory (Sherif & Sherif, 1969), the intervention might involve the design and implementation of the task components followed by an emphasis on social components. Conducting such research may offer support for the importance of considering a group's development when designing and evaluating an effective group-based intervention. As past cohesion-adherence intervention studies, including the present one, have been relatively short in duration (24-36 sessions), a longitudinal design may provide an opportunity to evaluate the benefits of both task and social dimensions of cohesion on adherence as the group develops.

One design component that may be helpful to monitor cohesion within the extended design would be the inclusion of an additional measurement time point (3rd) of cohesion (i.e., end of baseline, 1 week after implementation, following integration). Utilizing this design would provide the temporal sequence necessary to test for the mediation of cohesion between TB and adherence (Baron & Kenny, 1986), and offer further insight into the role of cohesion within a group's development (Estabrooks, 2000). In terms of cohesion, future research also may wish to examine the timing of the assessment of this potential mediator. For example, based on the suggestion that elements of cohesion may develop at different times, it may be beneficial to test for the mediation of individual perceptions of cohesion (e.g., ATG-T) prior to group perceptions of cohesion (GI-T) (Carron et al., 1998).

While the focus in the present study was on adherence within the intervention, it also may be beneficial to examine the intention of an individual to be active in a similar setting in the future. Research evidence with older adults (Estabrooks & Carron, 1999) found that TB might be

useful in enhancing the likelihood of a participant returning to an exercise group after a hiatus. Would this finding also hold true for youth?

One final area of interest may be to examine potential moderators influencing the TB-adherence relationship. Possible moderators to investigate might include the context or environment (i.e., urban versus rural) and activity (i.e., exercise versus sport). Given that the present intervention yielded positive results using a highly motivated youth sample who typically face barriers to being active as a result of their rural residence, one wonders whether the same results would occur in an urban setting where opportunities to be active are more numerous and barriers are less owing to residence.

Another possible moderator to examine is that of the activity setting. Past literature has encouraged TB with youth in sport settings (e.g., Spink & Carron, 1993; Annessi, 1999). Given the past equivocal findings between sport and exercise settings (e.g., Prapavessis et al., 1996), prompts the question of whether some of the methodological improvements (i.e., 3-phase TB approach) included in this dissertation would improve the effectiveness of TB interventions in a sport setting.

5.7 Knowledge Translation

Over the past decade, increased attention has been paid to improving the communication of research findings through the process of knowledge translation where knowledge translation aims to share research findings with key audiences (Lyons & Warner, 2005). In essence, utilization of this process strives to “inspire people to think and/or act differently” (Lyons & Warner, 2005, p.1).

In the past, dissemination strategies have often been limited to viewing knowledge translation as a mechanistic, linear conception of “getting the word out” (Farkas, Jette,

Tennstedt, Haley, & Quinn, 2003). In reality, knowledge is not static and knowledge translation activities are said to vary according to the type of research to be translated and the intended user audience (Canadian Institutes of Health Research, 2008). To assist researchers, Farkas and colleagues (2003) have developed a conceptual framework to organize knowledge translation activities. The framework identifies four dissemination goals: (1) exposure – increased knowledge, (2) experience – increased knowledge and positive attitudes, (3) expertise - increased competence, and (4) embedding - increased utilization over time. I have employed Farkas and colleagues' framework to identify the different knowledge translation strategies I have attempted to use to disseminate my doctoral research findings.

In an effort to increase the exposure (Strategy #1) and experience (Strategy #2) of the results to the intended audience (i.e., teachers), I provided two follow-up letters summarizing key research findings to the teachers who volunteered to be the leaders of the activity clubs. In addition, I was invited to present my research at the Saskatchewan Physical Education Association (SPEA) annual meeting for physical educators. Collectively, the activities connected my dissertation findings with the teachers, as the strategies generated a number of interesting questions from teachers within the study and those attending the SPEA presentation.

During the course of the intervention, I attempted to increase the competence (Strategy #3) of the exercise leaders in their knowledge and execution of the standardized exercise program. This objective was achieved through a one-hour orientation session outlining the standardized exercise program prior to all the leaders at the beginning the intervention. At the orientation session, I provided each instructor with a resource package including an innovative exercise program and a CD. The CD provided helpful video clips and photos to provide a visual demonstration of the activities in the program. Over the course of the intervention, I also

addressed any questions regarding the standardized exercise program posed by the club leaders. At the conclusion of the intervention, I met with each exercise leader on-site and debriefed them on the TB intervention. Anecdotally, several teachers expressed evidence of this increased competence and stated that they would be incorporating the exercise and TB activities into the physical education classes or sport teams.

The final goal strategy proposed by Farkas and colleagues (2003) is embedding, or increasing the use of new findings over time. With the teacher or end user in mind, I have attempted to sustain the utilization of my dissertation findings over time. This process has involved maintaining ongoing contact and support for teachers (e.g., responding to requests for additional copies of the program materials). Through this communication, I have learned that several of the participants at one (TB) site initiated the organization of the exercise club the following school year and a group of women began using the exercise program in their rural community in the evening. In unison, these knowledge translation efforts have attempted to improve the communication of research findings.

5.8 Conclusion

Groups are a pervasive part of our lives. While group research has been well documented in the activity domain (cf. Carron, 1981), minimal research has attempted to understand how the power of groups can influence the physical activity behaviour of youth. This dissertation provides preliminary evidence for the positive influence of a group-based team building intervention on the physical activity adherence of youth. It is my hope that this dissertation will serve as an innovative starting point for a productive line of group research in sport and exercise psychology.

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APPENDIX A

Pilot Study Questionnaire

Group Questionnaire Development

Project Outline:

In our continuing efforts to keep youth active, we are planning on launching and examining physical activity clubs in high schools. As part of the clubs, students in grades 9-12 will participate in physical activity sessions 3 times a week for 8 weeks. During the study, we intend to monitor the group experiences of the students who are involved. To help us get ready for that, we are interested in getting your help on the wording and relevance of several questions that we would like to ask. If you choose to participate, you will be asked to read about a group, then answer some questions. Your participation today is completely confidential, so no name will be placed on any of the questionnaires. Prior to examining the questionnaire, please provide the following information.

School: _____

Grade: _____

Gender: _____

Age: _____

Group Setting

Please read the next paragraph, then answer the questions that follow:

Imagine that you have been in a physical activity workout club with 10 other people. Your group participates together 3 times a week for a period of 8 weeks. You experience interesting workouts in the club led by a knowledgeable instructor. The instructor has asked the group members to think of ways that they can

- move the club members toward accomplishing their fitness goals in a united way as well as
- feel strongly about their experiences in the club.

As **strongly as you can**, think of belonging to the physical activity club described above **that is moving everyone toward their fitness goals and creating a strong feeling about being in the club**.

Now please answer the questions that follow on the next page

PLEASE CONTINUE

INSTRUCTIONS

Try to answer each question by placing a number from 1 to 9 in the place marked **VALUE** beside each question. Use the following as a guide to indicate on a 1-9 scale from strongly disagree to strongly agree.

1	2	3	4	5	6	7	8	9
STRONGLY DISAGREE								STRONGLY AGREE

Here is a sample question:

	VALUE	Don't Understand	Does Not Apply
Members of the club would get into lots of arguments	<u>2</u>	_____	_____

If you feel that **you can't give a value**, in order to answer the item, then, please put an **X** in the space beside only one of the two reasons below:

1. You didn't understand the question
2. You didn't think the question applied

Here is a sample question:

	VALUE	Don't Understand	Does Not Apply
Members of the club would have conflicting aspirations regarding the group's progress	___	<u>X</u>	_____

QUESTIONS

The first nine questions are designed to assess your feelings about **YOUR PERSONAL INVOLVEMENT** with this physical activity club.

- | | | | | | |
|---|-------------|-------------------|-----|----------------|-----|
| 1. I would not enjoy the social interaction occurring in this physical activity club. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |
| 2. I would not be happy with the amount of physical activity I get. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |
| 3. I would not miss the members of this physical activity club when the program ends. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |
| 4. I'd be unhappy with my group's level of commitment to exercise. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |
| 5. By the end, some of my best friends would be in this physical activity club. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |
| 6. This club would not give me enough opportunities to improve my personal fitness. | VALUE _____ | Didn't Understand | ___ | Does not apply | ___ |

7. I would enjoy other social events more than the social activities that would be associated with this physical activity club.

VALUE ____ Didn't Understand __ Does not apply __

8. I would not like the approach to exercising done in this physical activity club.

VALUE ____ Didn't Understand __ Does not apply __

9. For me this physical activity club would be one of the most important social groups to which I belong.

VALUE ____ Didn't Understand __ Does not apply __

The next nine questions are designed to assess your perceptions of YOUR PHYSICAL ACTIVITY CLUB AS A WHOLE.

10. Our physical activity club would be united in trying to reach its goals for fitness.

VALUE ____ Didn't Understand __ Does not apply __

11. Members of our physical activity club would rather not socialize than get together as a group.

VALUE ____ Didn't Understand __ Does not apply __

12. We would all take responsibility if one of our exercise sessions for the club goes poorly.

VALUE ____ Didn't Understand __ Does not apply __

13. Members of our physical activity club would rarely socialize together.

VALUE ____ Didn't Understand __ Does not apply __

14. Members of our physical activity club would not agree about the difficulty level at which we attempt to exercise.

VALUE ____ Didn't Understand __ Does not apply __

15. Members of our physical activity club would like to spend time together after the program is over.

VALUE ____ Didn't Understand __ Does not apply __

16. If members of our physical activity club have problems during workouts, all our members would want to help them so we could make progress together.

VALUE ____ Didn't Understand __ Does not apply __

17. Members of our physical activity club would not stick together outside of our workout sessions.

VALUE ____ Didn't Understand __ Does not apply __

18. After and during workouts, members of our physical activity club would not communicate freely about what is to be done in the workouts and exercise sessions.

VALUE ____ Didn't Understand __ Does not apply __

THANK YOU

APPENDIX B

University Ethical Approval



**UNIVERSITY OF SASKATCHEWAN
Behavioural Research Ethics Board (Beh-REB)**

NAME: Kevin Spink, Kinesiology
Mark Bruner

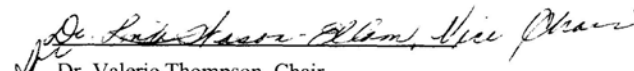
Beh 05-158

DATE: 02-Aug-2005

The Behavioural Research Ethics Board (Beh-REB) has reviewed the Application for Ethics Approval for your study "Examining the Influence of Group Cohesion on Physical Activity Behaviour in Rural Youth" (Beh 05-158).

1. Your study has been APPROVED.
2. Any significant changes to your proposed method, or your consent and recruitment procedures should be reported to the Chair for Committee consideration in advance of its implementation.
3. The term of this approval is for 5 years.
4. This approval is valid for one year. A status report form must be submitted annually to the Chair of the Committee in order to extend approval. This certificate will automatically be invalidated if a status report form is not received within one month of the anniversary date. Please refer to the website for further instructions <http://www.usask.ca/research/behavsc.shtml>

I wish you a successful and informative study.


Dr. Valerie Thompson, Chair
Behavioural Research Ethics Board (Beh-REB)

Office of Research Services, University of Saskatchewan
Room 1607, 110 Gymnasium Place, Box 5000 RPO University, Saskatoon SK S7N 4J8 CANADA
Telephone: (306) 966-8576 Facsimile: (306) 966-8597
<http://www.usask.ca/research>

APPENDIX C

School Board Ethics Approvals



September 22, 2005

Mr. Mark Bruner, PhD Candidate
College of Kinesiology
University of Saskatchewan
87 Campus Drive
SASKATOON, SK S7N 5B2

Dear Mr. Bruner:

Re: Research Project

Thank you for your letter and supporting documentation in which you request approval to conduct a research project in Saskatchewan Valley School Division.

Your proposal was considered at the regular meeting of our Board of Education on September 19, 2005. I am pleased to advise that the Board has approved Martensville High School, Hepburn School, Blaine Lake School, Hague High School, and Waldheim School to participate in the project entitled "An Examination of the Influence of Group Cohesion on Rural Youth Physical Activity Behaviour."

I wish you success in this project and if you have any questions, please don't hesitate to contact me.

Sincerely,

A handwritten signature in cursive script, appearing to read "Stephanson", is written over a horizontal line.

Sherry L. Stephanson
Interim Assistant Director of Education

SLS:blq



SASK CENTRAL SCHOOL DIVISION #121

**BOX 520 116 MAIN STREET WATROUS, SASKATCHEWAN S0K 4T0
(306) 946-3332 (Fax) 946-3442**

September 14, 2005

Mark Bruner
College of Kinesiology
University of Saskatchewan
87 Campus Drive
Saskatoon, Saskatchewan
S7N 5B3

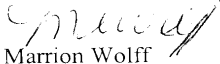
Dear Sir:

Re: Group Cohesion and Physical Activity Behavior Study

Please be advised that a motion was passed at the September 14, 2005 regular Board of Education meeting approving your request to conduct the above Research Project at Winston High School.

We wish you a successful study and please call if you have any questions.

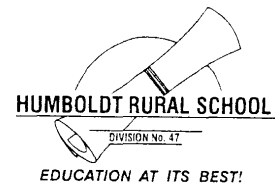
Sincerely,


Marrion Wolff
Superintendent of School Operations

Cc Phil Gleim, Principal

HUMBOLDT RURAL SCHOOL DIVISION No. 47

Janet Mueller, Secretary-Treasurer
Patrick Donegan, Director of Education



September 22, 2005

Mark Bruner
College of Kinesiology
University of Saskatchewan
87 Campus Drive
Saskatoon, SK
S7N 5B2

Dear Mark:

This is to advise you that your request for Ethical Approval has been approved subject to the conditions outlined in your research project.

Yours truly,

A handwritten signature in cursive script, appearing to read "Milt Kerpan", is written over a horizontal line.

Milt Kerpan
Acting Director of Education

MK:ss



Dalmeny High School

*Box 430
Dalmeny, Saskatchewan S0K 1E0
Phone (306) 254-2036
Fax (306) 254-2759
Principal: G. Smith
Vice Principal: M. Harcastle*

October 6, 2005

Mark Bruner, PhD Candidate
College of Kinesiology
315 Arthur Avenue
Saskatoon, Saskatchewan
S7N 1J4

Dear Mark:

I am in receipt of your project summary with respect to physical activity in rural youth and am pleased that Dalmeny High School has been given the opportunity to be a part of this exciting project.

The students and staff of Dalmeny High look forward to working with you and your supporting partners in promoting physical activity at our school.

Thank you.

Sincerely,

Garry Smith
Principal

cc: Mr. Bill Macfarlane
Director of Education

Walter W. Brown School

Box 260 Langham, Saskatchewan S0K 2L0
Telephone: (306) 283-4434 Fax: (306) 283-4829

Mr. N. Buswell
Principal

Mrs. J. Kozun
Vice Principal

October 3, 2005


Mark Bruner
315 Arthur Ave.
Saskatoon, Sk
S7N 1J4

Dear Mr. Bruner:

I am pleased to inform you that Walter W. Brown School grants you permission to conduct your RYPAC study. The program will be administered in our school by Brendan Proctor.

I look forward to learning of the results of your study. Any increase in understanding of factors which can increase physical activity in youth is welcomed.

Yours truly,


Neil Buswell

APPENDIX D

Standardized Exercise Protocol

Rural Youth Physical Activity Club

Program Booklet

Project Partners:

CAHR 'Saskatoon In Motion', Canadian Institutes of Health Research (CIHR)
Human Performance Center, University of Saskatchewan
CIHR Strategic Training Program in Public Health and the Agricultural Rural Ecosystem
(PHARE) and Partner Institutes

Project Supervisor:

Dr. Kevin Spink

Project Coordinator:

Mark Bruner, PhD Candidate
College of Kinesiology
University of Saskatchewan
mark.bruner@usask.ca
(306) 966-1099 (school)
(306) 653-8989 (home)

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Table of Contents

1. Attendance Sheet
2. Physical Activity Session Protocol
3. Physical Activity Program
4. Appendixes

Physical Activity Session Protocol

I. Warm-up (10 min.)

- Dynamic Warm-up or Activity

II. Energy Systems (20 min.)

- Aerobic & Anaerobic Activities

III. Dynamic Strength (20 min.)

- Resistance Training
- Plyometrics
- Agility

IV. Cool Down (10 min.)

- Core strength
- Flexibility
- Push-ups

Physical Activity Program Guide

Day 1

I. Warm-up (10 min.)



- Dynamic Warm-up

II. Energy Systems (20 min.)

- Aerobic – Walk & Jog -> 3 minute walk, 1 minute jog x 5

III. Dynamic Strength (20 min.)



- Station Circuit #1 (bench step ups, pushups, wall sits, chin-ups, squats, hover, towel hang, calf raises)
-20 seconds on activity, 60 seconds rest x 2

IV. Cool Down (10 min.)



- Ab Circuit - 3 minutes – 6 exercises/30sec
- Flexibility & 1 Push-up

Day 2

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Partner Skip & Jog Pyramid
-one partner in middle skipping while other partner jogging around outside of gym

Progression

- 20 sec. jog & 20 sec. skip
- 40 sec. jog & 40 sec. skip
- 20 sec. jog & 20 sec. skip
- 40 sec. jog & 40 sec. skip

water break & repeat x 3

III. Dynamic Strength (20 min.)



- Individual Tubing Circuit (biceps, triceps, rear deltoids, squats)

IV. Cool Down (10 min.)

- Ab Circuit – 3 minutes – 6 exercise/30 sec
- Flexibility & 2 Push-ups

Day 3

I. Warm-up & Energy Systems (30 min.)



- Relay Games With Cones

Dynamic Strength (20 min.)



- Line Hops – 20 secs on/ 20 secs rest

Forward/Backwards

- Right leg
- Left leg
- Both legs

Side to Side

- Right leg
- Left leg
- Both legs

- Standing Broad Jumps – 10 secs on/ 30 secs rest

- Right leg
- Left leg
- Both legs

Cool Down (10 min.)

- Ab Circuit – 3 minutes – 6 exercise/30 secs
- Flexibility & 3 Push-ups

Day 4

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)



- Stairs – every stair, forward lunge walk, angle lunge walk, lateral lunge walk, cross over lunge

III. Dynamic Strength (20 min.)



- Exercise circuit #2 with walk/ jog recovery
 - Exercises -20 sec.(lunges, push-ups, wall sit, mountain climbers, squat)
 - Walk/jog recovery – 40 sec.

Repeat x 3 with 3 minute break between sets

IV. Cool Down (10 min.)

- Ab Circuit 3.5 minutes – 7 exercise/30 sec
- Flexibility & 4 Push-ups

Day 5

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Skipping Drills & Foot Speed Activities (Appendix I)

III. Dynamic Strength (20 min.)



- Partner Tubing – Shoulder Stabilizers

IV. Cool Down (10 min.)

- Ab Circuit 3.5 minutes – 7 exercises/30 sec
- Flexibility & 5 Push-ups

Day 6 –Data Collection #1

Data Collection: 40 mins

I. Warm-up (10 min.)

- Activity: Ultimate basketball
 - Rules: No bouncing the ball
 - When you receive the ball, you must stop and pass/shoot
 - Must rotate passing between sexes
 - Must make a minimum of 5 passes before shooting

IV. Cool Down (10 min.)

- Ab Circuit 3.5 minutes – 7 exercises/30 sec
- Flexibility & 6 Push-ups

Day 7

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Nine square foot speed activities (Appendix II)

III. Dynamic Strength (20 min.)



- Plyometric jumps (Quadzillas)

- one leg three big jumps, 5 single leg squats without touching, 3 more jumps, 5 tuck jumps
- Repeat with 2 feet with their eyes closed – fun to watch

IV. Cool Down (10 min.)

- Ab Circuit - 4 minutes – 8 exercises/ 30 secs
- Flexibility & 7 Push-ups

Day 8

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)



- Sprint Progression

- Start on stomach, head facing front
- Start on stomach, feet facing front
- Start on back, head facing front
- Start on back, feet facing front
- Cross over start sprint
- Rolling start sprint

III. Dynamic Strength (20 min.)



- 7 Station Circuit

- Left hand push-up on basketball ball
- Left leg single leg balance
- Dips on bench
- Right hand push-up on basketball
- Right leg single leg balance
- Dips on 2 basketballs
- Squat

20 seconds on/ 40 seconds rest (Repeat 2 times)

IV. Cool Down (10 min.)

- Ab Circuit – 4 minutes - 8 exercises/ 30 secs
- Flexibility & 8 Push-ups

Day 9 (2nd Time Through)

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Aerobic – Walk & Jog -> 2.5 minute walk, 1.5 minute jog x 5

III. Dynamic Strength (20 min.)

- Station Circuit #1 (bench step ups, pushups, wall sits, chin-ups, squats, hover, towel hang, calf raises)
-20 seconds on activity, 60 seconds rest
-do circuit 2 times

IV. Cool Down (10 min.)

- Ab Circuit - 4 minutes – 8 exercises/ 30 sec
- Flexibility & 9 Push-ups

Day 10

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Partner Skip & Jog Pyramid
-one partner in middle skipping while other partner jogging around outside of gym

Progression

- 20 sec. jog & 20 sec. skip
- 40 sec. jog & 40 sec. skip
- 40 sec. jog & 40 sec. skip
- 20 sec. jog & 20 sec. skip

water break & repeat x 3

III. Dynamic Strength (20 min.)

- Individual Tubing Circuit (biceps, triceps, rear deltoids, squats)

IV. Cool Down (10 min.)

- Ab Circuit – 4.5 minutes – 9 exercises/30 sec
- Flexibility & 10 Push-ups

Day 11



I. Warm-up & Energy Systems (30 min.)

- Relay Games With Cones

Dynamic Strength (20 min.)

- Line Hops – 20 secs on/ 20 secs rest
 - Forward/Backwards
 - Right leg
 - Left leg
 - Both legs

Side to Side

- Right leg
- Left leg
- Both legs

- Standing Broad Jumps – 10 secs on/ 30 secs rest
 - Right leg
 - Left leg
 - Both legs

Cool Down (10 min.)

- Ab Circuit – 4.5 minutes – 9 exercises/30 secs
- Flexibility & 11 Push-ups

Day 12

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Stairs – every stair, forward lunge walk, angle lunge walk, lateral lunge walk, cross over lunge

III. Dynamic Strength (20 min.)

- Exercise circuit #2 with walk/ jog recovery
 - Exercises -20 sec.(lunges, push-ups, wall sit, mountain climbers, squat)
 - Walk/jog recovery – 40 sec.

Repeat x 3 with 3 minute break between sets

IV. Cool Down (10 min.)

- Ab Circuit 4.5 minutes – 9 exercises/30 sec
- Flexibility & 12 Push-ups

Day 13

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Skipping Drills & Foot Speed Activities (Appendix I)

III. Dynamic Strength (20 min.)

- Partner Tubing – Shoulder Stabilizers

IV. Cool Down (10 min.)

- Ab Circuit 5.0 minutes – 10 exercises/30 sec
- Flexibility & 13 Push-ups

Day 14

I. Warm-up (10 min.)

- Activity: Partner Frozen Tag

II. Energy Systems (20 min.)

- Aerobic - Walk & Jog -> 2.5 minute walk, 1.5 minute jog x 5

III. Dynamic Strength (20 min.)



- Plyometric Cone Jumps

2 Foot Progression: 1) Forward/Backward 2) Lateral

Single Leg (Left/Right): 1) Forward 2) Inside Leg Lateral 3) Outside Leg Lateral

Lateral lunge jump

Broad jump

IV. Cool Down (10 min.)

- Ab Circuit 5.0 minutes – 10 exercises/30 sec
- Flexibility & 14 Push-ups

Day 15

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Nine Square Foot Speed Activities (Appendix II)

III. Dynamic Strength (20 min.)

Plyometric jumps (Quadzillas)

- one leg three big jumps, 5 single leg squats without touching, 3 more jumps, 5 tuck jumps
- Repeat with 2 feet with their eyes closed – fun to watch

IV. Cool Down (10 min.)

- Ab Circuit – 5.0 minute – 10 exercise/30sec
- Flexibility & 15 Push-ups

Day 16

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Sprint Progression
 - Start on stomach, head facing front
 - Start on stomach, feet facing front
 - Start on back, head facing front
 - Start on back, feet facing front
 - Cross over start sprint
 - Rolling start sprint

III. Dynamic Strength (20 min.)

- 7 Station Circuit
 - Left hand push-up on basketball ball
 - Left leg single leg balance
 - Dips on bench
 - Right hand push-up on basketball
 - Right leg single leg balance
 - Dips on 2 basketball
 - Squat

20 seconds on/ 40 seconds rest (Repeat 2 times)

IV. Cool Down (10 min.)

- Ab Circuit – 5.5 minutes – 11 exercises/30sec
- Flexibility & 16 Push-ups

Day 17 (3rd Time Through)

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Aerobic – Walk & Jog -> 3 minute walk, 1 minute jog x 5

III. Dynamic Strength (20 min.)

- Station Circuit #1 (bench step ups, pushups, wall sits, chin-ups, squats, hover, towel hang, calf raises)
-20 seconds on activity, 60 seconds rest
-do circuit 2 times

IV. Cool Down (10 min.)

- Ab Circuit - 5.5 minutes – 11 exercises/30sec
- Flexibility & 17 Push-ups

Day 18

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Partner Skip & Jog Pyramid
-one partner in middle skipping while other partner jogging around outside of gym

Progression

- 20 sec. jog & 20 sec. skip
- 40 sec. jog & 40 sec. skip
- 60 sec. jog & 60 sec. skip
- 40 sec. jog & 40 sec. skip

water break & repeat x 3

III. Dynamic Strength (20 min.)

- Individual Tubing Circuit (biceps, triceps, rear deltoids, squats)

IV. Cool Down (10 min.)

- Ab Circuit – 5.5 minutes – 11 exercises/30 sec
- Flexibility & 18 Push-ups

Day 19

I. Warm-up & Energy Systems (30 min.)

- Activity: Chaos / Relay Games With Cones



III. Dynamic Strength (20 min.)

- Plyometric Cone Jumps
 - 2 Foot Progression: 1) Forward/Backward 2) Lateral
 - Single Leg (Left/Right): 1) Forward 2) Inside Leg Lateral 3) Outside Leg Lateral
 - Lateral lunge jump
 - Broad jump

Cool Down (10 min.)

- Ab Circuit – 6 minutes – 12 exercises/30 secs
- Flexibility & 19 Push-ups

Day 20

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Stairs – every stair, forward lunge walk, angle lunge walk, lateral lunge walk, cross over lunge

III. Dynamic Strength (20 min.)

- Exercise circuit #2 with walk/ jog recovery
 - Exercises -20 sec.(lunges, push-ups, wall sit, mountain climbers, squat)
 - Walk/jog recovery – 40 sec.

Repeat x 3 with 3 minute break between sets

IV. Cool Down (10 min.)

- Ab Circuit 6 minutes – 12 exercises/30 sec
- Flexibility & 20 Push-ups

Day 21

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Skipping Drills & Foot Speed Activities (Appendix I)

III. Dynamic Strength (20 min.)

- Partner Tubing – Shoulder Stabilizers

IV. Cool Down (10 min.)

- Ab Circuit 6 minutes – 12 exercises/30 sec
- Flexibility & 21 Push-ups

Day 22

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- Sprint Progression
 - Start on stomach, head facing front
 - Start on stomach, feet facing front
 - Start on back, head facing front
 - Start on back, feet facing front
 - Cross over start sprint
 - Rolling start sprint

III. Dynamic Strength (20 min.)

- 7 Station Circuit
 - Left hand push-up on basketball ball
 - Left leg single leg balance
 - Dips on bench
 - Right hand push-up on basketball
 - Right leg single leg balance
 - Dips on 2 basketball

20 seconds on/ 40 seconds rest (Repeat 2 times)

IV. Cool Down (10 min.)

- Ab Circuit 7 minutes – 14 exercises/30 sec
- Flexibility & 22 Push-ups

Day 23

I. Warm-up (10 min.)

- Dynamic Warm-up

II. Energy Systems (20 min.)

- 9-Square Foot Speed Activities (Appendix II)

III. Dynamic Strength (20 min.)

Plyometric jumps (Quadzillas)

- one leg three big jumps, 5 single leg squats without touching, 3 more jumps, 5 tuck jumps
- Repeat with 2 feet with their eyes closed – fun to watch

IV. Cool Down (10 min.)

- Ab Circuit - 7 minutes – 14 exercises/30sec
- Flexibility & 23 Push-ups

Day 24 – Final Exercise Session

Data Collection – 40 minutes

I. Warm-up (10 min.)

- Activity: Instructor or group choice

IV. Cool Down (10 min.)

- Ab Circuit – 14 exercises/30sec
- Flexibility & 24 Push-ups

Appendixes

I- Skipping Drills & Foot Speed Activities

II- 9 Square Foot Speed Activities

III- Stretching & Flexibility – Option I

IV- Stretching & Flexibility - Option II

Appendix I

Skipping Drills Foot Speed & Agility

Skipping

2-foot hops
1-foot hops (15 sec each leg)
2-foot slalom
1-foot slalom (15 sec each leg)
Double Unders (every 5th skip)
Alternate leg heel taps
High knee running
Double Unders (every 3rd skip)
Relay race (approx. 4 in a group) length of triple gym and back

Rest Intervals

30' on (30"- 60") off (you will have to judge based on your athletes)

10 push-ups for every mistake – max 30 per pattern

Focus on foot speed – eyes up – concentrate

Appendix II
9 - Square
Foot Speed & Agility

Patterns

- Use a space 3 feet by 3 feet and picture 9 squares in it:

1	2	3
4	5	6
7	8	9

- Z Pattern: 1- 3 - 5 - 7 - 9 / 9 - 7 - 5 - 3 - 1
- Hourglass Pattern: 1 & 3 - 5 - 7 & 9
- Star Pattern: 5 - 1 - 5 - 3 - 5 - 7 - 5 - 9 - 5
- + Pattern: Starting in 5 – 4&6 – 5 – 2&8 – 5 – repeat
- Big – Z Pattern: 1- 3 - 7 - 9 / 9 - 7 - 3 - 1

Rest Intervals

30' on (30"- 60") off (you will have to judge based on your athletes)

Keep knees bent in ready position at all times

Try to keep upper body still

Focus on foot speed – eyes up – hit the squares - concentrate

Appendix III

STRETCHING & FLEXIBILITY – Option #1

Stretching Keys: 1. warm up before stretching 2. Exhale as you “move into” the stretch 3. Breath normally while stretching (do not hold your breath) 4. Hold the stretch for 10-30 seconds 5. Do not bounce as you stretch, but slowly move into stretch 6. Repeat each stretch

STANDING QUADRICEPS STRETCH CALF STRETCH



Grasp the right foot with the right hand and bend the right leg back towards the buttocks, stretching the front of the bent leg, repeat on left side (quadriceps).

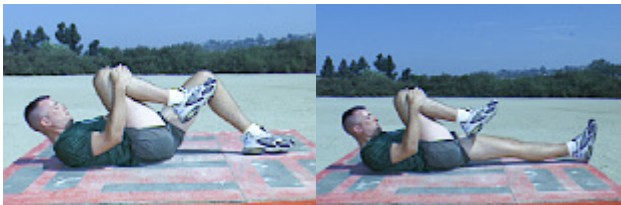


Place left foot approximately 2 feet forward and bend the right knee (keep knees close). With the left hand, bend forward and hold the left foot and pull gently. Repeat on right side (calf). Advanced, drop right hand to toe.

HIP FLEXOR STRETCH



LOWER BACK STRETCH



Move the left foot forward approximately 3 feet, (left foot on the deck, right knee on the deck), while keeping back straight, move forward. When you feel the stretch, the left knee should move forward to be directly over the heel of the foot. Caution, at no time should the front knee go past the toe!

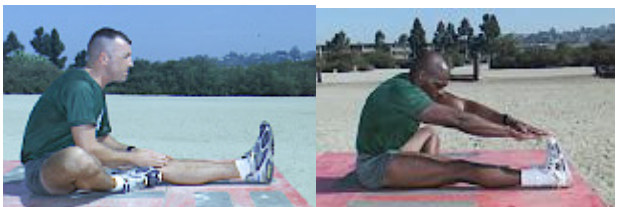
From a sit up position, grasp the right leg just below the knee, with both hands bring the leg as close the chest as possible, then while hugging the right leg, slide the left leg down to where it is flat on the deck. Repeat left side.

GROIN STRETCH (BUTTERFLY)



From sitting, bring both feet together while attempting to keep back straight. Bring feet as close to the groin area as possible. Grasp feet at shoe laces, place elbows on legs and move the chest toward the feet while pressing the legs down with the arms.

MODIFIED HURLER



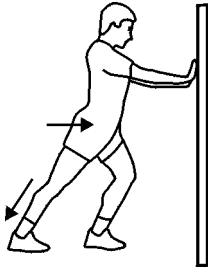
With left leg straight and toe pointing to the sky, move hands toward left toe while trying to keep the back straight (hamstrings). Repeat on the right leg.

Stretching & Flexibility – Option #2

- Flexibility work will be performed after the training sessions on training days
- The stretch should be held slowly by pressing the stretched portion gently for 10 seconds, eventually progressing to 30 seconds, repeating 2 to 4 times
- Hold the stretch until just before it feels painful, stretching through pain can cause injury
- Never stretch a muscle you believe to be injured

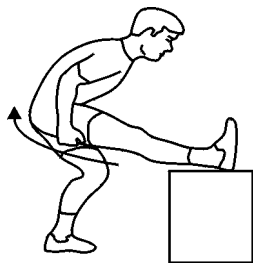
Suggested Flexibility Exercises

1)



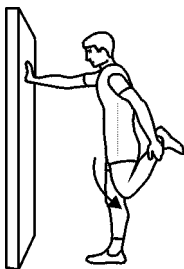
- Place one foot one stride length behind the other.
- With feet shoulder width apart and pointing forwards, maintain hip, shoulder, knee and ankle alignment.
- Keep shoulders and pelvis square and move forward, shifting weight over the front foot. Movement should be isolated to the ankle

2)



- Standing slowly raise one leg and rest it on an elevated platform at a comfortable height
- Breathe out keeping both legs straight and your hips squared
- Slowly flex forward from the hips, extend your back and lower your trunk onto your raised thigh

3)



- Stand holding something for balance, for example a goal post or partner
- Flex one knee and raise one heel to buttocks
- Slightly flex your supporting leg, exhale and grasp your raised foot with one hand
- Inhale and slowly pull your heel towards your buttock, without overcompressing the knee, arching your lower back or twisting your pelvis

4)



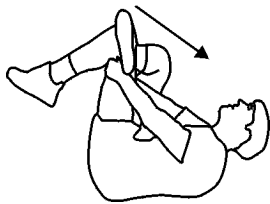
- Sit on the floor with your buttocks against a wall, your legs flexed and your heels touching each other and pulled towards you
- Hold both your heels and pull them as close as possible towards your groin
- Place your elbows on your inner knees or thighs, exhale and push your knees to the floor
- Remember to keep your back straight

5)



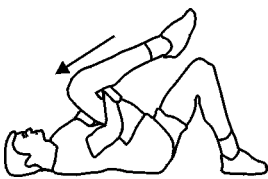
- Stand with legs spread about two feet apart. Bend one knee and lower your body, keeping your back leg straight
- Place your hands on your hips and keep your front knee bent at 90 degrees
- Exhale and push the front of your hip of your rear leg towards the floor

6)



- Lie on your back with your left leg crossed over your right knee
- Exhale and flex your right knee, lifting your right foot off the floor, and let it slowly push your left foot toward your face, keeping your head, shoulders and back flat on the floor

7)



- Lie on your back with one leg bent
- Inhale and slowly flex the opposite knee to your chest

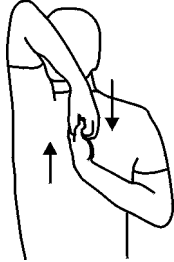
8)



- Sit in upright position with straight back and legs on the floor
- Keeping legs in the same position and back straight, rotate 90 degrees using your waist
- Bend one knee and pull across your body towards your opposite shoulder

- Keep stretching until an easy stretch is felt on the outside of the hip
- Hold for up to 30 seconds

9)



- Sit or stand with one arm behind your lower back and as far up on your back as possible
- Lift your other arm overhead and grasp your lower arm
- Flex your elbows
- Inhale as you bring your hands closer together by flexing the fingers of both hands

APPENDIX E

Evaluation of Team Building Factors

These questions ask about your perception of things that may have happened within the physical activity group. Please **CIRCLE** a number from 1 to 7 to indicate your perception of the presence of each of the items in your physical activity club.

1. A distinctive environment was developed within the physical activity club.

1 2 3 4 5 6 7
STRONGLY STRONGLY
DISAGREE AGREE

2. A set of accepted standards for group behaviour was developed within the physical activity club.

1 2 3 4 5 6 7
STRONGLY STRONGLY
DISAGREE AGREE

3. Well recognized positions within the group were developed within the physical activity club.

1 2 3 4 5 6 7
STRONGLY STRONGLY
DISAGREE AGREE

4. Members of the physical activity club interacted and communicated with everyone in the group.

1 2 3 4 5 6 7
STRONGLY STRONGLY
DISAGREE AGREE

5. Members of the physical activity club made personal sacrifices to be a member of the group.

1 2 3 4 5 6 7
STRONGLY STRONGLY
DISAGREE AGREE

These items ask about the presence of different things that might have occurred in your physical activity club. Please tick a box to indicate whether the item was present or absent. If the item was present in your physical activity club, please **CIRCLE** a number from 1 to 7 to indicate your perception of the frequency of that item.

1. Group name

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

2. Group music – (e.g., CD, theme song)

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

3. Bracelets for identification

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

4. Group water bottles

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

5. ☺ hand stamp- for attending

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

6. Code names for participants

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

7. Buddy system for attendance

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

8. Window of time to start – will start when everyone arrives to curb lateness

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

9. Attendance Sign-in book with time

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

10. Mini group competition for lateness and attendance

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Present Always Present

11. Point system for attendance/punctuality

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

12. Rotate/switch participant leaders for warm-up and/or cool-down

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

13. Participants have a 'home' or set pattern/formation for warm-up and/or cool down

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

14. Ab buddies

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

15. Pair up with different participants each activity

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

16. Each student draws a number- order of participants for warm-up/cool-down remains the same for each but they rotate through selecting the exercises

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

17. Secret weekly workout buddy/partner- 'Guardian Angel' to monitor work ethic or attendance

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

18. Offering Fitness tips

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

19. Encouragement on performing activity

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

20. Peer/partner feedback on effort and/or technique

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

21. Secret ballot – write down sacrifices participants have made for the group and sacrifices they have noticed others members have made for the group

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

22. Talk to group members outside of workouts (e.g., hallways, in community)

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

23. Arranging for an alternative ride to school

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

24. Dominant person letting someone else take the lead or have first choice of the equipment

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

25. Negotiate start time and/or finishing time of the workout sessions

Absent Present - if Present please rate: 1 2 3 4 5 6 7
Rarely Always
Present Present

APPENDIX G

TB Factor Correlation Table

	ATG-T Followup	GI-T Followup	Group	ATG-T Baseline	GI-T Baseline	Group Envir.	Group Norms	Group Positions	Comm./ Interaction	Sacrifices
ATG-T Followup	1									
GI-T Followup	.552**	1								
Group	.252*	.181	1							
ATG-T Baseline	.318**	.308**	.148	1						
GI-T Baseline	.286**	.430**	.090	.274**	1					
Group Envir.	.305**	.354**	.599**	.189	.191*	1				
Group Norms	.316**	.375**	.320**	.151	.139	.407**	1			
Group Positions	.155	.104	.086	.062	-.041	.338**	.150	1		
Comm./ Interaction	.429**	.507**	.186	.341**	.362**	.341**	.267**	.250*	1	
Sacrifices	.290**	.345**	.327**	.254*	.185	.299**	.312**	.108	.250*	1

*p<.05

**p<.01

