

**Perceptual Similarity and Member Functioning in Exercise Groups**

**by**

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## **ABSTRACT**

This study explored the relationships between perceived intra-group similarity, cohesion, and adherence among exercise group members. Participants ( $N = 402$ ) from 46 registered health and wellness courses in a large city in Western Canada completed a questionnaire assessing their perceived level of similarity with the other group members and cohesion three times during the first eight weeks of their course. Data were collected following the second, fifth, and eighth classes (this coincided with the second, fifth, and eighth week of each course). Participants' initial perception of the proportion of group members that were similar to themselves was found to significantly (and positively) predict program adherence. In contrast, early measures of class cohesion did not predict program adherence. A secondary aim of this study was to apply a theoretical framework developed within the domain of organizational psychology to understand some of the contextual determinants of cohesion in group-based exercise programs. This framework had been used to explain the emergence of cohesion within work groups through the consideration of (a) similarity among members' surface- and deep-level attributes, and (b) the relative stage of group development (i.e., combined amount of time the group has spent together). Dimensions of task and social cohesion were predicted by both surface- and deep-level similarity perceptions. Findings are discussed in relation to theory development, measurement, and the application of group dynamics principles to behavioral medicine research.

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Finally, I would like to thank my fellow graduate students at UBC. Though the means that we adopt vary greatly, we are united in our passion for the pursuit of understanding life in all its many facets. I hope this passion never withers.



## **DEDICATION**

To my father, whose passion for knowledge and critical reflection is eclipsed only by his ability to be present in, and enjoy, the moment no matter how simple or routine.

## 1 INTRODUCTION

“Never doubt that a small group of thoughtful, committed citizens can change the world. Indeed, it is the only thing that ever has.”

Margaret Mead (1901-1978)

Groups, and group functioning, have a pervasive influence on how we live our lives. As a result, much work within social (Alcock, Carmens, & Sadava, 1998; Kenrick, Neuberg, & Cialdini, 2005, organizational (Robbins & Langton, 1999), sport, and exercise (Carron, Hausenblas, & Eys, 2005; Harwood & Beauchamp, 2007) psychology has explored the many variables that influence group functioning. To a large degree, this exploration has been fostered by the continued application of concepts and theories across these sub-disciplines. For example, through the study of the performance of professional cyclists (a topic that could be considered to fall under the discipline of sport and exercise psychology), Norman Triplett (1897) identified the phenomenon now known as social facilitation. In turn, this phenomenon has been researched heavily by social (e.g., Guerin, 1993; Spence, 1956; Zajonc, 1965) and organizational (e.g., Bond & Titus, 1983; Robbins & Langton, 1999) psychologists.

Within social, organizational, and sport psychology, a considerable amount of research attention has been focused on the study of group composition. Group composition is defined as “the relationships among the characteristics of individuals who compose the group” (Shaw, 1981, p. 454). The attention this concept has received within these disciplines is likely a result of the fact that group composition has been linked to several important outcome measures, most notably performance (Knippenberg & Schippers, 2007; Milliken & Martins, 1996).

Researchers who study group composition are often concerned with identifying the combination of group members that will likely result in optimal group and member functioning. Consequently, the primary focus of researchers in this area has centered on the study of diversity within groups and teams. Intra-group diversity is defined as “a characteristic of the social grouping (i.e., group organization, society) that reflects the degree to which there are objective and subjective differences between people within the group” (Knippenberg & Schippers, 2007, p. 519). Consistent with this definition, intra-group diversity and similarity are understood to be diametrically opposed, falling on opposite ends of the “similarity-difference continuum” (Harrison, Price, Gavin, & Florey, 2002, p. 906). That is, similarity is conceptualized as being diametrically opposite to diversity (higher levels of one correspond to lower levels of the other).

Intra-group similarity has been found to relate to many variables relevant to group functioning including (but not limited to) cohesion (e.g., Back, 1951; Shaw & Shaw, 1962), creativity (e.g., Dose, 1999) member satisfaction (e.g., Tsui, Egan, & O'Reilly, 1992), social integration (e.g., Tsui, Egan, & Xin, 1995), communication (e.g., Lincoln & Miller, 1979), commitment (e.g., Knippenberg, Haslam, & Platlow, 2007), and the quality of interpersonal relations, (e.g., Milliken & Martins, 1996; Knippenberg & Schippers, 2007; Triandis, Kurowski, & Gelfand, 1994). Given this seemingly pervasive influence, as well as the tendency for researchers within social, organizational, and sport and exercise psychology to incorporate concepts and theories across sub-disciplines, it is surprising to note that intra-group similarity has received scant attention within the domain of exercise psychology. Indeed, only one known study (Shapcott, Carron, Burke, Bradshaw, & Estabrooks, 2006) has considered the importance of this topic within

exercise groups. Thus, the overall purpose undertaken in this thesis was to address this gap in the research literature by exploring the relationship between intra-group similarity and member functioning in exercise groups.

### **1.1 Perspectives on Intra-group Similarity**

Essentially, two perspectives on intra-group similarity exist: the first purports that intra-group similarity is detrimental to group functioning, the second that it is beneficial. This first perspective on intra-group similarity is based largely on the beliefs that (a) similar or homogeneous groups have less varied resources on which to draw upon and (b) greater and more varied resources enhance group processes (e.g., group creativity; Dose, 1999). The majority of empirical work providing support for this perspective has explored the effect that varied backgrounds, training, and perspectives can have on work group performance and communication (e.g., Cox, 1993; Cox & Blake, 1991). Greater diversity in these factors is thought to result in an expanded pool of information (and knowledge) available to group members (Milliken & Martins, 1996). This perspective has been fostered under the moniker of the ‘information processing model’ (Knippenberg, De Dreu, & Homan, 2004; Mannix & Neale, 2005). While recognizing that this model was conceived with access to diverse information in mind it has also been theorized that greater diversity with respect to many other, non-informational attributes/variables may also benefit a group’s task and social functioning (see Carron et al., 2005). Although the name of this model implies a restricted focus on information or knowledge diversity, for the purpose of the present discussion, the ‘information processing model’ will be used to refer to the perspective that intra-group similarity (be it informational or non-informational in nature) is detrimental to group functioning.

The second perspective on intra-group similarity views within-group homogeneity as beneficial to group functioning. This perspective is largely informed by Byrne's (1971) Similarity-Attraction Hypothesis and Turner's (1984; 1985; 1987) Self Categorization Theory. Simply put, the similarity-attraction hypothesis predicts that one will be attracted to similar others and repelled (see Chen & Kenrick, 2002) by those that are dissimilar. This hypothesis has been supported by a great deal of anecdotal and empirical evidence (Montoya, Horton, & Kirchner, 2008). For example, attraction has been correlated with many different types of similarities including attitudinal (e.g., Byrne, Baskett, & Hodges, 1971; Tan & Singh, 1995), personality (e.g., Banikotes & Neimeyer, 1981; Bleda, 1974), and physical (e.g., Peterson & Miller, 1980; Stevens, Owens, & Schaefer, 1990) similarity.

Byrne (1971) proposed that the relationship between similarity and attraction occurs as a result of each individual's desire to have their own attitudes, beliefs, and world views validated. According to Byrne, this desire stems from a fundamental need for a logical and consistent view of the world. By being attracted to, and associated with, similar others, one increases the likelihood that this need will be satisfied. This is because similar others are more likely to share, and thus validate, one's world views. In this manner, interactions with similar others are believed to be positively reinforcing (Byrne, 1971). Indeed, as Struass, Barrick, and Connerly (2001) state, "similar attitudes, for example, are perceived to be rewarding and are therefore viewed in the model as positive reinforcements, whereas dissimilar attitudes function as negative reinforcements" (p. 638).

The proposed relationship between similarity and attraction can be positioned within the larger conceptual framework of self-categorization theory (Turner, 1984; 1985; 1987). This theory, created to explain how and when individuals place themselves and others into social categories, purports that people are more likely to adopt membership of a group if they perceive congruencies in salient qualities between themselves and the other members (e.g., members may be perceived to be similar in age). Thus, a person is more likely to be drawn to, and adopt membership in, a group in which they believe they share relevant attributes with the other members.

Self-categorization theory contends that “our self-concept is based on the social categories we place ourselves in (e.g., age, gender, race)” (Strauss et al., 2001, p. 638). It follows that membership of a group in which one is dissimilar to others will not align with that individual’s sense of self-identity. As Riordan and Shore (1997) state, “to the extent that self-identity is important to a person, the lack of continuity in self-identity due to employment in a...group may prevent the individual from positively evaluating the...group and feeling a great deal of support and commitment toward the group” (p. 344). This is because individuals have a disposition to evaluate the categories that they do not occupy (i.e., categories inconsistent with one’s self-identity) negatively and evaluate the categories that they do occupy positively (Kramer, 1991; Tajfel, 1981; Strauss et al., 2001). Due to these evaluative processes, people are drawn to others, and reinforced by those, who occupy the same categorizations as themselves and deterred from others who do not fit in these categories. For the purposes of the present discussion, the ‘categorization model’ will be used to refer to the perspective that individuals are

attracted to similar others and, as a result, intra-group similarity is beneficial to group functioning.

It would be a gross over-simplification to claim that either of these two competing perspectives can explain all processes and functions that occur within groups. Indeed, as Ely (2004) states, “the link between diversity...and the group’s performance...is neither simple nor direct” (p. 755). However, in large part, intra-group similarity has been found to have a positive effect on “the psychological relationship between the individual and the group (i.e., identification, commitment, cohesion) and affective/evaluative responses to the group” (Knippenberg et al., 2007, p. 207). Among other outcome variables, more similar groups have been found to report higher levels of group attachment (Tsui et al., 1992), communication (Riordan & Shore, 1997), and cooperation (Turner 1982; 1984), better interpersonal relations (Triandis et al., 1994), less turnover and absences (Jackson et al., 1991; Tsui et al., 1992) and less conflict (Pelled, 1996) than comparably diverse groups. As a result, Harrison, Price, and Bell (1998) identified the perspective that intra-group similarity has a positive impact on functioning as “the primary thesis” among diversity researchers (p. 96). Although homogeneous groups may reap the aforementioned benefits, groups with a low degree of similarity may actually outperform more homogeneous groups when tasks require creative solutions or the consideration of multiple perspectives (i.e., perspective taking; Dose, 1999).

From the research reviewed thus far, more heterogeneous groups seem to hold the potential to outperform more homogeneous groups on certain tasks, such as those that require creativity or perspective taking. However, on tasks that do not require a high level of creativity or perspective taking, homogeneous groups will likely function better than

more diverse groups. This is due to the fact that homogeneous groups are likely to report a higher level of cohesion, communication, member satisfaction, and commitment than comparably heterogeneous groups (Tsui et al., 1992). This conclusion provides support for the information processing model as well as the categorization model. However, the question remains, which processes are more applicable to exercise groups?

Although heterogeneous groups may have the potential to outperform more homogeneous groups on some tasks, such as those requiring creativity (Dose, 1999), these benefits (e.g., creativity) are likely limited in their applicability to exercise groups. Instead, processes such as cohesion, member satisfaction, and adherence derived from greater within-group homogeneity seem much more applicable to groups of this kind (Castellani, Ianni, Ricca, Mannucci, & Rotella, 2003; Estabrooks, 2007). Since the majority of evidence from social and organizational psychology suggests that groups composed of similar members tend to report improved interpersonal relationships when compared to members in more diverse groups, the central thesis proposed in this project was that intra-group similarity would be beneficial to the functioning of exercise group members. In this thesis, member functioning was operationalized based on (a) each group member's level of adherence and (b) the level of cohesion reported by each member.

## **1.2 Group-based Exercise Programs**

Dishman (1988) observed that within six months of enrolling in an exercise program one in two individuals will typically withdraw from the program and drop out. As a result, maintaining participant adherence throughout the duration of a program represents one of the greatest challenges faced by applied health researchers and coordinators (Castellani et al., 2003). In an attempt to understand and enhance adherence



to exercise programs many different approaches have been adopted (e.g., Carels et. al, 2008; Marcus et. al, 2007; Napolitano et. al, 2008; Booth, Nowson, & Matters, 2008; Hong, Hughes, & Prohaska, 2008). However, from the perspective of the research designs inherent in these programs, the vast majority of programs can be classified as either individual-, or group-based in nature.

Individual-level exercise programs are most often designed to enable participants to exercise within a personally convenient location, such as the home (e.g., King et al., 2008). Although there is some variability in the types of individual-based programs offered, by definition these programs are undertaken without membership in a formalized exercise group. In contrast, group-based programs typically consist of a collection of participants within communal exercise environments that require them to either (a) perform activities together (e.g., Annesi, 1999; Carron & Spink, 1993; Estabrooks & Carron, 1999a,b), and/or (b) work independently towards the pursuit of a collective goal (e.g., Shapcott et al., 2006).

On average, group-based programs are more cost effective than individual-level interventions (Estabrooks, 2007). In addition, group-based approaches offer the added potential of providing a beneficial social experience (Carron et al., 2005), seem to be preferred by the majority of individuals (Beauchamp, Carron, McCutcheon, & Harper, 2007; Burke, Carron, & Eys, 2006; Heinzelmann & Bagley, 1970; Stephens & Craig, 1990) and, in several prominent meta-analyses have been found to be more effective in supporting exercise adherence than individual-based programs (i.e., Carron, Hausenblas, & Mack, 1996; Dishman & Buckworth, 1996).

### **1.3 Intra-Group Similarity and Adherence**

A large body of research within social and organizational psychology reports that when individuals are acutely similar to the other members of the group, they are more likely to remain a part of that group than when they differ markedly from other group members (e.g., Jackson et al., 1991; Milliken & Martins, 1996; Tsui et al., 1992). As an example, Jackson et al., (1991) reported that members of executive management teams who were similar to their teammates in terms of age, education level attained, college curriculum, and experience outside the industry were more likely to maintain their membership in their work group than those who were dissimilar on the aforementioned variables.

The finding that people are more likely to remain a part of a group when they are similar to the other group members accords with the categorization perspective of intra-group similarity (i.e., similarity is beneficial), and is also consistent with the “primary thesis” (Harrison et al., 1998, p. 96) purported by diversity researchers. In accordance with this evidence, the principal hypothesis proposed in this thesis was that members who perceived that they are similar to the other members of their group would be more likely to adhere to the group-based exercise program than those who perceived a comparably low level of similarity (Hypothesis 1).

### **1.4 Cohesion and Exercise Groups**

Within the exercise psychology literature a considerable amount of research attention has focused on the role of exercise class cohesion. Cohesion is defined as “a dynamic process reflected by 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

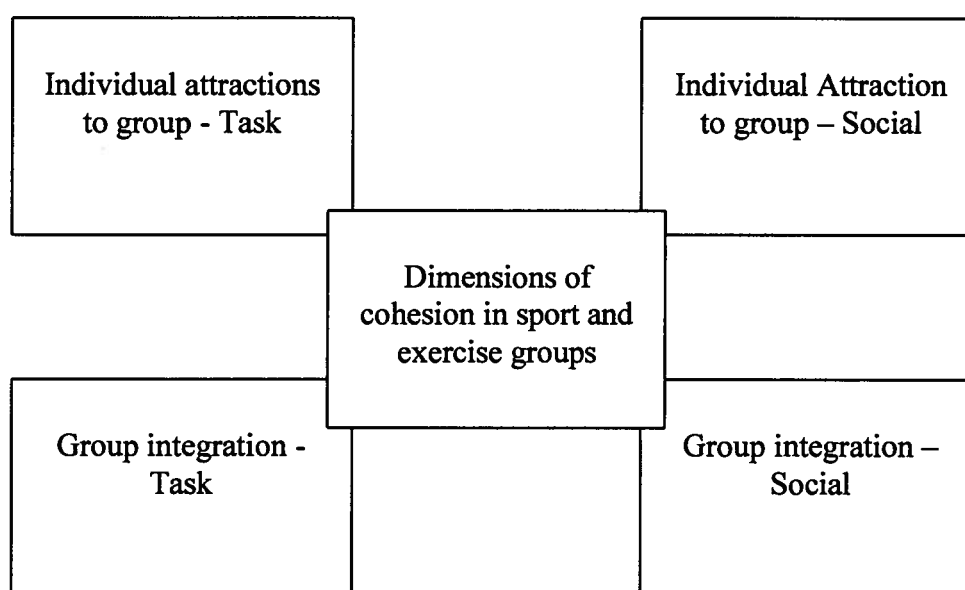
needs” (Carron, Widmeyer, & Brawley, 1988, p. 213). This construct is thought to possess four main characteristics (Carron et al., 2005). First, cohesion is multidimensional in nature as there are multiple factors that may lead a group to remain together and these factors may not necessarily be the same in every group. Second, cohesion is thought to be dynamic and can change as the group develops. Third, cohesion is instrumental in nature insofar as it is related to the reasons for the group’s initial formation. Finally, cohesion also has an affective component. This is because the satiation of member’s affective needs is thought to influence the likelihood that the group will remain together (Carron, Shapcott, & Burke, 2007).

Consistent with these characteristics, the conceptual model of cohesion advanced by Carron et al. (1985) includes a task and social foci, as well as individual and group orientations, thus resulting in a four dimension model. The task focus represents the motivation or desire to achieve the group’s instrumental objectives. The social focus represents the motivation to build and maintain social relationships and activities within the group and among group members. An individual orientation is represented by an individual’s attractions to the group. These attractions represent the personal motivations and feelings about the group that act to attract and retain the member. Finally, the group orientation is represented by members’ perceptions of group integration (Carron et al., 2007).

Four conceptually distinct dimensions of cohesion result when the task and social foci are combined with the attraction and group orientations (see Figure 1). The individual attractions to the group – task dimension (ATG-T) represents each member’s perception of his or her desire to be involved with the group’s task. The individual

attractions to the group – social dimension (ATG-S) represents a member’s perception of the level of social interaction, as well as the degree of social acceptance, they experience in the group. Both group integration dimensions reflect perceptions regarding the degree of unanimity or harmony within the group as a whole. However, the group integration – task dimension (GI-T) conceptualizes this perception around the group’s collective tasks, whereas the group-integration – social (GI-S) dimension does so around social concerns.

**Figure 1 A conceptual model of group cohesion (Adapted from Carron et al., 1985)**



In his recent review of group integration interventions in exercise, Estabrooks (2007) identified cohesion as a “fundamental consideration in physical activity interventions” (p. 143). The significance attached to group cohesion likely stems from the positive relationship that has consistently been found between cohesion and adherence behaviours in exercise groups (e.g., Carron & Spink, 1993; Estabrooks & Carron, 1999a,b). For example, Spink and Carron (1994) found that the ATG-T, GI-T, and GI-S dimensions of cohesion could be used to discriminate program adherers from non-

adherers. In this study a higher score on these dimensions was positively related to the likelihood that the participant would remain in the exercise program. In a similar manner, Spink and Carron (1992) reported that one's level of program adherence related positively to the ATG-T and ATG-S dimensions of cohesion among group-based exercise classes. In a similar vein, Estabrooks and Carron (1999a,b) found a positive relationship between both task and social cohesion and adherence behaviours and, when examining the relationship between cohesion and adherence across multiple studies, Carron et al. (1996) identified a general positive trend between task cohesion and exercise adherence. The positive relationship between cohesion and program adherence in group-based physical activity settings has also been observed within young (e.g., Spink & Carron, 1994), middle-aged (e.g., Annesi, 1999) and older (e.g., Estabrooks & Carron, 1999a,b) adult populations (i.e., across the lifespan).

Although the relationship between group cohesion and program adherence among exercise group members is relatively well established, the specific antecedents, or causes, of cohesion in this setting has received limited attention. In spite of the paucity of research designed to identify the antecedents of group cohesion within exercise settings, considerable attention within social and organizational psychology has sought to identify the sources of cohesion within experimental and work groups. In social and organizational psychology, a strong link has been established between intra-group similarity and cohesion that is largely consistent with the categorization perspective of intra-group similarity (e.g., Harrison et al., 1998; 1998; Jackson et. al, 1991; Knippenberg et al., 2007; Molleman, 2005; Tsui & O'Reilly, 1989; Terborg, Castore, & DeNinno,

1976; Wiersema & Bird, 1993). That is, these studies generally report a positive relationship between the degree of intra-group similarity and group cohesion.

### **1.5 Surface-level and Deep-level Similarity in Groups**

There are multiple ways in which one can characterize similarity within groups (for a review see Harrison & Sin, 2005; Riordan & Wayne, 2008). Much of the past research quantifying intra-group similarity has placed an over-riding emphasis on the physical qualities of group members, particularly with respect to group members' age, ethnicity, and gender makeup (e.g., Colquitt, Noe, & Jackson, 2002; Turban, Dougherty, & Lee, 2002; Tsui et al., 1995). However, psychological variables have also been considered (e.g., Chatman & Flynn, 2001; Harrison et al., 2002; Klein, Conn, Smith, & Sorra, 2001). Furthermore, it has recently been suggested that a more complete understanding of intra-group similarity is likely to be gained by considering the physical *as well as* the psychological composition of groups (Harrison & Sin, 2005). In line with this suggestion, an emerging stream of group-based research has sought to examine both physical *and* psychological similarity through the consideration of a group's degree of surface-level similarity (SLS) and deep-level similarity (DLS; Harrison et al., 1998; Phillips & Loyd, 2006).

Surface-level variables, as defined by Harrison et al. (1998), refer to "overt, biological characteristics that are typically reflected in physical features" (p. 97). Examples of surface-level variables include age, gender, and ethnicity. In comparison, deep-level variables consist of characteristics that are not overtly observable and are usually discovered through extended personal communication. Examples of deep-level variables include attitudes, beliefs, and personal values. Surface-level variables are

thought to be analogous to physical attributes and deep-level variables are thought to be analogous to psychological attributes (Harrison & Sin, 2005).

Harrison and colleagues (1998) conducted a study on the effects of SLS and DLS on group cohesion and social integration in work groups. They found that the group's level of SLS had the strongest effect on group cohesion initially (i.e., early in the stages of group development), with those groups high in SLS reporting higher levels of cohesion when compared to the more surface-level heterogeneous groups. However, as time progressed, the effect of SLS on cohesion greatly decreased. The opposite was true for the groups' level of DLS. Initially, intra-group DLS had little effect on cohesion but, over time, higher levels of DLS were found to positively relate to group cohesion at an increasingly strong degree.

When interpreting the above results, Harrison and colleagues proposed that the pattern between SLS, DLS, cohesion, and time observed occurred as a result of each member's acquisition of knowledge related to their group's deep-level composition. Harrison and colleagues suggested that individuals in recently formed groups may have to rely on surface-level attributes when initially assessing the degree of similarity present within the group (i.e., the deep-level composition of the group is largely unknown at this time). As a result, it is the degree of SLS that influences group cohesion initially following the group's formation. Over time, and as group members get to know each other, they begin to discern the other members' deep-level qualities (attitudes, beliefs, and values). As this information becomes known, the degree of DLS present within the group begins to influence the group's level of cohesion at an increasingly strong degree. Coincidentally, as a function of obtaining information regarding the deep-level

composition of the group, the group's degree of SLS begins to decrease in importance. Once this has occurred, the relationship between SLS and cohesion is thought to diminish to the level of non-existence (i.e., non-significance; Harrison et al., 1998).

The secondary purpose of this thesis was to integrate the above SLS and DLS paradigm within group-based exercise settings in an attempt to better understand some of the social processes that occur among participants in these types of environments. The implementation of this conceptual model, based on surface- and deep-level variables holds great potential as this system may more accurately capture the group- and individual-level characteristics that relate to factors such as cohesion and program adherence.

In this thesis five secondary hypotheses were tested. First, it was hypothesized that the extent to which exercise group members believed that they were similar to other members of the group in terms of surface-level qualities would be a strong positive predictor of the level of cohesion they report initially following the group's formation (Hypothesis 2A) and that perceived DLS would not significantly predict cohesion at this time (Hypothesis 2B). It was also hypothesized that the predictive ability of perceived SLS would decrease in strength over time, as the groups developed (Hypothesis 3A) and that perceived DLS would positively predict cohesion in later stages of group development (Hypothesis 3B). Finally, and in line with the research reviewed thus far, it was hypothesized that group cohesion would positively predict program adherence (Hypothesis 4).

## **1.6 Similarity, Attraction, and Cohesion**

As previously discussed, there is strong evidence to suggest that people are



generally attracted to others that they perceive as being similar to themselves (i.e., Byrne, 1971; Chen & Kenrick, 2002). Indeed, the relationship between similarity and attraction is considered to be of such strength that Byrne and Ramey (1965) refer to this phenomenon as the law of attraction.

Within the group dynamics literature it has been found that similarity among members enhances the level of attraction to the group (Pilkington & Lydon, 1997; Davis, 1984; Royal & Golden, 1981). With respect to deep-level qualities (Harrison et al., 1998), intra-group interpersonal attraction has been found to correlate positively with attitude (Harrison et al., 2002; Lott & Lott, 1965; Singh, Ng, Ong, & Lin, 2008; Singh, Ho, Tan, & Bell, 2007), belief (Sachs, 1975), and value (Hobman, Bordia, & Gallous, 2004; Husian & Kureshi, 1983; Knippenberg & Schippers, 2007; Lee & Duck, 1982; Rokeach, 1970) similarity.

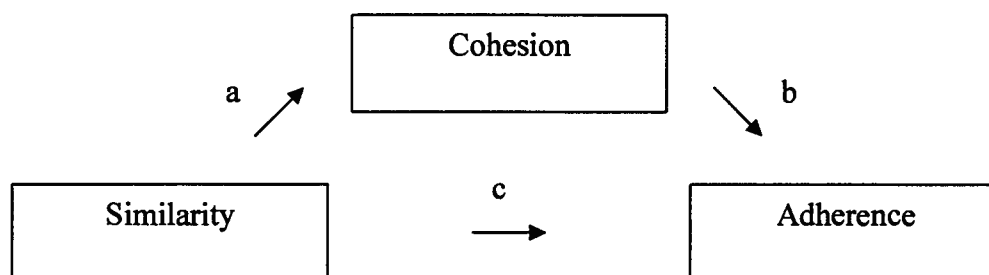
The strong relationship between similarity and attraction is closely mirrored by the relationship between attraction and cohesion within groups. In fact, the latter two constructs share such a close relationship that several models of group cohesion have conceptualized this variable based (sometimes primarily) on the level of attraction to the other group members (e.g., Bovard, 1951; Carron, et al., 2005; Deep, Bass, & Vaughn, 1967; Dimock, 1941; Fiedler, 1954; Klein & Christiansen, 1969; Stokes, 1983; Wilkenson, 2007). As previously stated, cohesion within exercise classes is thought to be composed of a task and social foci as well as individual and group orientations (Estabrooks & Carron, 2000). Accounting for the close relationship between attraction and cohesion, two of the dimensions resulting from this conceptualization of cohesion, ATG-T and ATG-S, make explicit reference to an individual's attraction to the group

(Carron et al., 2007).

To summarize the research reviewed in this section, similarity and attraction share a close, positive relationship. Indeed perceived similarity with respect to attitudes, beliefs, and values (the three types DLS qualities proposed by Harrison et al., 1998) have each been found to relate directly to attraction. The relationship between attraction and cohesion is also close, with current conceptual models (and measures) of cohesion incorporating attraction as a fundamental dimension of cohesion.

As a result of the theoretical relationship between intra-group similarity, cohesion, and adherence it was hypothesized that cohesion would mediate the relationship between the degree of perceived similarity and level of program adherence among participants (Hypothesis 5). This hypothesis stems from the established relationship between similarity and cohesion (as described by Harrison et al., 1998) and cohesion and adherence (e.g., Estabrooks & Carron, 1999a) as well as the relationship between similarity and adherence theoretically proposed in this thesis (see Figure 2).

**Figure 2 Representation of the hypothesized mediated relationship between similarity, cohesion, and adherence**



## **1.7 Assumptions Present in Surface-Level Homogeneous and Heterogeneous Groups**

One of the properties of group membership is that people's sense of 'self' can become influenced by their mere involvement in that group. As a result, members in such social contexts have a propensity to assume that other members share similar attitudes and beliefs as themselves (Allen & Wilder, 1979; Holtz & Miller, 1985; Wilder, 1984). As an example, Allen and Wilder (1979) asked university students to rate their preference for eight pairs of slides of paintings. The participants were then told that they were being assigned to one of two groups, allegedly based on their preference for the paintings. After this assignment the participants were asked to rate a hypothetical member of their group's opinion on topics relevant (e.g., "what color combination do you prefer?") and irrelevant to alleged group placement (e.g., "the national government is too conservative"). In this study, participants expected other group members to hold similar opinions as themselves on all topics presented, regardless of whether the topic was used to determine group placement.

Although Allen and Wilder found an effect stemming solely from group membership it should be noted that participants in their study did *not* get to see, or interact with, the other group members (i.e., these members were hypothetical). When group members do get the chance to interact with each other (and are exposed to their surface-level qualities) the degree of perceived SLS will likely influence perceptions of DLS within the group (Jackson et al., 1991; Levinger & Breedlove, 1966). After all, in the vast majority of normal (i.e., non-experimental) situations only one's surface-level attributes are immediately accessible, even in the absence of social interaction (Zellmer-

Bruhn, Maloney, Bhappu, & Salvador, 2008). As a result, initially, superficial/physical characteristics provide the only basis of information from which one can attempt to determine another person's deep-level qualities (Harrison, et al., 1998). Furthermore, as Phillips and Loyd (2006) suggest, "once a particular surface-level characteristic is made salient, people generally assume that they hold more similar attitudes and beliefs with individuals who share their surface-level characteristics than with people who do not, on topics both relevant and irrelevant to the salient distinction" (p. 146). In line with this suggestion, it has been found that surface-level homogeneous groups generally assume that their members have common deep-level qualities and are often surprised when they find evidence to the contrary (Chen & Kenrick, 2002; Graves & Powell, 1995). Chen and Kenrick (2002) suggest that this surprise greatly increases the likelihood that dissimilar members will eventually leave the group.

This inference of deep-level composition based on surface-level composition has been referred to as the "congruence assumption" (Mannix & Neale, 2005, p. 44). It is characterized by the belief that those group members who have a high level of demographic similarity (as a result of their surface-level attributes) with the respondent also have similar deep-level attributes including attitudes (Jackson et al., 1991), beliefs (Fiske, 2000), values (Elsass & Graves, 1997), educational history (Milliken & Martins, 1996) and past experiences (Pfeffer, 1983). These stereotypes likely permeate given that, in many cases a relationship between surface- and deep-level attributes exists (Harrison et al., 1998; Jackson et al., 1991). For example, age shares a positive relationship with risk-taking propensity (Vroom & Pahl, 1971). Indeed, to a certain extent, all analyses of intra-group demographic similarity treat these observable qualities as indicators of the degree

of DLS present within the group (Knippenberg & Schippers, 2007; Priem, Lyon, & Dess, 1999).

The importance of the congruence assumption becomes reinforced when one considers its relation to the rationale for the similarity-attraction hypothesis. As Byrne (1971) suggests, we are drawn to similar others in an attempt to reaffirm our logic and views of the world (*vis à vis* attitudes, beliefs, and values). These variables may be considered ‘deep’ in nature as they are, for the most part, unobservable. However, given the relationship between many surface-, and deep-level variables, surface-level attributes are often used as proxy indicators for inferences regarding DLS. It is this DLS that is thought to relate to attraction. In other words, following Byrne’s rationale, it is not the surface-level makeup of an individual *per se* that lies at the heart of attraction. Instead it is the level of DLS present that influences attraction which is inferred in the first instance by perceptions of one’s own and others’ surface-level attributes.

In this study two final (tertiary) hypotheses were tested. First, it was hypothesized that group members who initially perceived a high degree of similarity between themselves and the other group members with respect to surface-level qualities would also perceive a high degree of similarity among deep-level qualities early in the group’s development (i.e., before deep-level information is likely known). In other words, a positive correlation was expected between the initial SLS and DLS perceptions (Hypothesis 6).

The second hypothesis concerned the relationship between changes in perceptions of similarity across data collection periods. As previously mentioned, in group settings, members have a tendency to assume that other members of the group will hold similar

attitudes to themselves (e.g., Allen & Wilder, 1979) especially if the group has a homogeneous surface-level composition (Phillips & Loyd, 2006). In line with this finding, Chen and Kenrick (2002) have reported that when this assumption is violated (i.e., attitudes between an individual and other group members are perceived to be notably dissimilar) the level of attraction between dissimilar members decreases. Thus, (regardless of the level of SLS within a group), if a member's expectation of the degree of intra-group DLS is violated (i.e., one's initial perception of deep-level similarity within the group is interpreted as being over-estimated/inflated) a low level of attraction to the group is likely to be experienced by that member. Consequently, it was hypothesized that a lower degree of cohesion would be reported among those members who, over time, perceived reduced levels of DLS within their group (i.e., they perceived less DLS within the group than they initially assumed; Hypothesis 7).

### **1.8 Exercise and Intra-Group Similarity Studies**

As mentioned earlier, a surprisingly limited amount of research has explored the relationship between intra-group similarity, adherence, and cohesion in exercise groups. Recently, Beauchamp et al., (2007) reported that individuals generally display a preference for exercising within groups that are comprised of members of a similar age and a general dislike of exercising with those much younger or older than oneself. In this study participants from across the adult age span were asked to rate their preference for one individual-based, and three group-based exercise contexts. The group-based contexts presented in this study varied solely in the mean age of the members in each hypothetical group. Specifically, participants were asked to rate their preference for exercising in a group comprised mostly of people in their: 20s and 30s, 40s and 50s, or 60s and 70s. In

accordance with Beauchamp et al.'s hypothesis, a preference for group-based contexts composed of members of a similar age as the respondent was identified in all age groups. Also, as the disparity in the age between the hypothetical group members and the participant increased, personal preference for the given group-based context decreased. In a more recent study employing a similar research design, Dunlop and Beauchamp (2008) found that, across the age-spectrum, people reported a greater preference for gender-segregated classes when compared to gender-integrated classes (i.e., males preferred male-only classes, females preferred female-only classes).

Although these two studies did not link these preferences to outcome measures such as cohesion or program adherence, the results reported are none the less consistent with the literature reviewed. Age and gender each represent surface-level qualities. Based on the position forwarded in this thesis, intra-group similarity on each of these variables is predicted to correlate with each member's attraction to the other group members.

The sole study, to date, that has explored the relationships between intra-group similarity, cohesion, and adherence in exercise groups was conducted by Shapcott and colleagues (2006). In this study, personal and group attributes were conceptualized as being either task-related (self-efficacy, level of previous activity, and personal goals) or task-unrelated (ethnicity and gender). Groups of six people completed an eight-week course in which a collectively agreed upon number of miles were to be walked by the group. The authors reported that only similarity in the level of previous physical activity among the group members correlated (positively) with both cohesion and adherence. Thus, the more similar members were in their previous physical activity behaviours, the more cohesive the group was and the higher the level of adherence in the group.

Although only one of the intra-group similarity variables investigated by Shapcott and colleagues (2006) was found to relate to cohesion and adherence, several dissimilarities between their investigation and the proposed study should be noted. First, the ‘groups’ in the Shapcott et al. study differed from the groups proposed for inclusion in the current study with respect to the manner in which the prescribed activities were performed. While each of the walking groups in Shapcott et al.’s study were invited to specify a group goal (i.e., miles walked collectively), participants did not have to pursue and accomplish this goal together. Instead, each member was responsible for a certain proportion of the total amount of miles to be walked and was free to complete this activity with others or *by* themselves based on their own preference. Under these conditions, the degree of intra-group similarity may have had a less pronounced effect on adherence, given that if a particular member did not feel as though he or she was similar to the other group members, this member could still complete the required activity without interacting with the rest of the group.

Second, the indices of intra-group similarity used by Shapcott et al. were objective (i.e., non-perceptual) in nature whereas the measures of intra-group similarity used in the current study were subjective (perceptual) in nature (this point is discussed more thoroughly below). Recent research (Riordan & Wayne, 2008) has found that perceptual measures of intra-group similarity have a stronger relationship with certain outcome measures when compared to more objective measures. Indeed, perceptions of reality have been argued to hold a dominant influence on outcome measures such as attitudes and involvement (Lawrence, 1997). It follows that perceptions of certain intra-group similarities may have influenced cohesion and adherence within Shapcott and



colleagues' groups; however, the researchers would have been unable to document these effects given the type of measures they employed.

Finally, no attention was paid by Shapcott et al., to the effect that time may have played in the relationship between similarity, cohesion, and adherence. Given the strong foundation within organizational psychology suggesting that the relationship between intra-group similarity and cohesion is dynamic in nature (e.g., Harrison et al., 1998; Turban et al., 2002) it remains possible that Shapcott and colleagues failed to identify the relationship between these variables in its entirety.

In summary, the study proposed in this thesis attempts to apply a framework from social and organizational psychology to understand some of the determinants of cohesion and adherence within a group-based exercise setting. Given that many differences exist between work and exercise groups several integrative issues require consideration. These issues are outlined below.

### **1.9 Can Exercise Groups Really be Considered 'Groups?'**

Needless to say, the question of whether an exercise group can be considered a true group will ultimately come down to how one defines a group. One universally accepted characteristic of a group is that it must be composed of two or more individuals (Carron et al., 2005). Building on this requisite, Alcock et al., (1998) suggested that in order for a collection of individuals to be considered a group the members must also be aware of each other, influence one another, share common goals, engage in ongoing relationships, and perceive themselves as belonging to the group. Typical exercise groups will likely meet these conditions (though to varying degrees). However, it has also been argued that a collection of individuals must share a common fate in order to be

considered as true group (Fielder, 1967). This last criterion potentially poses a serious challenge to recognizing exercise groups as true groups.

Although each member of a given exercise group may share a common goal (e.g., to lose weight or increase muscle mass) one's progress to that goal is largely independent of the other members of the group (in any given exercise group some members will achieve their goal, others will not). It is unlikely that members who attain their personal goals would consider the program a failure if all other individuals in the group did not reach their own goals. For that reason the characteristic of common fate does not seem to be met by typical exercise classes.

Given that exercise groups do not meet the qualification specified above, Spink and Carron (1992) likened exercise groups to what Tajfel and Turner (1979) considered minimal groups. Specifically, Spink and Carron (1992) noted, "these are social categorizations that develop because humans possess a need to enhance and protect their self-esteem. Because of this need to enhance and protect self-esteem, people have a strong motivation to develop social bonds and social identities from their memberships in collectives" (p. 9).

Several parallels can be drawn between this perspective and the rationale for the similarity-attraction hypothesis proposed by Byrne (1971; i.e., the reinforcement of world views). Regardless, even though exercise groups would fail to meet the qualification suggested by Fielder (1967) they nonetheless may still be considered a type of group. In addition, Burke et al. (2005) have argued that exercise groups may be considered to be groups on statistical grounds. This argument is supported by the finding that exercise groups show agreement regarding the degree of cohesion present within the group and a

divergence on this construct between groups.

### **1.10 How is Intra-Group Similarity Measured within Exercise Groups?**

In the majority of previous research that has attempted to quantify interpersonal similarity within groups one of two approaches has typically been adopted. The first approach requires that group members complete measures that assess their individual-level attributes (Mohammed & Angell, 2004). For example, participants' age, ethnicity, satisfaction with supervision (e.g., Harrison et al, 1998), level of previous physical activity, self-efficacy (e.g., Shapcott et. al, 2006) or other variables relevant to the research questions posed may be assessed. With these data, indices of variability among the group members on each of these variables are then calculated. Typically these indices of variability provide an indication of the degree of 'groupness' (e.g., intra-cluster correlation; see Klein & Kozlowski, 2000), or a measure of disparity between each member and the rest of the group (e.g., Euclidean distance scores; see Harrison & Sin, 2005; Riordan & Wayne, 2008). Examples of previous applications of these indices include the quantification of a group's personality composition (e.g., Barry & Stewart, 1997) and age diversity (e.g., Tsui et al., 1992). Among diversity researchers these measures are referred to as 'objective' or 'actual' assessments of intra-group similarity (Harrison & Sin, 2005). This operationalization is used in recognition of the fact that the characteristics of others in the "group represent part of the objective contextual environment in which an individual operates" (Riordan & Wayne, 2008, p. 566).

A second approach used by researchers interested in assessing intra-group similarity is to measure each group member's perception of the level of similarity within the group. Perceived intra-group similarity is conceptualized as the degree to which an

individual believes that members of the group are similar to himself or herself (Knippenberg & Schippers, 2007; Strauss et al., 2001). Several researchers have operationalized perceptual similarity with a high level of specificity by stating that perceived similarity must be assessed in reference to a specific (Crutchfield, Spake, D'Souza, & Morgan, 2003) or relevant (Riordan & Wayne, 2008) attribute (e.g., age, gender, attitudes). However, general (hereafter referred to as 'global') perceptions of similarity have also been investigated (e.g., Hobman, Bordia, & Gollus, 2003; Hobman et al., 2004).

Perhaps unsurprisingly, actual (or objective) and perceptual (or subjective) measures of similarity have been argued to represent different facets of the intra-group similarity construct (Riordan, 2000; Riordan & Wayne, 2008; Zellmer-Bruhn et al., 2008) and several reasons have been given for considering the study of perceptual similarity beyond actual similarity. By definition, measures of actual similarity fail to account for the salience and importance that each member ascribes to certain dissimilarities that may or may not exist objectively in the group (Hobman et al., 2003). Specifically, the respondent is prevented from considering all the attributes and qualities that they deem relevant to their conceptualization of their group's degree of similarity (Hobman et al., 2004). Indeed as Randel and Earley (2009) state, "a purely 'objective' assessment may fail to capture how team members perceive similarity within the team, how each team member views multiple similarity characteristics on that team, and how these characteristics are relied on to varying degrees in describing others on the team" (p. 807).

Perceptions of similarity have been found to correlate with subsequent behavior (Hensley, 1981) and these perceptions have often been found to relate more strongly with

outcome measures than measures of actual similarity (Hobman et al., 2003; Montoya et al., 2008; Orpen, 1984; Riordan & Wayne, 2008; Strauss et al., 2001; Turban & Jones, 1988). For example, when comparing the predictive strength of perceptual and non-perceptual (i.e., objective) measures, Riordan and Wayne (2008) reported that the perceptual measures were “more often related to and accounted for more variance in the outcomes” (p. 582) than comparable objective measures. This likely stems from the fact that, as Ferris and Judge (1991) suggest, “people react on the bases of perceptions of reality, not reality *per se*” (p. 464). It follows that the level of similarity within a group that one perceives and the actual level of intra-group similarity may not necessarily relate (Dose, 1999; Randel & Earley, 2009) and an emphasis on perceptual, as opposed to actual, similarity may be justified.

Although perceptual similarity is distinct from actual similarity and, in many cases may be a more significant predictor of salient outcome variables, there is a relative dearth of research examining the effects of perceived similarity in diversity research (Harrison et al., 2002; Riordan & Wayne, 2008; Zellmer-Bruhn et al., 2008). As a result, considering perceptions of intra-group similarity has been identified as an important area of future research (Harrison & Sin, 2005; Riordan 2000; Riordan & Wayne, 2008). Indeed, exploring perceptions of intra-group similarity has been recognized as a “necessary step towards a more complete understanding of how diversity influences team outcomes” (Zellmer-Bruhn et al., 2008, p. 52). For these reasons, perceptual, as opposed to actual measures of similarity were employed in this study.

Parenthetically, if one were to attempt to describe the variance in deep-level qualities within the group, using objective measures of intra-group similarity, all

specific/salient qualities would have to be measured. Within the current study, this would be less of a problem for surface-level variables, given that there are a relatively few readily apparent surface-level characteristics that are theoretically tenable (e.g., age, ethnicity, gender, physical appearance). However, when attempting to conceptualize the potential range of deep-level qualities of interest there are countless attitudes, beliefs, and values that could be considered equally valid for study inclusion (e.g., political affiliation, environment, views on human rights, welfare legislation, death penalty, legalization of drugs, gay and lesbian rights; see Chen & Kenrick, 2002, for an extensive list). The benefit of measuring similarity ‘perceptually’ is that perceived similarity with respect to *general* attitudes, beliefs, and values can be assessed. Indeed, by utilizing a general/omnibus measure, participants can consider those attitudes, beliefs, and values that are personally salient for them. The limitation of measuring similarity in this way is that specific information is not provided with respect to which attitudes, beliefs, and values the respondent is basing their rating of similarity on (Riordan & Wayne, 2008). Provided that a relationship between these (general) deep-level qualities and exercise adherence is identified in this study, future researchers may subsequently look to explore which *specific* attitudes, beliefs, and values contribute to this relationship.

Consistent with the recommendations of Riordan and Wayne (2008), the perceptual content of the questionnaire used in this research included multiple items to assess perceived surface-level (e.g., age, gender, ethnicity, physical appearance) and deep-level (values, attitudes, beliefs, life experiences) similarity. In addition, and also in accordance with the recommendations of Riordan and Wayne, these perceptions were collected repeatedly (discussed in the procedure subsection), and related to objective

outcome measures (i.e., the objective measure of adherence described in the next section).

## **2 METHOD**

### **2.1 Participant Recruitment**

There were four criteria that potential exercise courses had to meet to be considered for inclusion in this study. The first criterion was that participant pre-registration for the entire course was required (i.e., the course was described as ‘registered’ in nature). Thus, ‘drop-in’ classes were excluded from this study as these types of programs require no such commitment. This criterion was adopted in an attempt to ensure that the same group (i.e., the same group members) met on a weekly basis. Several of the hypotheses proposed in this study dealt with the developmental pattern of cohesion and adherence as a function of group composition. If this composition changed every class (i.e., the same members were not expected to be present every class) then these hypotheses could not be tested. Also, drop-in classes frequently do not commence and conclude within a single term as these types of programs often run on an on-going basis throughout the year. As a result, it would not be possible to study these groups from their inception.

The second criterion for study inclusion was that the activities performed in the studied courses were physical in nature and required some corporal exertion. Many leisure and community centres have moved away from the term ‘exercise’ courses and have chosen to adopt the more inclusive term of ‘health and wellness’ courses. The latter term is more inclusive in that it allows for some attention to be given to one’s mental, as opposed to strictly physical, health. Although many of the courses involved in this investigation were classified as health and wellness, instead of exercise, courses, all courses included in this study met the second requirement for inclusion. In other words,



although some of the courses included in this study did allot time for the advancement of psychological wellness they also dedicated a substantive amount of time to physical exercise and exertion.

The third requirement was that, in each course, classes were scheduled to meet once per week. Estabrooks and Carron (1999a) have suggested that perceptions of cohesion may be influenced by the frequency of contact. This third criterion was introduced in an attempt to control for any differences in the social interaction that may occur between weekly and more frequently meeting classes (i.e., two or more times per week).

The final criterion for study inclusion was that potential courses had to be at least eight weeks in length. This was necessary to ensure that data could be collected at all three time points (i.e., during the second, fifth, and eighth week of the course). In addition, this length is consistent with past research on the effects of diversity on cohesion and adherence in exercise groups (i.e., Shapcott et al., 2006).

The population of interest in this study comprised participants registered in group-based exercise courses meeting the criteria listed above. In an attempt to accurately represent this diverse population, a list of all courses offered at community centres in Vancouver, West Vancouver, North Vancouver, and Richmond meeting the above criteria was first compiled. This was done by consulting each centre's recreation guide for the 'winter term' (January through March) of 2009. Several fitness centres in the Greater Vancouver Area were also contacted regarding the group-based exercise courses they offered. Unfortunately, the vast majority of these fitness centres offered group-based programs solely on a drop-in basis. As a result, community, as opposed to fitness, centres

were targeted for study inclusion.

Upon receiving ethical approval from the University of British Columbia's Behavioral Research Ethics Board ([www.orsil.ubc.ca/ethics/behavioral/b-fomrs.htm](http://www.orsil.ubc.ca/ethics/behavioral/b-fomrs.htm); see Appendix A,B) program coordinators at potential sites of data collection were sent a letter of initial contact (See Appendix C) via email. This letter briefly explained the purpose of the project and stated that the study's principal investigator would be in touch via telephone to discuss the possibility of their centre's participation. A list of the centre's courses that would be appropriate for study inclusion was also included in the body of this email.

Within one week of sending this email the study's principal investigator contacted each program coordinator via telephone. The intention of this phone call was to further explain the purpose of the study, address any questions or concerns the coordinator may have had, and to determine if the program coordinator would be amenable to participating in this study. If the coordinator agreed to participate, a request for the contact information (i.e., email addresses) of the course instructors working at the coordinator's centre was made. A letter of initial contact specifically designed for the course instructors (see Appendix D) was then sent via email to each of the instructors ( $N = 22$ ) at the respective community centres. This letter briefly explained the study's purpose and procedures, made the request for each instructor to keep accurate attendance records, and informed the instructor that they would receive a \$30.00 honorarium (per course) in exchange for their participation in this study.

## **2.2 Participants**

Participants were recruited from 46 gender-integrated exercise courses (from nine

community centres) within the Greater Vancouver Area. Based on the course description provided in each community centre's program guide, 48% ( $n = 22$ ) of the included courses were categorized as 'yoga' courses, 40% of the included courses ( $n = 17$ ) were categorized as 'pilates' courses, and 15% of the included courses ( $n = 7$ ) were categorized as 'strength or conditioning courses.' The average class size of these courses was 13.43 people ( $SD = 5.59$ ). This number was determined through the consultation of each course's registry. 85% of the individuals registered in these courses were female and 15% were male. In total, 402 individuals participated in this study. 84.8% of participants were female and 15.2 % were male (note that the sample characteristics closely matched the population characteristics for gender). The average age of respondents was 47.49 years ( $SD = 14.68$ ; see Table 1 for demographic description of the sample).

**Table 1 Descriptive Statistics**

Variable	Males	Females
<i>N</i>	60	336
Age (years)	49.15 (13.30)	47.14 (14.89)
Canadian (%)	66.70	65.20
Height (inches)	70.67 (2.43)	64.91 (2.82)
Weight (pounds)	179.24 (23.36)	139.15 (23.28)
Body Mass Index	25.10 (3.04)	23.25 (3.46)
Regularly Active (%)	21.67	18.45

Note: Standard deviations provided in brackets

## 2.3 Measures

Activity Status. Participants were asked to report the types of physical activity they engaged in (e.g., cycling, running) during the two weeks prior to completing the questionnaire. Once these activities had been identified they were prompted to provide the number of times they engaged in each activity as well as the duration of these bouts. Finally, participants were asked to specify the intensity level of each activity. This intensity was indexed based on the changes in breathing and heart rate as experienced by the participant. Four levels of intensity were specified: (a) no, (b) small, (c) moderate, and (d) large increases in heart rate and breathing. Consistent with past research (Beauchamp et al., 2007; Caspersen, Christiansen, & Pollard, 1986; Young, King, & Oka, 1996; Wilcox, King, Brassington, & Ahn, 1999) participants were classified as ‘active’ if they reported engaging in moderate or vigorous (i.e., moderate to large increases in heart rate and breathing) activities for a duration of at least 20 minutes three or more times per week. This status was determined using the first questionnaire that each participant completed (for a small number of participants activity status was determined using data collected from the second or third data collection period).

Adherence. Program adherence was assessed through two different, complementary methods. The first method was instructor-mediated, the second method was self-reported in nature. Instructors participating in this study were asked to record class attendance over the first eight weeks of the course on a log sheet (see Appendix E). In addition, during the last data collection period participants were asked to report the number of classes that they had missed since the program began. This number was then subtracted from the total number of classes held (eight) to arrive at a measure of the

number of classes the participants believed they had attended. Following the protocol of previous research (e.g., Annesi, 1999; Eastabrooks & Carron, 1999 a,b) both measures of adherence were converted from raw scores based the number of classes attended to the percentage of classes attended. This percentage was calculated by dividing the number of classes that the participant attended by the total number of classes offered. The instructor-mediated and self-report measures were found to correlate significantly ( $r = .63, p < .001$ ).

Cohesion. The Physical Activity Group Environment Questionnaire (PAGEQ; Estabrooks & Carron, 2000) was used to measure cohesion within the exercise groups included in this study. This measure is multidimensional in nature and has been found to have an acceptable level of content, concurrent, factorial and predictive validity (Estabrooks & Carron, 2000). Consistent with past research employing this measure (e.g., Estabrooks & Carron, 2000), each item of the PAGEQ was assessed using a 9 point Likert-type scale with responses ranging from ‘strongly disagree’ (1) to ‘strongly agree’ (9). Subscale scores were created by averaging the appropriate item responses. This resulted in scores ranging from one to nine for each of this measure’s four subscales.

Demographic Variables. Participants were asked to report their gender, age, current occupation, level of education achieved, height and weight. Each participant’s Body Mass Index (BMI) was calculated by dividing the square of his or her self-reported height ( $m^2$ ) by self-reported weight (kgs). A measure of ethnicity was also included. This measure included a list of the 21 most frequently identified ethnicities/nationalities for Vancouver

([www.12.statcan.ca/english/census01/products/highlight/ETO/Table1.cfm?Lang=E&T=5](http://www.12.statcan.ca/english/census01/products/highlight/ETO/Table1.cfm?Lang=E&T=5))

01&Gv=2&GID=933) and asked respondents to place a checkmark beside each ethnicity they identified with.

Similarity. Consistent with past research (e.g., Phillips & Loyd, 2006; Phillips, Northcraft, & Neale, 2006), on a nine point Likert-type scale (ranging from strongly disagree to strongly agree), participants were asked to rate the degree to which they felt that the other members of their group were similar to them on five surface-level and five deep-level attributes (e.g., In my exercise class, I believe that group members are similar to me in terms of age) It should be noted that this approach is markedly different than assessing the degree to which participants perceived all members of the group to be similar.

To highlight the above this distinction, consider a group with five homogeneous members and one radically divergent member. If this diverse member was asked to rate the degree to which members of the group are similar, he would most likely report that members of the group are indeed very similar. After all, five of the six members of the group would be very similar. However, if this same person was asked to rate the degree to which he felt that members of the group were similar to him a different response would likely emerge given his relation to the rest of the group. Thus, the two measures of perceptual similarity described above assess two distinct aspects of the perceived degree of similarity within a group. It follows that the measurement of perceptual similarity used in this study displays an *egocentrically relational* characteristic. This is because the approach used taps into respondents' perceptions of themselves (which may be considered to be egocentric) in relation to the other members of the group (which, by definition is relational in nature).

Perceptions of each surface-level and deep-level attribute were assessed using a single-item methodology. Although use of single-item measures may potentially compromise reliability, Riordan and Wayne (2008) suggest that “asking individuals about their similarity in demographic characteristics is similar to asking them about their own demographic characteristics” (p. 572). Single item measures regarding demographic characteristics are extensively used in diversity research and have been found to be reliable (e.g., Crampton & Wagner, 1994). It follows that concerns regarding the reliability of the single-item perceptual measures can be largely dispelled.

Harrison et al., (1998) identify age, gender, and ethnicity (all three being surface-level qualities) as the three most common attributes studied among diversity researchers. As a result, measures of perceived similarity with respect to the above three attributes were assessed in this study. The additional surface-level perceptions included in this study were in reference to physical appearance and physical conditioning similarity. Fiske and Taylor (1991) suggest that the salience of member characteristics vary across different contexts and situations. The final two surface-level perceptions were included due to the physical nature of the activities performed in group-based exercise settings, and due to the likelihood of physical appearance and condition being highly relevant when these activities are performed.

In contrast to the strong theoretical and empirical foundation upon which to identify salient surface-level qualities, limited guidance was available when attempting to create a comparable list of deep-level attributes (Harrison et al., 1998). This is likely a result of the fact that, conceivably, hundreds of deep-level attributes could be considered (e.g., Chen & Kenrick, 2002; Meglino, Ravlin, & Adkins, 1989). Given the definition of

‘deep-level’ attributes provided by Harrison et al. perceptions of similarity with regard to attitudes, personal values, and personal beliefs were included in this study. Also, consistent with Milliken and Martin (1996), educational similarity was classified as a deep-level attribute and included as the fourth deep-level perception assessed in this study. The final deep-level perception included in this study was in reference to previous life experiences. It was believed that these five perceptions would provide a general sense of the degree to which individuals considered that they were similar to other group members on a ‘deep’ (i.e., non-observable/psychological) level.

Two ‘global’ measures of perceived similarity were also included in this study. These measures were global in the sense that they each assessed a general perception of inter-personal similarity without reference to a specific attribute or trait. The first global measure (hereafter referred to as the ‘overall’ measure of perceived similarity; OPS) simply asked participants to provide an overall rating of their perceived inter-personal similarity with other group members on the same nine-point Likert-type scale described above. The second measure of global similarity asked participants to report the number of group members they felt “very similar” to as well as the perceived size of their group. A perceived proportion of similar others variable (hereafter referred to as the measure of perceived ‘proportional’ similarity; PPS) was calculated by dividing the total number of individuals the participant felt very similar to by the perceived group size.

The OPS variable required consideration of all members present within the group (including those that were perceived as dissimilar or incongruent) and was informed by the notion of prototypicality and depersonalized attraction (Hogg, 1992; 1993; Hogg, Abrams, Otten, & Hinkle, 2004; Turner, 1987). According to Hogg et al. (2004),



members of a group tend to conceive a prototypical group member as a result of a group's composition and task. This prototype is thought to embody all positive categorizations present within the group. As an example, in this case of exercise classes, the prototypical member may be a physically fit and active person. In any manner, individuals are thought to index their attraction to the group based on the degree to which group members accord with this prototype. This attraction is depersonalized in so far as it is indexed based on reference to an aggregated conception of all members within the group, and not any one specific person within the group. The notion of prototypicality and depersonalized attraction relate to the OPS measure since this prototype is created as a result of the composition of the group in its entirety.

In comparison, the construction of the PPS variable was informed by the belief that individuals would be attracted to similar others – especially *within* groups (see Byrne, 1971). In other words, individuals may still be attracted to, and retain membership in, a group composed of dissimilar others provided they can identify with at least some of the other members of the group. From this perspective, an overall perception of similarity between the respondent and all (or most) group members would not be required for increased functioning, especially if the task is not excessively interdependent in nature.

## **2.4 Procedure**

A research assistant was present at the end of the first class of each of the 46 courses included in this study. At this time, the research assistant solicited the group members' attention and requested a couple of minutes of their time. This research assistant then informed the class about the general purpose (to explore some of the factors that influence adherence to these types of programs) and procedure of the study. With

respect to the procedures associated with this study, each class was told that a research assistant would be present at the end of the second, fifth, and eighth class with a very brief, two page questionnaire. Group members were instructed to approach the research assistant and request a blank questionnaire if they wished to participate in this study. The research assistant also stressed that participation in this study was entirely voluntary and that the potential participants would not endure any negative repercussions as a result of declining the offer to participate or withdrawing from this study. Following this verbal description of the study, the group members were provided with a written description of the study, in the form of an information letter (see Appendix F).

Consistent with the information provided after the first class, a research assistant was present at the end of the second class of each of the 46 courses included in this study. This research assistant once again solicited the attention of the group members at this time, reminded them about the study, and requested that class members fill out a blank questionnaire if they wished to participate. This questionnaire (see Appendix G) included the perceptual measures of similarity outlined above as well as the PAGEQ. In addition, several demographic measures were included in this document. In accordance with the procedures approved by the University of British Columbia's Behavioral Research Ethics Board, written consent on the part of the participants was not required. Instead, consent was demonstrated through each member's choice to participate. This process was repeated after the fifth and eighth class of the course, with the only difference being that the questionnaire administered after the eighth class was slightly modified (see Appendix H). Specifically, this updated questionnaire no longer requested information regarding each participant's ethnicity and instead included a self-reported measure of program

adherence.

### 3 RESULTS

#### 3.1 Response Rate

All course instructors participating in this study were asked to keep accurate and up-to-date attendance records for each of their class members. Unfortunately, while many instructors were very diligent in this regard, many others neglected to keep any record of course attendance at all. Of the 22 instructors participating in this study eight (36.36%) failed to maintain an accurate attendance log. These eight instructors taught a total of 13 of the 46 classes studied. Thus, the instructor-mediated attendance records were available for 71.74% ( $n = 33$ ) of the classes included in this study. As a result, instructor-mediated attendance records were available for 68.40% ( $n = 275$ ) of the sample and unavailable for the remaining 31.60% ( $n = 127$ ).

Participation rates were calculated for each course and within each data collection period. This was done by dividing the number of registered group members who completed the questionnaire during each data collection period by the total number of registered group members in attendance on that collection period (i.e., on the second, fifth, and eighth class). As a result of this method, response rates were only tabulated for those courses in which instructor-mediated attendance records were kept. During the first data collection period (after the second class) the average group response rate was 77.59% (SD = 18.20%). The average group response rate for the second (after the fifth class) and third (after the eighth class) data collection periods were 60.67% (SD = 22.58%) and 71.49% (SD = 20.18%) respectively. The low response rate observed during the second data collection period is addressed below.

### **3.2 Analysis**

Prior to the main analyses, the data were screened for any errors that may have occurred during imputation using SPSS Frequencies and Descriptives. If an anomaly was identified then the original source (i.e., the completed questionnaire) was consulted. Once this was done all values were found to reside within the appropriate range for each variable. In addition, each variable's mean and standard deviation was deemed plausible.

Next, the data were once again screened to identify those participants who completed a questionnaire in two or more different courses. Six such participants were identified. Each of these six participants completed the questionnaire in two different courses. As a result, one of the two entries for these participants was removed at random (via coin flip) resulting in the sample of 402 participants.

Following these case deletions, data corresponding to all of the study variables were examined using SPSS Missing Values Analysis (MVA). It is generally assumed that if the percentage of cases with missing values for a given variable is greater than or equal to five percent then the pattern of missing responses for the given variable should be examined (Tabachnick & Fidell, 2007). The pattern of missing data for a given variable can be classified in one of three ways: missing completely at random (MCAR), missing at random (MAR), and not missing at random (NMAR). As the name suggests, when the data are MCAR it can not be predicted by any of the other variables in the data set. In other words, there is no relationship between the pattern of response/non-response for the given variable and the other variables (including independent and dependent variables). As Tabachnick and Fidell (2007) state, this is "the best of all possible worlds, if data must be missing" (p. 63). If data are found to be MCAR then the researcher is justified in

analyzing the data in a routine way as concerns regarding the pattern of response/non-response can largely be dispelled. When data are MAR the pattern of missing values can be predicted from at least one of the other independent variables in the data set (as a result this term is really a “misnomer”; Scheffer, 2002, p. 153). Finally, when the data is NMAR the pattern of response/non-response is related to the dependent variable(s) (Scheffer, 1997). Several options exist to deal with data that are classified as MAR or NMAR (for a review see Scheffer, 1997; Tabachnick & Fidell, 2007) however, if researchers wish to be conservative in their analyses they can simply delete or remove the data that are MAR or NMAR. This was the approach adopted in this study.

Responses for each data collection period were examined separately to identify the pattern of missing responses. SPSS MVA provides a test to determine whether one’s data are MCAR or MAR/NMAR with a significant result indicating that the data are either MAR or NMAR. The pattern of missing data from the first,  $\chi^2(301) = 316.98, p = .252$ , and third,  $\chi^2(218) = 195.56, p = .860$ , collection periods (collected during the second and eighth week of the course) was found to be MCAR. In contrast, the pattern of missing data from the second collection period (i.e., the fifth week of the course) was found to be MAR/NMAR,  $\chi^2(198) = 270.128, p < .001$ . Subsequently, data from this collection period was removed from all subsequent analyses.

The data were then screened for potential univariate outliers using SPSS Descriptives (to record the standard scores of each variable in the database) and Explore (to identify the five highest and lowest standard scores for each variable). Six standard scores in excess of 3.29 were identified. Since these outliers were not a result of a data imputation error and one can expect a few standard scores in excess of 3.29 in a large

sample (Tabachnick & Fidell, 2007), these cases were left in the data file.

Scores for each of the four subscale measures of the PAGEQ were then calculated (following the protocol outlined by Estabrooks and Carron, 2000) for the first and last data collection periods and added to the data file. All four of these measures at each of the time points (after class 2 and class 8; hereafter referred to as the first, and second data collection periods respectively) were found to have an acceptable level of reliability (Cronbach's  $\alpha \geq .87$ ). The percentage of the group each participant felt "very similar" to at both time points was then calculated by dividing the number of people the respondent felt very similar to by the respondent's perceived group size.

Consistent with past research on intra-group similarity (e.g., Harrison et al., 2002; Turban et al., 2002), the possibility of reducing the surface-level and deep-level perceptual measures of similarity into broader factors was then explored. Harrison and Sin (2005) stressed caution when aggregating individual measures of specific similarities into composite measures or 'factors.' They contend that "diversity is meaningful [only] when it is more narrowly defined or dimensionalized" (p. 199). This caution likely stems from the fact that intra-group similarity factors composed of a combination of attributes that have no conceptual or theoretical relationship are quite difficult to interpret (Riordan & Wayne, 2008) and the haphazard construction of these types of factors runs the risk of masking the effects of each of the individual perceptions included (Harrison & Sin, 2005). In an attempt to address these reservations, four criteria were adopted to evaluate the validity of the potential intra-group similarity factors being considered. First, the perceptions included in each factor were required to be significantly inter-correlated at both time points (i.e., the relationship among components was stable across time points).

Second, and perhaps most importantly, a conceptual/theoretical argument for the composition of each factor was required (thus ensuring interpretability). Third, each model was required to fit the data adequately. Finally, the factors that met the proceeding criteria were required to have an acceptable level of scale reliability at both time points.

In this study, five single-item measures were used to assess perceptions of similarity in relation to surface-level qualities (i.e., age, gender, physical condition, physical appearance, and ethnicity). Five items were also used to assess perceptions of similarity in relation to deep-level qualities (i.e., attitudes, education, personal values, personal beliefs, and previous life experience). As a result, the possibility of creating composite ‘surface-level’ and ‘deep-level’ measures based on the combination of applicable single-item measures was deemed appropriate. An acceptable case-to-variable ratio (Floyd & Widaman, 1995) was achieved as a result of the sample size at the two time points, and the number of individual-item measures included in each a priori factor.

The first criteria that these two potential factors had to satisfy was that each of the five items composing each factor were related (significantly) at both time points. Both of the potential factors (surface and deep) satisfied this requirement when analyzing the data from the first data collection period (see Table 2). All five of the single-item deep-level perceptual measures were also found to correlate significantly with each other among the data collected during the final time period (see Table 3). However, when analyzing the single-item surface-level perceptions collected during the last time period a different pattern emerged. Among these items, the ethnicity and gender measures did not correlate significantly with each of the other three measures. As a result, the possibility of creating a ‘surface-level’ factor composed of all five of the single-item surface-level perceptions



was compromised. Attention was then focused on testing the validity of the five item 'deep-level' factor (hereafter referred to as the DLS factor) and three item 'surface-level' subset factor composed of perceptions regarding member's age, physical condition, and physical appearance similarity.

**Table 2 Intercorrelations Among SLS and DLS Perceptions (Time 1)**

Sim.	Dimension	Mean	SD	Min.	Max.	1	2	3	4	5	6	7	8	9	10
SLS															
1.	Age	4.91	2.11	1	9	—	.51**	.41**	.25**	.25**	.27**	.29**	.34**	.40**	.31**
2.	Appearance	5.13	1.87	1	9	—	—	.62**	.20**	.30**	.50**	.54**	.51**	.53**	.64**
3.	Condition	5.14	1.78	1	8	—	—	—	.23**	.30*	.37**	.50**	.39**	.56**	.44**
4.	Gender	6.65	2.56	1	9	—	—	—	—	.21**	.33**	.13	.21**	.09	.09
5.	Ethnic	5.45	2.24	1	9	—	—	—	—	—	.12	.31**	.26**	.30**	.26**
DLS															
6.	Attitude	6.37	1.76	2	9	—	—	—	—	—	—	.45**	.54**	.32**	.61**
7.	Belief	5.06	1.49	2	8	—	—	—	—	—	—	—	.44**	.65**	.64*
8.	Education	5.51	1.52	1	9	—	—	—	—	—	—	—	—	.50**	.64**
9.	Life Exp.	4.54	1.52	1	8	—	—	—	—	—	—	—	—	—	.48**
10.	Value	5.61	1.54	1	9	—	—	—	—	—	—	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$

**Table 3 Intercorrelations Among SLS and DLS Perceptions (Time 2)**

Sim. Dimension	Mean	SD	Min.	Max.	1	2	3	4	5	6	7	8	9	10
SLS														
1. Age	4.98	2.03	1	9	—	.36**	.44**	.13	.24**	.30**	.18*	.33**	.37**	.18**
2. Appearance	5.23	1.77	1	8	—	—	.73**	.16*	.37**	.52**	.53**	.47**	.55**	.59**
3. Condition	5.20	1.72	1	9	—	—	—	.15*	.38**	.46	.50**	.44**	.63**	.47**
4. Gender	6.65	2.48	1	9	—	—	—	—	.17*	.30**	.14	.25**	.04	.18
5. Ethnic	5.73	2.14	1	9	—	—	—	—	—	.33**	.44**	.36**	.53**	.38**
DLS														
6. Attitude	6.13	1.57	1	9	—	—	—	—	—	—	.48**	.62**	.38**	.65**
7. Belief	5.09	1.49	1	8	—	—	—	—	—	—	—	.55**	.67**	.73*
8. Education	5.52	1.55	1	9	—	—	—	—	—	—	—	—	.53**	.70**
9. Life Exp.	4.79	1.59	1	8	—	—	—	—	—	—	—	—	—	.56**
10. Value	5.52	1.56	1	9	—	—	—	—	—	—	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$

The second criterion that these two potential factors were required to satisfy was that a theoretical or conceptual rationale could be given for their construction. Attention is first turned to the proposed surface-level factor, which included perceptions of age, physical appearance, and physical conditioning similarity. A distinguishing feature of the three perceptions proposed for inclusion in this factor is that these three perceptions relate to the functional ability of exercise group members. 'Functional ability' is, of course, context dependent, and in the current discussion, functional ability refers to the capacity of group members to perform the exercises prescribed within that setting.

The consideration of a factor comprised of perceived age, physical appearance, and physical condition similarity also allows for a more select focus on the effects of perceived ethnicity and gender similarity. This select focus is consistent with past research (e.g., Graves & Powell, 1995; Hogg et al., 2004; Turban et al., 2002; Tsui et al., 1995; Tsui, Porter, & Egan, 2002; Zellmer-Bruhn et al., 2008) and may be justified due to the particular salience of these two attributes when forming impressions of others (Riordan & Shore, 1997; Brickson, 2000; Stangor, Lynch, Duan, & Clas, 1992). Indeed as Randel and Earley (2009) state, "gender and race are the characteristics most relied on in forming perceptions of others" (p. 808). As a result of the seeming importance of gender and ethnicity when categorizing others, and the rationale provided for a surface-level factor composed of age, appearance, and condition similarity (hereafter referred to as the 'physical functionality factor'), dividing the surface-level perceptions into a three-item factor and two single-item measures was deemed justifiable.

With respect to the DLS factor, all five items were conceptualized as collectively reflecting each participant's belief that he or she is similar to other members of in terms

of deep-level characteristics. These items were not conceived with a multidimensional conceptualization in mind (i.e., reflecting different facets of DLS), and indeed this unidimensional conceptualization of DLS is consistent with approaches adopted in previous diversity research (e.g., Harrison et al., 2002; Turban et al., 2002). In short, the creation of a DLS factor was deemed to be theoretically justified.

Potential factors were analyzed using SPSS Factor, and were extracted via the generalized least squares method. This method of extraction was chosen due to the fact that it weights variables based on their importance to the solution. This importance is determined based on the amount of shared variance accounted for by each variable (Tabachnick & Fidell, 2007). Since the amount of shared, as opposed to total, variance accounted for was of primary interest, this method of extraction was deemed justified. The eigenvalue-greater-than-one criteria (see Tabachnick & Fidell, 2007), Scree plot, total amount of common variance accounted for, and factor loadings were consulted as indices of each model's fit. When analyzing the deep-level perceptual data from the first data collection period, one factor was clearly identified through both the eigenvalue-greater-than-one criteria and Scree test. This factor accounted for 51.65% of the common variance among the five deep-level items and each item was found to load onto the factor (Tabachnick & Fidell, 2007; factor loadings ranged from .61 to .87). The structure of this DLS factor remained comparable during the final data collection period. Once again employing the eigenvalue-greater-than-one criteria, a single factor was clearly identified during this time period. This was confirmed after consulting this DLS factor's Scree plot. This factor accounted for 57.59% of the common variance among the five deep-level items and each of these items was found to load onto the factor (factor loadings ranged

from .66 to .89). This potential factor was determined to have an acceptable level of fit at both time points as a result of the criteria explored.

Next, the physical functionality factor was explored, using SPSS Factor once more. Within the data collected during the initial time period one factor was clearly identified following the eigenvalue-greater-than-one criteria and the Scree test. This factor accounted for 53.40% of the common variance among the three surface-level items and each of these items was found to load onto the factor (factor loadings ranged from .59 to .85). This pattern was replicated in the data collected during the last time period. Once again, one factor was clearly identified following the eigenvalue-greater-than-one criteria and consultation of the model's Scree plot. This factor accounted for 57.20% of the common variance among the three surface-level items, with each item loading on the a priori factor (factor loadings ranged from .51 to .90). Given these indices of fit at both time points, this unidimensional operationalization of 'physical functionality' was deemed acceptable.

To satisfy the final criteria, the scale reliabilities of each factor at each time point were explored using SPSS Reliability Analysis. Among the data collected during the first time point, the DLS factor and the surface-level functionality factor were both found to have an acceptable level of reliability (Cronbach's Alpha = .83 and .76 respectively). This trend continued during the last data collection period with the DLS factor (Cronbach's Alpha = .87) and the surface-level functionality factor (Cronbach's Alpha = .76) each demonstrating an acceptable level of reliability.

### **3.3 Individual-Level, or Group-Level Analyses?**

An issue that requires addressing is whether the data should be analyzed at the individual-level or group-level. By analyzing the data at the individual-level, each participant's responses are free to vary within each group and direct (although not causal) links between individual-level independent and dependent measures can be made. However, given that these data were collected within groups, the choice to analyze these data at the individual-level will ultimately, and perhaps unavoidably, be accompanied by questions regarding the appropriateness of treating 'nested' data as independent. In comparison, a group-level analysis would address the nested nature of the data. However, it would also restrict the variability of responses within each group and may obscure the relationship between the individual-level independent and outcome measures (Bickle, 2007; Cohen, Cohen, West, & Aiken, 2003).

Given that each type of analysis has its associated benefits and drawbacks, it is perhaps unsurprising that debate regarding whether the individual or the group should be the unit of analysis has occurred for some time (e.g., Allport, 1924). Carron and Spink (1995) suggest that this debate has been sustained in part because no definite answer as to which level of analysis should be preferred exists. Instead, these researchers suggest that the determination of the appropriate level of analysis "depends on the nature of the question" (p. 91) posed.

In the current study the research questions primarily corresponded to individual perceptions (e.g., perceived similarity) and individual-level outcomes (e.g., adherence behaviours). Since individual perceptions and individual behaviours were the critical consideration in this study, analysis at the individual-level was deemed justified. This

rationale is consistent with that of Carron and Spink (1995) as well past research exploring cohesion and adherence in exercise groups (e.g., Anessi, 1999; Carron & Spink, 1993; 1995; Shapcott et al., 2006; Estabrooks & Carron, 1999a,b) and perceptions of similarity in work groups (e.g., Crutchfeild, Spake, D'Souza, & Morgan, 2003; Hobman et al., 2003; Piasentin & Chapman, 2007).

### **3.4 Consideration of Group Size**

In their recent article, Randel and Earley (2009) suggest that the size of the group or team may influence the salience of team members' diversity characteristics. Specifically, these researchers state that in large groups or teams it may be harder to arrive at a perception regarding intra-group similarity. This is due to the fact that it may be more difficult for members to identify group-composition in larger groups. It follows that the possibility accounting for group size in the subsequent analyses is worthy of serious consideration.

Group size may indeed have an effect on perceptions of similarity, cohesion, and adherence behaviours in exercise groups. However it would be imprudent to blindly incorporate group size as a control variable in all subsequent analyses before first unpacking some of the terms described above. In order to assess the appropriateness of accounting for group size when analyzing the present data 'small', 'medium', and 'large' groups were first defined. The proportion of groups within the current data set that fell within each of these three classifications was then determined and a decision regarding the inclusion of a group size variable was made.

Carron and Spink (1995) define 'small' groups as those groups with less than 20 participants. In addition, Carron et al., (1990) define 'large' groups as those groups



ranging between 32 and 46 members in size. It follows that ‘medium’ classes may be considered to be those classes ranging between 20 and 31 participants in size. Turning to the data on hand, 44 of the 46 groups (95.65% of all groups; 89.64% of all individual-level data) were ‘small’ in size. Given the relatively small proportion of groups that were not ‘small’ in size it was determined unnecessary to control for group size in the subsequent analyses. This approach was consistent with past research exploring cohesion and adherence behaviours among exercise group participants (e.g., Anessi, 1999; Carron & Spink, 1993; 1995; Shapcott et al., 2006; Estabrooks & Carron, 1999a,b).

### **3.5 Global Similarity and Adherence**

In spite of the fact that members’ perceptions regarding their degree of global similarity with the other group members were collected during both time points, only data from time 1 were analysed in relation to the adherence measures employed in this study. Consistent with person perception theory (Allport, 1954) and attribution theory (Shaver, 1975), initial perceptions are considered to influence future behaviours (in this case, adherence behaviours). That is, global similarity was hypothesized to be a theoretical antecedent of adherence behaviours. In addition, initial perceptions are known to be quite “tenacious” (Zellmer-Bruhn et al., 2008, p. 46) as these perceptions have a much stronger influence on subsequent behaviours than later perceptions, even if later perceptions run counter to those made earlier (Zellmer-Bruhn et al., 2008). It follows that a focus on the relationship between initial perceptions of global similarity and adherence within the current study is justified on both theoretical and empirical grounds.

A correlation matrix including OPS, PPS (both calculated from data derived from time 1), and the two measures of adherence was then created (see Table 4). As is evident

from this table, PPS correlated with the instructor-mediated,  $r = .21$   $p = .007$ , and self-report adherence data,  $r = .31$ ,  $p < .001$ . In comparison, OPS did not correlate significantly with either measure of adherence.

**Table 4 Intercorrelations Among Global Measures of Perceptual Similarity and Adherence**

	Mean	SD	Min.	Max.	1	2	3	4
1. Overall Perception of Similarity (OPS)	5.42	1.66	1	9	—	.52**	.09	.14
2. Perceived Proportional Similarity (PPS)	40.65%	27.18%	0	1.0	—	—	.21*	.31**
3. Instructor-Mediated Adherence Data	74.75%	20.90%	0	1.0	—	—	—	.62**
4. Self-Reported Adherence Data	86.15%	13.06%	.43	1.0	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$

When the self-reported adherence data were regressed onto these two global measures of perceived similarity a significant equation resulted,  $Adj. R^2 = .09$ ,  $F(2,124) = 6.78$ ,  $p = .002$ . However, only PPS contributed significantly to this equation,  $\beta = .318$ ,  $t = 3.35$ ,  $p = .001$ . A similar result was obtained when the instructor-mediated adherence measures were regressed onto these two global measures of perceived similarity. This equation was found to account for a significant portion of the variability in the instructor-mediated data,  $Adj. R^2 = .04$ ,  $F(2,169) = 4.07$ ,  $p = .019$ . Once again, only PPS contributed significantly to this equation,  $\beta = .231$ ,  $t = 2.70$ ,  $p = .008$ . The significant regression equations provided support for Hypothesis 1. However, the non-significant contribution of OPS to these equations ran counter to the predictions made. Thus, partial support for Hypothesis 1 was attained.

### **3.6 Surface- and Deep-Level Perceptual Similarity and Cohesion**

Time 1. Table 5 lists the descriptive statistics for, and the bivariate correlations among, perceptions of similarity and cohesion at time 1. Data from scores derived from the four cohesion subscales were each regressed onto the gender, ethnicity, physical functionality, and DLS variables. When ATG-T was regressed onto these similarity variables the equation was significant,  $Adj. R^2 = .12$ ,  $F(4,258) = 10.28$ ,  $p < .001$ , with the perception of gender similarity,  $\beta = .18$ ,  $t = 2.96$ ,  $p = .003$ , and the DLS factor,  $\beta = .260$ ,  $t = 3.45$ ,  $p = .001$ , contributing significantly to this equation. ATG-S was then regressed onto the deep-level and three SLS variables. This equation accounted for a significant portion of the variability in ATG-S,  $Adj. R^2 = .09$ ,  $F(4,258) = 7.09$ ,  $p < .001$ , with the physical functionality factor contributing significantly to this equation,  $\beta = .278$ ,  $t = 3.54$ ,  $p < .001$ . Next, scores derived from the GI-T subscale were regressed onto the same four

similarity variables. A significant result was once again found,  $Adj. R^2 = .12$ ,  $F(4,257) = 9.90$ ,  $p < .001$ , with the DLS factor contributing significantly to this equation,  $\beta = .309$ ,  $t = 4.03$ ,  $p < .001$ . Finally, the GI-S factor was regressed onto the four similarity variables, and again this equation accounted for a significant portion of the variability in GI-S,  $R^2 = .05$ ,  $Adj. R^2 = .03$ ,  $F(4,255) = 3.174$ ,  $p = .014$ , with the physical functionality factor significantly contributing to this equation,  $\beta = .193$ ,  $t = 2.38$ ,  $p = .018$ . Hypothesis 2A proposed that cohesion would be predicted by SLS at time 1. Three of the four elements of cohesion were predicted by SLS variables at this time. Thus, partial support for Hypothesis 2A was attained. In comparison, Hypothesis 2B proposed that cohesion would not be predicted by DLS at time 1. Although two of the four cohesion elements were not predicted by DLS at this time, the remaining two elements were. As a result, partial support for Hypothesis 2B was attained.

**Table 5 Intercorrelations Among SLS and DLS Perceptions and Cohesion (Time 1)**

	Mean	SD	Min.	Max.	1	2	3	4	5	6	7	8
1. Gender Similarity	6.65	2.56	1	9	—	.21**	.29**	.25**	.25**	.06	.19**	.06
2. Ethnic Similarity	5.45	2.24	1	9	—	—	.34**	.33**	.23**	.11	.14*	.15*
3. Physical Functionality Factor	5.01	1.65	1	9	—	—	—	.57**	.19**	.29**	.25**	.24**
4. DLS Factor	5.62	1.41	1	9	—	—	—	—	.34**	.30**	.39**	.11
5. ATG-T	7.87	1.23	1	9	—	—	—	—	—	.24**	.41**	.05
6. ATG-S	4.56	2.01	1	9	—	—	—	—	—	—	.63**	.63**
7. GI-T	5.77	1.81	1	9	—	—	—	—	—	—	—	.46**
8. GI-S	3.21	1.91	1	9	—	—	—	—	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$

Time 2. Table 6 lists the descriptive statistics for, and the bivariate correlations among, perceptions of similarity and cohesion at time 2. Each of the four cohesion factors were once again regressed onto the deep-level and three surface-level variables. When ATG-T was regressed onto these four independent variables the equation was significant,  $Adj. R^2 = .04$ ,  $F(4,178) = 2.98$ ,  $p = .020$ . However, none of the four independent variables contributed significantly to this equation. The ATG-S factor was then regressed onto the same four independent variables. This equation was also significant,  $Adj. R^2 = .22$ ,  $F(4,178) = 14.15$ ,  $p < .001$  with the physical functionality factor,  $\beta = .361$ ,  $t = 4.40$ ,  $p < .001$ , and the DLS factor,  $\beta = .205$ ,  $t = 2.39$ ,  $p = .018$ , contributing significantly to its predictive value. Next, GI-T was regressed onto the deep-level and three surface-level variables. This equation was significant,  $Adj. R^2 = .25$ ,  $F(4,176) = 16.15$ ,  $p < .001$ , with the physical functionality factor,  $\beta = .296$ ,  $t = 3.65$ ,  $p < .001$ , and the DLS factor,  $\beta = .300$ ,  $t = 3.53$ ,  $p = .001$ , contributing significantly to its predictive value. Finally, the GI-S factor was regressed onto the four similarity variables. This equation was also significant,  $Adj. R^2 = .13$ ,  $F(4,176) = 7.57$ ,  $p < .001$ , with the physical functionality factor contributing significantly to the predictive value of this equation,  $\beta = .370$ ,  $t = 4.23$ ,  $p < .001$ .

**Table 6 Intercorrelations Among SLS and DLS Perceptions and Cohesion (Time 2)**

	Mean	SD	Min.	Max.	1	2	3	4	5	6	7	8
1. Gender Similarity	6.65	2.48	1	9	—	.13	.18**	.23**	.14	-.02	.08	.03
2. Ethnic Similarity	6.10	5.57	1	9	—	—	.16*	.28**	.06	.07	.11	.06
3. Physical Functionality Factor	5.08	1.55	1	9	—	—	—	.56**	.18**	.41**	.43**	.37**
4. DLS Factor	5.51	1.37	1	8	—	—	—	—	.17*	.37**	.44**	.22**
5. ATG-T	7.90	1.11	1	9	—	—	—	—	—	.19*	.38**	.15*
6. ATG-S	4.25	1.93	1	9	—	—	—	—	—	—	.62**	.74**
7. GI-T	5.95	1.79	1	9	—	—	—	—	—	—	—	.57**
8. GI-S	3.37	1.98	1	9	—	—	—	—	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$



Hypothesis 3A proposed that cohesion would no longer be predicted by SLS at time 2. This hypothesis was not supported as all four of the cohesion elements were predicted by SLS during this time period. In contrast, Hypothesis 3B proposed that cohesion would be predicted by DLS at time 2. Two of the four elements of cohesion were predicted by DLS at this time. Thus, partial support for Hypothesis 3B was attained.

### **3.7 Cohesion and Adherence**

Table 7 lists the descriptive statistics for, and the bivariate correlations among, the cohesion and adherence variables for both time points. Although measures of cohesion were administered repeatedly (i.e., during each data collection period; see methods section) no predictions regarding these later-administered measures of cohesion and adherence were made. This is because (in a similar manner to initial perceptions of global similarity) cohesion is understood to be a theoretical antecedent of many outcome variables, including adherence. In accordance with this conceptual understanding, researchers have traditionally focused on measures of cohesion that (temporally) precede outcome measures (e.g., Carron & Spink, 1993; Carron et al., 1988; Estabrooks & Carron, 2000; Spink & Carron, 1992). In an attempt to ensure that the results of the current study would be comparable to relevant past research, no attention was given to the relationship between perceptions of cohesion and past adherence behaviours (i.e., relating perceptions of cohesion at the end of a course/program to the adherence in the program) in this study.

**Table 7 Intercorrelations Among Cohesion and Adherence**

	Mean	SD	Min.	Max.	1	2	3	4	5	6
1. ATG-T	7.87	1.23	1	9	—	.24**	.41**	.05	.15*	.06
2. ATG-S	4.56	2.01	1	9	—	—	.61**	.63**	.05	.10
3. GI-T	5.77	1.81	1	9	—	—	—	.46**	.07	-.01
4. GI-S	3.21	1.91	1	9	—	—	—	—	.07	.07
5. Instructor-Mediated Adherence	74.75%	20.90%	0	1.0	—	—	—	—	—	.62**
6. Self-Reported Adherence	86.15%	13.06%	.43	1.0	—	—	—	—	—	—

Note: \*  $p < .05$ , \*\*  $p < .01$

The two measures of adherence employed in this study were each regressed onto the data derived from the four cohesion subscales. When the instructor-mediated adherence data were regressed onto these four variables a non-significant equation resulted,  $Adj. R^2 = .02$ ,  $F(4,205) = 1.91$ ,  $p = .111$ . A similar (i.e., a non-significant) result was found when the self-reported adherence data were regressed onto these four cohesion variables,  $Adj. R^2 = .003$ ,  $F(4,138) = 1.09$ ,  $p = .363$ . Given these non-significant regression equations, Hypothesis 4 (linking cohesion to adherence) was rejected.

### **3.8 Test of Mediation**

In order to test for mediation a significant relationship between the independent and dependent variable must first be established. Baron and Kenny (1986) state that a variable functions as a mediator when it meets the following three conditions: first, variations in the presumed mediator (cohesion) are accounted for by variations in the independent variable (similarity; see path 'a' in Figure 2). Second, variations in the mediator variable are statistically associated with variations in the dependent variable (adherence; see path 'b' in Figure 2). Finally, when paths 'a' and 'b' are held constant the relationship between the independent and dependent variable becomes non-significant (path 'c' in Figure 2). In cases where the relationship between the independent and dependent variable is reduced but does not become non-significant this is taken as evidence of partial mediation, as other mediating factors may also exist.

Since neither equation in which a measure of adherence was regressed onto the four cohesion factors was significant, all hypothesized mediation paths were precluded. As a result Hypothesis 5 was rejected.

### **3.9 Assumption of Deep-level Similarity and Cohesion**

In order to explore the relationship between initial perceptions of SLS and DLS a correlation matrix composed of the deep-level and three surface-level variables was created (see Table 8). As a result of the prediction that initial perceptions of SLS and DLS would be correlated, data from the first data collection period were used in the subsequent analysis. Specifically, the DLS factor correlated significantly with the physical functionality factor,  $r = .57, p < .001$ , as well as the perceptions of gender,  $r = .25, p < .001$ , and ethnicity,  $r = .33, p < .001$ , similarity.

**Table 8 Intercorrelations Among SLS and DLS Perceptions (Time 1)**

Similarity Dimension	Mean	SD	Min.	Max.	1	2	3	4
1. Gender	6.65	2.56	1	9	—	.21**	.29**	.25**
2. Ethnic	5.54	2.24	1	9	—	—	.34**	.33**
3. Physical Functionality Factor	5.01	1.65	1	9	—	—	—	.57**
4. DLS Factor	5.62	1.41	1	9	—	—	—	—

Note: \* $p < .05$ , \*\*  $p < .01$

The DLS factor was then regressed onto these three surface-level perceptions. This equation was significant, *Adj. R*<sup>2</sup> = .42, *F*(3,262) = 64.71, *p* < .001, with the physical functionality factor,  $\beta = .587$ , *t* = 11.54, *p* < .001, and ethnicity similarity,  $\beta = .119$ , *t* = 2.39, *p* = .018, contributing significantly to its predictive value. This significant equation was taken as support of Hypothesis 6.

Consistent with past research exploring the development of perceptions across multiple time points (e.g., Polzer, Milton, & Swann, 2002), a change score variable was created by subtracting each participant's DLS factor value for the first data collection period from their reported value during the last data collection period. Thus, a positive value on this new variable signified an increase in one's perception of the degree of DLS between oneself and the rest of the group whereas a negative value signified a decrease in one's perception of the degree of this similarity.

A correlation matrix was then created to explore the relationship between changes in perceptions of DLS and the cohesion variables reported during the last data collection period (see Table 9). Changes in one's score on the DLS factor correlated significantly with ATG-S, *r* = .18, *p* = .040, and GI-S, *r* = .24, *p* = .005. In contrast, this DLS change score did not correlate significantly with ATG-T, *r* = .002, *p* = .977, or GI-T, *r* = .024, *p* = .775. When the DLS change score was regressed onto these four elements of cohesion a significant equation resulted, *Adj. R*<sup>2</sup> = .05, *F*(4,134) = 4.56, *p* = .038, with GI-S contributing significantly to this equation,  $\beta = .317$ , *t* = 2.16, *p* = .033. Given this significant equation and the mixture of significant and non-significant intercorrelations, partial support for Hypothesis 7 was attained.

**Table 9 Intercorrelations Among DLS Factor Change Score and Cohesion**

	Mean	SD	Min.	Max.	1	2	3	4	5
1. Change in Deep-Level Factor	-.12	1.35	-4.40	4.40	—	.002	.18*	.024	.24**
2. ATG-T (week 8)	7.90	1.11	1	9	—	—	.19*	.38**	.15*
3. ATG-S (week 8)	4.25	1.94	1	9	—	—	—	.61**	.73**
4. GI-T (week 8)	5.95	1.79	1	9	—	—	—	—	.57**
5. GI-S (week 8)	3.37	1.98	1	9	—	—	—	—	—

Note: \* $p < .05$ , \*\* $p < .01$

## **4 DISCUSSION**

This section begins with a discussion of each of the hypotheses tested in this study. This is followed by a general discussion of the thesis findings. During this general discussion the broad objectives and aims of this thesis are revisited, limitations are acknowledged, and suggestions for future researchers are made.

### **4.1 Hypothesis 1**

Exercise psychologists place a great deal of importance on the notion of program adherence (see Carron et al., 1996; Dishman & Buckworth, 1996). Indeed, the success of a given program is often judged based on its reported level of adherence. Within the fields of social and organizational psychology a literature has emerged suggesting that similar group members are more likely to remain a part of the group than comparably dissimilar members (e.g., Jackson et al., 1991; Milliken & Martins, 1996; Tsui et al., 1992). Combining (a) the importance of adherence within exercise settings with (b) the relevant work on similarity and sustained group membership conducted in the domains of social and organizational psychology, the primary hypothesis examined in this study was that a participant's perceived level of similarity between him or herself and the other group members would positively relate to that participant's level of program adherence.

This primary hypothesis was tested by relating the two 'global' measures of perceived similarity (i.e., OPS and PPS variables) to measures of adherence. The OPS (overall perception of similarity) measure simply asked each respondent to rate how similar they felt they were to the other members of the group. This question was intended to represent an overall assessment of the degree of perceived similarity between the participant and all other group members. In comparison, the second measure of global



similarity required participants to report the number of members they felt they were very similar to as well as the perceived size of their group. These two values (number of very similar others, reported group size) were used to calculate the PPS (perceived proportional similarity) variable.

In this study, the PPS variable was found to correlate significantly with the instructor-mediated, and self-reported, adherence data. In comparison, the correlations between OPS and these two measures of adherence did not reach the level of statistical significance. In addition, when the instructor-mediated adherence data were regressed onto OPS and PPS only the latter independent variable significantly contributed to the predictive value of the resulting equation. A similar pattern emerged when the self-reported adherence data were regressed onto OPS and PPS. Once again, only the PPS variable significantly contributed to this equation. Thus, the PPS variable was a much stronger predictor of adherence behaviours when compared to the OPS variable. Since one of the two global measures of perceived similarity (PPS) predicted adherence, partial support for the primary hypothesis proposed in this study was attained.

The importance of considering the proportion of similar others in a group (as opposed to the overall level of perceived similarity) accords with a phenomenon highlighted by Riordan and Shore (1997). These researchers brought attention to the fact that “research has indicated that as the proportion of individuals who possess a particular characteristic (e.g., female) grows smaller, people who possess the minority characteristic will become increasingly self-aware of their social identity” (p. 343). It follows that members who perceive a low proportion of similar others in the group may be markedly more aware of their dissimilarity than members who perceive a medium or high degree of

PPS within their group. Consistent with the categorization perspective of diversity, this lack of identification with a significant portion of one's group members may be detrimental to adherence behaviours. That is, there may be a causal relationship between one's level of PPS and adherence behaviours within group-based exercise settings. This statement is made cautiously (i.e., may be as opposed to is) given the observational (i.e., non-experimental) nature of the study design.

#### **4.2 Hypotheses 2 and 3**

The secondary aim of this study was to apply the taxonomy of intra-group similarity proposed by Harrison et al., (1998) to the study of cohesion among exercise groups. As discussed in the introduction, Harrison and colleagues conducted a study of the relationships between SLS, DLS, cohesion, and time in work groups. These researchers reported that the degree of SLS within groups (based on the observable traits and attributes of group members) had a strong, positive relationship with cohesion initially following group formation. As time progressed, the relationship between SLS and cohesion decreased to the level of non-significance. The opposite was true for the group's degree of DLS (based on the non-observable or psychological traits and attributes of the group members; Harrison & Sin, 2005): initially, the group's degree of DLS had a non-significant relationship with cohesion. However, over time the level of DLS within the group was found to positively relate to the group's cohesion at an increasingly strong degree.

It was hypothesized that the relationships between SLS, DLS, cohesion, and time observed in work groups by Harrison et al. (1998) would also be present among exercise groups. In other words, it was hypothesized that perceptions of SLS would positively

relate to cohesion initially (Hypothesis 2A) and only initially (Hypothesis 3A) and that perceptions of DLS would positively relate to cohesion during later data collection periods (Hypothesis 3B) and only during these later data collection periods (Hypothesis 2B) among exercise group members.

As highlighted in the results section, three of the four cohesion elements were predicted by SLS at time 1. Also, two of the four cohesion elements were predicted by DLS at time 2. Thus, partial support for the relationships between SLS, DLS, cohesion, and time proposed in Hypotheses 2 and 3 was attained. These results speak to the importance of considering perceptions of the surface-level and deep-level composition of the group and time when attempting to explain the level of cohesion present in a given exercise class (and at a given time). Although support for the proposed relationships was evident, this support was not absolute. Two findings observed ran contrary to the predictions made in Hypotheses 2 and 3. These findings are discussed below.

During time 1 (and contrary to Hypothesis 2B), two of the four elements of cohesion were predicted by perceptions DLS. This unpredicted finding may be a result of the congruence assumption (see Hypothesis 6). Specifically, members may have instantly developed a firm perception of the deep-level composition of the group (and a comparably strong perception of the degree of DLS in the group) based on the surface-level composition of the group. This perception (or, rather the similarity of perceptions regarding the level of SLS and DLS in the group) may have influenced the results reported during time 1.

The second unpredicted finding pertains to the data collected during time 2. During this time period (and contrary to Hypothesis 3A), all four of the cohesion

elements were predicted by a SLS variable. A possible explanation as to why this DLS variable was not the primary predictor of cohesion at time 2 can be gleaned by returning to the Harrison et al. (1998) paper. It is important to note that, although 'time' was measured by these researchers in this study, the theoretical variable of interest for these researchers was 'information transmission'. As Harrison et al. (1998) stated,

“Although time is the variable we examined, the fundamental medium is information. Demographic factors are often a poor surrogate for the deeper-level information people need to make accurate judgments about similarity of attitudes among group members. Time merely allows more information to be conveyed. Indeed, it might be more appropriate to think of the richness of interactions as the conduit of information exchange” (p. 104).

Indeed, if the participants in this study did not have sufficient time to interact with each other accurate insight into the level of DLS in the group would be quite limited. Following Harrison et al.'s rationale for why DLS predicts cohesion (as a result of the acquisition of accurate knowledge relating to the deep-level composition of the group) this lack of information acquisition, due to the relatively short nature of the exercise courses involved in this study, may have hindered the predictive power of DLS.

In retrospect, perhaps eight weeks was not long enough to record the potential relationships between SLS, DLS, cohesion, and time. At the end of this eight week term, members may have had yet to discover the actual deep-level composition of the group. Although, studies that have look at this relationship in the workplace have employed a similar time frame (e.g., Harrison et al., 1998), the groups explored in these studies have typically met much more frequently than once a week. It remains possible that, if the

length of the current study was increased, with courses longer in duration, DLS would have eventually usurped the predictive value of SLS.

#### **4.3 Hypothesis 4**

Due to the relationship between cohesion and adherence within exercise groups reported in previous research (e.g., Annesi, 1999; Estabrooks & Carron, 1999a,b; 2000) it was hypothesized that cohesion would positively relate to adherence behaviours in this sample. Although one of the cohesion factors (ATG-T) significantly correlated with the instructor mediated adherence data, when this adherence data were regressed on all four cohesion dimensions the resulting equation was non-significant. A similar result was found when the self-reported adherence data were regressed onto these four elements of cohesion. That is, this equation was non-significant. Due to the non-significance of these two equations, Hypothesis 4 was rejected.

#### **4.4 Hypothesis 5**

As Barron and Kenny (1986) state, one of the requisites for mediation is that “variations in the mediator significantly account for variations in the dependent variable” (p. 1176). Since, the hypothesized mediator (cohesion) failed to account for variations in the dependent variable, Hypothesis 5 was rejected. The rejection of Hypotheses 4 and 5 runs contrary to much of the published work exploring the relationship between cohesion and adherence among exercise group members (e.g. Annesi, 1999; Carron, et al., 2007; Carron et al., 1988; Estabrooks & Carron, 2000). This discrepancy is addressed in the general discussion.

#### **4.5 Hypotheses 6 and 7**

People have a tendency to infer a group's deep-level composition based on the surface-level attributes of the group members when this deep-level information is unknown (Harrison et al., 1998; Phillips & Loyd, 2006). As a result, it was hypothesized that this assumption of congruence between SLS and DLS would be evident during the first data collection period (i.e., before a substantial amount of information regarding the deep-level composition of the group would likely be known). At time 1, perceptions of DLS were found to correlate (positively) with all three measures of SLS. In addition, when this omnibus perception of DLS was regressed onto these three SLS variables the equation was significant. Thus, full support of Hypothesis 6 was attained.

The final hypothesis proposed in this study was that changes in perceptions of DLS would be related to the scores of the four cohesion subscales collected during the last data collection period. Partial support for this hypothesis was attained as cohesion accounted for a significant portion of the variance in the DLS change score. Specifically, change in the perceived level of DLS was found to relate to scores derived from the two social cohesion subscales at time 2. However, only partial support can be given for this hypothesis as the DLS change score did not relate to the associated scores derived from the two task cohesion subscales.

It appears as though there is a relationship between changes in the perceived level of DLS and cohesion (or certain elements of cohesion). However, this relationship is far from uniform. As mentioned in the introduction, realizing that one has overestimated the degree of DLS in the group is theorized to greatly increase the likelihood that one will

withdrawal from the group (Chen & Kenrick, 2002). The relationship between changes in DLS, cohesion, and withdrawal represents an appropriate focus of future study.

#### **4.6 General Discussion**

This study contributes to the existing literature in four ways. First, it reinforces the categorization perspective on intra-group similarity. Second, it provides added support to the increasingly prevalent argument that diversity researchers should consider perceptual (or ‘subjective’) diversity in more depth. Third, it identifies a possible antecedent of cohesion among exercise group participants. Finally, it contributes to the exercise psychology literature by linking perceptions of similarity to adherence behaviours while simultaneously calling into question the appropriateness of exercise psychologists’ continued emphasis on group cohesion. Each of these contributions are discussed below.

##### **4.6.1 Is Intra-Group Similarity Beneficial to Member Functioning in Exercise Groups?**

In this study the “primary thesis” (Harrison et al., 1998, p. 96) proposed by diversity researchers was tested within the population of exercise group members. In its simplest and most direct form, this thesis purports that intra-group similarity is beneficial to group functioning. This proposition is largely informed by self-categorization theory (Turner, 1984; 1985; 1987) and the similarity-attraction hypothesis (Byrne, 1971). These theories indicate that (a) we categorize or classify individuals as similar or dissimilar based on salient qualities or attributes (e.g., gender, ethnicity, extraversion) and (b) similarity is attractive and dissimilarity repels. Taken together, this suggests that people should be attracted to groups with similar others (or similar others within a group) and

driven away by groups with dissimilar others (or dissimilar others within the group). As a result, this perspective has been referred to as the categorization perspective on diversity.

In accordance with this perspective, the central thesis proposed in this study was that intra-group similarity would benefit member functioning within exercise groups. Functioning was operationalized based on (a) each participant's adherence to the group-based exercise program and (b) the level of group cohesion reported by each participant.

Hypotheses 1, 2A, 2B, 3A, and 3B, may be viewed as a test of this thesis as each of these hypotheses proposed a link between perceptions of similarity and measures of functioning (adherence and cohesion). When testing each of these hypotheses, positive relationships between the degree of perceive similarity (whether global, surface-, or deep-level in nature) and the variables used to assess member functioning was found. This is evident as a result of the significant regression equations reported when testing the above hypotheses. Given these results, general support for the central thesis of this study was attained. It appears that subjective intra-group similarity is beneficial to the functioning of members within exercise groups.

These results provide further support for the categorization perspective of intra-group similarity. As a result, the appropriateness of the application of the information processing model (characterized by the belief that intra-group similarity is detrimental to group functioning) to exercise groups must be questioned. None of the results reported in this study provide support for the belief that disparate individuals will function at a higher capacity than more homogeneous members. This is not to say that the information processing model is erroneous. Rather the applicability of each model seems inextricably linked to the functional goals of the types of groups studied.



Diverse groups have been found to outperform more homogeneous groups on tasks that require a high level of creativity or imagination as well as tasks that require the consideration of multiple perspectives (Dose, 1999). None of these processes appear particularly applicable to exercise groups. Instead, processes such as cohesion, social integration, commitment to the group, enjoyment, and adherence seem much more relevant. Indeed, a focus on cohesion and adherence is quite common among researchers studying exercise groups (e.g., Anessi, 1999; Carron, et al., 2007; Carron et al., 1988; Estabrooks & Carron, 2000). Although limited research has explored the relationships between intra-group similarity, cohesion, and adherence, the vast majority of empirical work within social and organizational psychology exploring this relationship accords with the categorization perspective of intra-group similarity (e.g., Knippenberg et al., 2007; Jackson et al., 1991; Milliken & Martins, 1996). In addition, previous work that has explored the relationship between intra-group similarity and member functioning in exercise groups (i.e., Shapcott et al.'s 2006 study) is also consistent with this perspective. Given the theorized relationships between perceptions of intra-group similarity, cohesion, and adherence it may be concluded that the categorization perspective of intra-group similarity is more applicable to exercise groups than the information processing model.

#### **4.6.2 The Importance of Considering Subjective Intra-Group Similarity**

Montoya et al. (2008) recently published a meta-analysis exploring the relationships between perceived similarity, actual similarity, and attraction. In this paper, the studies reviewed were classified in one of three ways based on the duration of contact between the perceiver and the perceived. Studies classified as being 'non-interactional' involved asking participants to rate the degree to which they were attracted to a

hypothetical target based on information provided by the researcher. ‘Short interaction’ studies were those that involved individuals interacting for 10 minutes or less – most often in a lab setting. Finally, ‘existing relationship’ studies were those that assessed attraction in pre-existing relationships.

Montoya and colleagues found that both subjective and objective measures of similarity significantly related to attraction among non-interactional studies. However, they reported that, “there was a significant reduction in the effect size of actual similarity beyond no-interaction studies and the effect of actual similarity in existing relationships was not significant”. (p. 889). In comparison, perceptual measures of similarity were found to significantly relate to attraction in both ‘short interaction’ and ‘existing’ relationships.

The meta-analysis performed by Montoya et al., (2008) is both timely and appropriate. For decades (e.g., Curry & Emerson, 1970; Orpen, 1984; Turban & Jones, 1988), perceptual measures of similarity have been found to relate quite strongly to the outcome measures considered. In fact, in the majority of cases in which both subjective and objective measures of similarity were employed, subjective measures tended to share a *stronger* relationship with the outcome measures considered (see Chapdelaine, Kenny, & LaFontana, 1994; Curry & Emerson, 1970; Harrison & Sin, 2005; Riordan & Wayne, 2008; Strauss et al., 2001). Perceptual similarity has also been found to positively relate to such diverse outcomes as interpersonal liking (Chapdelaine et al., 1994), identification with fictional characters (Johnson, 1995; Jose & Brewer, 1984), and message effectiveness (Andsager, Bemker, Choi, & Torwel, 2006).

It is interesting to note that calls for researchers to consider subjective measures of similarity (e.g., Hartel & Fujimoto, 1999; Harrison et al., 2002; Riordan, 2000; Zellmer-Bruhn et al., 2008) have, to a large degree, fallen on deaf ears. This is reflected in the number of effect sizes reported in Montoya et al.'s (2008) meta-analysis corresponding to objective ( $N = 406$ ) and subjective ( $N = 54$ ) measurements of similarity. In order for the field of diversity research to progress a greater emphasis must be placed on perceived similarity (Riordan & Wayne, 2008). After all, we function largely on the basis of perceptions, not objective reality (Ferris & Judge, 1991).

While an emphasis has been placed on perceptual measures of similarity in the proceeding discussion, it should be stressed that the abandonment of objective similarity measures is not being purported here. Indeed, it would be foolish to suggest that one should be concerned solely with perceptions of similarity as these perceptions are likely influenced by the objective composition of the group. It has even been suggested that subjective intra-group similarity may mediate the relationship between actual intra-group similarity and outcome measures (Harrison et al., 2002). Indeed, Ashforth and Mael (1989) have argued that the substantive effect of objective intra-group similarity is carried out through perceptions. Instead, a call is placed for future research to attempt to more appropriately balance a focus on both subjective and objective measures of intra-group similarity. This balance, couple with a more thorough investigation of the relationship between these two types of intra-group similarity (subjective and objective) will likely contribute to a greater understanding of group and individual functioning within teams.

#### **4.6.3 Perceptual Intra-Group Similarity, Cohesion, and Adherence**

This is the first known study to relate perceptions of intra-group similarity to measures of cohesion among exercise groups. Although correlation does not equate to causation, the results provide preliminary support for the theoretical argument that similarity is an antecedent of cohesion. Future studies should attempt to establish a causal link between these two constructs through the implementation of experimental studies.

This is also the first study to date to link perceptions of similarity with adherence behaviours in exercise classes. In this study the PPS variable was positively linked to the instructor-mediated and self-reported measure of adherence. This observed relationship may be due to the fact that individuals tend to be attracted to similar others (Byrne, 1971), and that a group with a high proportion of very similar others will be more attractive (and easier to identify with; Hogg, 1992; Turner, 1987) than a group with a low proportion of very similar individuals. This explanation is consistent with the categorization perspective of diversity.

In light of the relationship between global similarity and adherence behaviours reported in this thesis, the next logical step is to try to identify which specific attributes or traits within the group (such as age, gender, personal values) contribute to this global perception. Consistent with the argument put forth in the previous section, this step may be most effectively completed by considering both subjective and objective conceptions of similarity within the group. With this information in hand, a potential causal link between these similarities (both subjective and objective) and adherence could be explored through experimental investigation.

In contrast to past research (e.g., Anessi, 1999; Carron et al., 2007; Carron et al., 1988; Estabrooks & Carron, 2000), the scores derived from the PAGEQ did not

significantly predict adherence behaviours within the present sample. At the very least, these results call into question Estabrooks (2007) bold claim that cohesion should be a “fundamental” (p. 143) consideration in physical activity interventions. Given the results of this study, it is likely that other contextual determinants within the exercise environment (such as the degree of perceived similarity between each member and the rest of the group) may be more salient for adherence behaviors when compared to cohesion. It is also likely that non-interpersonal elements of the course (such as the mode, intensity, and duration of the activities performed) play an important role in adherence behaviors. These non-interpersonal elements of courses were not explored in the current study. In future, researchers are encouraged to explore the relationship between contextual determinants of the environment, non-interpersonal elements of the course, and adherence in tandem to identify the factors that share the strongest relationship with adherence to exercise programs. This will likely lead to a more thorough understanding of the primary reasons for why people do, or do not, adhere to exercise programs.

#### **4.6.4 Limitations**

In spite of the contributions made by this thesis to the existing exercise psychology and diversity literatures several inherent limitations must be recognized. To begin, one of the adherence measures employed was self-reported. Although people were asked to recall the number of classes they missed (as opposed to the number they attended), and this measure was found to correlate strongly with the instructor-mediated measure ( $r = .63, p < .001$ ), it remains possible that the level of adherence reported by the participants was positively biased (McAuley et al., 2007). As a result, conclusions drawn from these data should be interpreted with caution. That being said, both adherence

measures (including the instructor-mediated data) were predicted from the measures of perceptual similarity. It follows that this limitation is somewhat innocuous.

As a result of the data used in this thesis, there are two potential concerns regarding common method variance. First, participants were asked to report the perceptions of similarity and cohesion on the same Likert-type scale (9 point scale ranging from ‘strongly disagree’ [1] to ‘strongly agree’ [9]) and at the same time. Since the same scale (i.e., the 9 point Likert-type scale) was employed on different measures within a single data collection period, the similarity of responses across these measures may have been inflated. This may have led to an inflation in the reported strength of the relationships between the SLS and DLS variables and measures derived from the PAGEQ (see Hypothesis 2A, 2B, 3A, 3B, & 7). Second, the potential existence of percept-percept inflation – an inflation in the strength of relationship between self-report measures as a result of their self-reported nature (Crampton & Wagner, 1994) - must also be recognized. Aside from the instructor-mediated adherence data, all variables considered in this study were self-reported in nature.

It also goes without saying that the demographics of the sample collected restrict the generalizability and external validity of the findings. Future researchers should explore whether the results reported in this study hold in populations that differ markedly from the one studied in this thesis (e.g., children, older adults, European or Asian cultures).

The less than ideal response rate (i.e., 77.59% and 71.49% for the first and last data collection period respectively) is another potential limitation that should be duly noted. As Allen, Stanley, Williams, and Ross (2007) suggest, “the lower the response

rate, the greater the variability in the observed correlations...lower response rates make it more difficult to estimate accurately a true correlation” (p. 1423). Steps were taken to ensure that the response rates of this study were consistent with past research (e.g., O’Reilly, Caldwell, & Barnett, 1989; Pelled, Ledford, & Mohrman, 1999; Pelled, Xin, & Weiss., 2001). Indeed, data from one of the three collection periods was not analyzed partially due to the low response rate during this period. However, it remains possible that the relationships reported here may not hold within the entire population of group-based exercisers from which the current sample was drawn. That being said, not achieving a response rate of 100% would be a much greater limitation if similarity was quantified at the group level. If this were done, the calculation of a ‘group’ score would be based on incomplete information (Allen et al., 2007).

Nevertheless, it remains possible that there was a demographic pattern in the response/non-response of group members. Potentially, this pattern could have been based on the degree of similarity between the potential respondent and the other members of their group. Allen and colleagues (2007) investigated whether dissimilarity in age related to a participants’ propensity to participate in research involving their group. As these researchers reported, “it appears that responding to the survey was linked to the employee’s age in relation to others in the workgroup, with those who were more different being less likely to respond” (p. 1425). As a result, Allen et al. (2007) suggest that similar group members (as compared to non-similar group members) are more likely to participate in group-based research. Incorporating these findings into the present discussion, it remains possible that the relationships reported in this thesis may have fallen prey to a form of range restriction. It follows that the relationships reported in this

study may have actually been smaller than they were in reality. In future, researchers may wish to explore the characteristics of responders/non-responders in exercise groups to address this issue.

#### **4.6.5 Summary and Conclusion**

The present study contributes to the existing literature in four ways. First, it reinforces the validity of the categorization model of intra-group similarity. This model may be particularly appropriate for exercise groups given the established relationship between similarity and outcome measures such as cohesion (e.g., Back, 1951; Mullen & Cooper, 1994; Shaw & Shaw, 1962; Wiersema & Bird, 1993), adherence (e.g., Jackson et al., 1991; Milliken & Martins, 1996; Tsui et al., 1992) social integration (e.g., Ely, 2004; Riordan & Shore, 1997), satisfaction and motivation to remain part of the group (e.g., Ely 1995; Jackson et al., 1991; O'Reilly et al., 1989; Wharton & Baron, 1987; Wiersema & Bird, 1993) within social and organizational psychology.

Second, the results of this study add credence to the increasingly prevalent call for diversity researchers to consider objective and subjective measures of intra-group similarity. An exclusive focus on either subjective or objective intra-group similarity may preclude the advancement of a complete understanding of the relationship between group composition and outcome measures. As a field we must begin to look at these two types of diversities in relation to one another if we wish to continue to advance this area of research. Given the prevailing use of objective measures of diversity, the necessary first step in this process may be to allot a greater focus to perceptual data. Ideally, this increased focus will ultimately lead researchers to consider both types of diversity when conducting research.



Third, this is the first known study to explore some of the potential antecedents of cohesion within exercise groups. The results suggest that perceived similarity and cohesion share a positive relationship within this population. In future, researchers may wish to explore whether a causal link can be drawn between similarity and cohesion among exercise group participants through the implementation of experimental trials.

Finally, this study is the first known to explicitly link perceptions of similarity to adherence behaviours in exercise classes. Given the importance of adherence within this context (Carron et al., 1996; Dishman & Buckworth, 1996), researchers should continue to explore (a) the relationship between similarity perceptions and adherence behaviours (b) the qualities or attributes that contribute to perceptions of similarity and (c) the relationship between a group's composition and outcome measures such as adherence. Another potentially fruitful area of future research would be to explore whether a causal link between perceptions of similarity and adherence behaviours exists within these types of groups.

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# Appendix A



The University of British Columbia  
Office of Research Services  
**Behavioural Research Ethics Board**  
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

## CERTIFICATE OF APPROVAL - MINIMAL RISK

<b>PRINCIPAL INVESTIGATOR:</b> Mark R. Beauchamp	<b>INSTITUTION / DEPARTMENT:</b> UBC/Education/Human Kinetics	<b>UBC BREB NUMBER:</b> H08-02850
<b>INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:</b>		
<b>Institution</b> UBC Other locations where the research will be conducted: Community/fitness centres in the Lower Mainland of British Columbia		<b>Site</b> Vancouver (excludes UBC Hospital)
<b>CO-INVESTIGATOR(S):</b> William Dunlop		
<b>SPONSORING AGENCIES:</b> UBC Dean of Education		
<b>PROJECT TITLE:</b> Group Diversity and Exercise Adherence		

**CERTIFICATE EXPIRY DATE:** December 3, 2009

<b>DOCUMENTS INCLUDED IN THIS APPROVAL:</b>	<b>DATE APPROVED:</b> December 3, 2008	
<b>Document Name</b>	<b>Version</b>	<b>Date</b>
<b>Protocol:</b>		
Protocol	N/A	November 21, 2008
<b>Questionnaire, Questionnaire Cover Letter, Tests:</b>		
Questionnaire	N/A	November 21, 2008
<b>Letter of Initial Contact:</b>		
Program Coordinator Contact	N/A	November 21, 2008
Participant Contact and Consent Letter	N/A	November 21, 2008
Instructor Contact Letter	N/A	November 21, 2008
<b>Other Documents:</b>		
Log Sheet	N/A	November 21, 2008

The application for ethical review and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.

Approval is issued on behalf of the Behavioural Research Ethics Board  
and signed electronically by one of the following:

Dr. M. Judith Lynam, Chair  
Dr. Ken Craig, Chair  
Dr. Jim Rupert, Associate Chair  
Dr. Laurie Ford, Associate Chair  
Dr. Daniel Salhani, Associate Chair  
Dr. Anita Ho, Associate Chair

## Appendix B



The University of British Columbia  
Office of Research Services  
**Behavioural Research Ethics Board**  
Suite 102, 6190 Agronomy Road, Vancouver, B.C. V6T 1Z3

# CERTIFICATE OF APPROVAL - MINIMAL RISK AMENDMENT

<b>PRINCIPAL INVESTIGATOR:</b> Mark R. Beauchamp	<b>DEPARTMENT:</b> UBC/Education/Human Kinetics	<b>UBC BREB NUMBER:</b> H08-02850
<b>INSTITUTION(S) WHERE RESEARCH WILL BE CARRIED OUT:</b>		
<small>Institution</small>	<small>Site</small>	
UBC	Vancouver (excludes UBC Hospital)	
<b>Other locations where the research will be conducted:</b> Community/fitness centres in the Lower Mainland of British Columbia		
<b>CO-INVESTIGATOR(S):</b> William Dunlop		
<b>SPONSORING AGENCIES:</b> UBC Dean of Education		
<b>PROJECT TITLE:</b> Group Diversity and Exercise Adherence		

**Expiry Date - Approval of an amendment does not change the expiry date on the current UBC BREB approval of this study. An application for renewal is required on or before: December 3, 2009**

<b>AMENDMENT(S):</b>	<b>AMENDMENT APPROVAL DATE:</b> January 29, 2009	
<small>Document Name</small>	<small>Version</small>	<small>Date</small>
<b>Questionnaire, Questionnaire Cover Letter, Tests:</b>		
Questionnaire - Time 3	N/A	January 22, 2009
<p>The amendment(s) and the document(s) listed above have been reviewed and the procedures were found to be acceptable on ethical grounds for research involving human subjects.</p>		
<p><b>Approval is issued on behalf of the Behavioural Research Ethics Board and signed electronically by one of the following:</b></p> <p style="margin-top: 20px;">             Dr. M. Judith Lynam, Chair              Dr. Ken Craig, Chair              Dr. Jim Rupert, Associate Chair              Dr. Laurie Ford, Associate Chair              Dr. Daniel Salhani, Associate Chair              Dr. Anita Ho, Associate Chair           </p>		

## Exercise in Group Contexts

**Principal Investigator:**

Mark R. Beauchamp, Ph.D.  
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William Dunlop, M.A. Student  
Michael Smith Foundation for  
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School of Human Kinetics  
University of British Columbia  
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[wdunlop2@interchange.ubc.ca](mailto:wdunlop2@interchange.ubc.ca)

*Dear Program Coordinator,*

We are researchers from the University of British Columbia (UBC) who are currently involved in a long-term program of research that is designed to better understand the factors that influence adherence to group-based exercise programs. The reason we are writing to you is because we would like to invite you to take part in a study that we are currently undertaking. This study would involve having class members at your center completing a very short (5-minute) questionnaire, about their perceptions of the exercise class they are enrolled in, on three occasions over the length of the exercise course. The questions do not deal with any issues of a sensitive nature, and it is anticipated that the results of this research will be able to help those concerned with health promotion develop better group-based exercise programs.

If you decide to take part, all information that your members provide will be kept private/confidential, and will not be shared with ANYONE else. This means that their responses will be combined with all others and so no participants will know how any other members have responded to the survey. All questionnaires will be kept in a locked cabinet in the office of the principal investigator (at UBC), and will not be made available to anyone other than the researchers involved in this study. In this study, your members will be asked to provide the first three letters of their first and last name on the top of each questionnaire to allow us to match up the questionnaires over the three time points. Once we have matched up each of the questionnaires, we will remove this information (all information that they have provided will remain anonymous). Our database will be password protected and will be stored on a secure computer in the office of principal investigator.

There are no known risks associated with participation in this study. It is hoped that your center's involvement will help advance our understanding of the factors that influence adherence to group-based exercise programs. These results may be used to enhance future programs your center may pursue. If you have any questions about what is involved please contact Dr. Mark Beauchamp by email or phone (his contact details are at the top of this page). You can also contact the Office of Research Services at UBC. Their phone number is 604-822-8598.

Over the next week a researcher from our lab will be in touch via telephone to see if you would like to have your center participate.

Many thanks in advance for your help,

Mark Beauchamp, PhD  
William Dunlop, M.A. Student

## Appendix D

### Exercise in Group Contexts

Principal Investigator:  
Mark R. Beauchamp, Ph.D.  
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William Dunlop, M.A. Student  
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[wdunlop2@interchange.ubc.ca](mailto:wdunlop2@interchange.ubc.ca)

Dear Fitness Instructor,

We are researchers from the University of British Columbia (UBC) currently involved in a long-term program of research that is designed to better understand the factors that influence adherence to group-based exercise programs. The reason we are writing to you is because we would like to invite you to take part in a study that we are currently undertaking. This study would involve having your class members completing a very short (5-minute) questionnaire, about their perceptions of the exercise class, on three occasions over the length of the exercise course. The questions do not deal with any issues of a sensitive nature, and it is anticipated that the results of this research will be able to help those concerned with health promotion develop better group-based exercise programs.

To help us better understand how participants' perceptions of the class relate to their involvement in that class we would like to collect data about their adherence behaviours. Specifically, and only if you agree to do so, we would like to provide you with an attendance log sheet that will allow us to track the attendance of members of your class. After each class, all we ask is that you record the class members that were in attendance on the sheet provided. If you allow us to involve your exercise class in this study, we will provide you with a \$30 honorarium regardless of whether you choose to record the attendance of your class members.

All information that you and your members provide will be kept private/confidential, and will not be shared with ANYONE else. This means that your class members' responses will be combined with those from others that participate in the study (across centres in the Lower Mainland of BC) and so no participants will know how anyone else has responded to the surveys. All questionnaires will be kept in a locked cabinet in the office of the principal investigator (at UBC), and will not be made available to anyone other than the researchers involved in this study. Our database will be password protected and will be stored on a secure computer in the office of principal investigator.

There are no known risks associated with participation in this study. It is hoped that your involvement will help advance our understanding of the factors that influence adherence to group-based exercise programs. These results may be used to enhance future intervention-based programs. If you have any questions about what is involved please contact Dr. Mark Beauchamp by email or phone (his contact details are at the top of this page). You can also contact the Office of Research Services at UBC. Their phone number is 604-822-8598. If, at the end of this research (after June 2009), you would like to see a summary report of the study findings please contact either of us by e-mail, phone, or mail (see above contact details).

Many thanks in advance for your help,

Mark Beauchamp, PhD  
William Dunlop, M.A. Student





## Exercise Class Study

Principal Investigator:  
Mark R. Beauchamp, Ph.D.  
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Dear class participant,

We are researchers from the University of British Columbia (UBC) currently involved in a long-term program of research that is designed to better understand the factors that influence adherence to group-based exercise programs. The reason we are writing to you is because you have recently enrolled in an exercise class, and we are interested in your perceptions about that class. Your participation in this study would involve completing a very short (5-minute) questionnaire on three occasions over the length of the exercise course. The questions do not deal with any issues of a sensitive nature, and it is anticipated that the results of this research will be able to help those concerned with health promotion develop better group-based exercise programs. At the end of your first class a research assistant will invite you to take part in this research.

Please know that your involvement in this study is completely voluntary. It's up to you if you want to take part or not. If for ANY reason, you do not want to take part in this study that's fine, you don't have to. If you decide to take part, you will also be free to withdraw at any time without having to give any reason. If you drop out you will not experience ANY negative consequences at all. If you would like to take part in this study all you have to do is complete the questionnaires described above (by completing the questionnaires you have consented to take part in this research). We recommend that you keep a copy of this letter for your records.

If you decide to take part, all information you provide will be kept private/confidential, and will not be shared with ANYONE else. This means that your responses will be combined with those of other participants and so no-one will know how you will have answered the surveys except you. All questionnaires will be kept in a locked cabinet in the office of the principal investigator (at UBC), and will not be made available to anyone other than the researchers involved in this study. Our database will be password protected and will be stored on a secure computer in the office of principal investigator.

There are no known risks associated with participation in this study. If you have any questions about what is involved please contact Dr. Mark Beauchamp by email or phone (his contact details are at the top of this page). You can also contact the Office of Research Services at UBC if you have any concerns about your rights or treatment as a research subject. Their phone number is 604-822-8598. If, at the end of this research (after June 2009), you would like to see a summary report of the study findings please contact either of us by e-mail, phone, or mail (see above contact details).

Many thanks in advance for your help,

Mark Beauchamp, PhD  
William Dunlop, M.A. Student

## Appendix G

**Exercise and Group Contexts Questionnaire**

First Name (first three letters only):

Last Name (first 3 letters only):

Postal Code (first 3 letters only):

1) Gender (please circle appropriate response): Male / Female

2) Your Age: \_\_\_\_\_ yrs

3) What is your occupation? \_\_\_\_\_

6) Education Level:

High school education

☐

College or technical training

☐

Undergraduate degree

☐

Graduate degree (e.g., MA, M.D., Ph.D.)

☐

Other

☐7) How do you describe yourself in terms of your ethnic origin? PLEASE CHECK **ALL** THAT APPLY.

Canadian	<input checked="" type="checkbox"/>	East Indian	<input checked="" type="checkbox"/>	American (USA)	<input checked="" type="checkbox"/>
Native/Aboriginal	<input type="checkbox"/>	Dutch	<input type="checkbox"/>	Norwegian	<input type="checkbox"/>
Chinese	<input type="checkbox"/>	Persian	<input type="checkbox"/>	Italian	<input type="checkbox"/>
British	<input type="checkbox"/>	Polish	<input type="checkbox"/>	Korean	<input type="checkbox"/>
Irish	<input type="checkbox"/>	Hispanic	<input type="checkbox"/>	Filipino	<input type="checkbox"/>
German	<input type="checkbox"/>	Portuguese	<input type="checkbox"/>	Jewish	<input type="checkbox"/>
French	<input type="checkbox"/>	Vietnamese	<input type="checkbox"/>	Japanese	<input type="checkbox"/>

Other \_\_\_\_\_

8) Height \_\_\_\_\_ cms (or \_\_\_\_\_ ft)

9) Weight \_\_\_\_\_ kgs (or \_\_\_\_\_ lbs)

10) Which of the following activities have you taken part in during the last **2 weeks**?

Activity	<input checked="" type="checkbox"/>	How many times?	For how long – total (mins)?	Experienced (a) no, (b) small, (c) moderate, or (d) large increases in heart and breathing rates while participating
Walking	<input type="checkbox"/>			
Running	<input type="checkbox"/>			
Gardening	<input type="checkbox"/>			
Yoga	<input type="checkbox"/>			
Aerobics/Exercise Classes	<input type="checkbox"/>			
Swimming	<input type="checkbox"/>			
Cycling	<input type="checkbox"/>			
Racquet Sports	<input type="checkbox"/>			
(Others)	<input type="checkbox"/>			

12) In my exercise class, I believe that group members are similar to me in terms of:

	Strongly Disagree					Strongly Agree				
Age	1	2	3	4	5	6	7	8	9	
Gender	1	2	3	4	5	6	7	8	9	
Attitudes	1	2	3	4	5	6	7	8	9	
Education	1	2	3	4	5	6	7	8	9	
Personal values	1	2	3	4	5	6	7	8	9	
Physical appearance	1	2	3	4	5	6	7	8	9	
Personal beliefs	1	2	3	4	5	6	7	8	9	
Life experiences	1	2	3	4	5	6	7	8	9	
Physical condition	1	2	3	4	5	6	7	8	9	
Ethnicity	1	2	3	4	5	6	7	8	9	

	Strongly Disagree							Strongly Agree	
Overall, I feel that I am similar to other members of my exercise class:	1	2	3	4	5	6	7	8	9

How many members of your exercise class do you feel that you are very similar to? \_\_\_\_\_ out of \_\_\_\_\_ group members. 14)

15) The following questions correspond to your personal involvement with your exercise class, as well as your perceptions about the class as a whole. Please circle the appropriate number from 1 (Strongly Disagree) to 9 (Strongly Agree).

	Strongly Disagree							Strongly Agree	
1. I like the amount of physical activity I get in this program.	1	2	3	4	5	6	7	8	9
2. This physical activity group provides me with a good opportunity to improve in areas of fitness I consider important.	1	2	3	4	5	6	7	8	9
3. I am happy with the intensity of this physical activity program.	1	2	3	4	5	6	7	8	9
4. I like the program of physical activities done in this group.	1	2	3	4	5	6	7	8	9
5. I enjoy new exercises done in this physical activity group.	1	2	3	4	5	6	7	8	9
6. This physical activity group provides me with good opportunities to improve my personal fitness.	1	2	3	4	5	6	7	8	9
7. This physical activity group is an important social unit for me.	1	2	3	4	5	6	7	8	9
8. I enjoy my social interactions within this physical activity group.	1	2	3	4	5	6	7	8	9
9. I like meeting the people who come to this physical activity group.	1	2	3	4	5	6	7	8	9
10. If this program was to end, I would miss my contact with the other participants.	1	2	3	4	5	6	7	8	9
11. In terms of the social experiences in my life, this physical activity group is very important to me.	1	2	3	4	5	6	7	8	9
12. The social interactions I have in this physical activity group are important to me.	1	2	3	4	5	6	7	8	9
13. Our group is united in its beliefs about the benefits of the physical activities offered in this program.	1	2	3	4	5	6	7	8	9
14. Our group is in agreement about the program of physical activities that should be offered.	1	2	3	4	5	6	7	8	9
15. Members of our group are satisfied with the intensity of the physical activity in this program.	1	2	3	4	5	6	7	8	9
16. Members of our group enjoy helping if work needs to be done to prepare for the activity sessions.	1	2	3	4	5	6	7	8	9
17. We encourage each other in order to get the most out of the program.	1	2	3	4	5	6	7	8	9
18. Members of our physical activity group often socialize during exercise time.	1	2	3	4	5	6	7	8	9
19. Members of our physical activity group would likely spend time together if the program were to end.	1	2	3	4	5	6	7	8	9
20. Members of our group sometimes socialize together outside of activity time.	1	2	3	4	5	6	7	8	9
21. We spend time socializing with each other before and after our activity sessions.	1	2	3	4	5	6	7	8	9

## Appendix H

**Exercise and Group Contexts Questionnaire**

First Name (first three letters only): \_\_\_\_\_

Last Name (first 3 letters only): \_\_\_\_\_

Postal Code (first 3 letters only): \_\_\_\_\_

1) Gender (please circle appropriate response): Male / Female

2) Your Age: \_\_\_\_\_ yrs

3) What is your occupation? \_\_\_\_\_

6) Education Level:

High school education ☐ College or technical training ☐ Undergraduate degree ☐Graduate degree (e.g., MA, M.D., Ph.D.) ☐ Other \_\_\_\_\_ ☐

8) Height \_\_\_\_\_ cms (or \_\_\_\_\_ ft)

9) Weight \_\_\_\_\_ kgs (or \_\_\_\_\_ lbs)

10) Which of the following activities have you taken part in during the last **2 weeks**?

Activity	✓	How many times?	For how long – total (mins)?	Experienced (a) no, (b) small, (c) moderate, or (d) large increases in heart and breathing rates while participating
Walking				
Running				
Gardening				
Yoga				
Aerobics/Exercise Classes				
Swimming				
Cycling				
Racquet Sports				
(Others)				

11A) During the first eight weeks of this course how many classes have you missed? \_\_\_\_\_ classes.

11B) How many classes have you attended? \_\_\_\_\_ classes.

12) Prior to this course, had you previously taken a course at this center? YES NO

13) Prior to this course, had you previously taken a course with this instructor? YES NO

14) Prior to this course, did you know any of the other members in this group? YES NO

15) Have you signed up for a future course at this center? YES NO

16) If you have not yet signed up for a future course at this center, do you plan to do so? YES NO

17) In my exercise class, I believe that group members are similar to me in terms of:

	Strongly Disagree					Strongly Agree				
Age	1	2	3	4	5	6	7	8	9	
Gender	1	2	3	4	5	6	7	8	9	
Attitudes	1	2	3	4	5	6	7	8	9	
Education	1	2	3	4	5	6	7	8	9	
Personal values	1	2	3	4	5	6	7	8	9	
Physical appearance	1	2	3	4	5	6	7	8	9	
Personal beliefs	1	2	3	4	5	6	7	8	9	
Life experiences	1	2	3	4	5	6	7	8	9	
Physical condition	1	2	3	4	5	6	7	8	9	
Ethnicity	1	2	3	4	5	6	7	8	9	

18)

	Strongly Disagree							Strongly Agree	
Overall, I feel that I am similar to other members of my exercise class:	1	2	3	4	5	6	7	8	9

19) How many members of your exercise class do you feel that you are very similar to? \_\_\_\_\_ out of \_\_\_\_\_ group members.

20) The following questions correspond to your personal involvement with your exercise class, as well as your perceptions about the class as a whole. Please circle the appropriate number from 1 (Strongly Disagree) to 9 (Strongly Agree).

	Strongly Disagree							Strongly Agree	
1. I like the amount of physical activity I get in this program.	1	2	3	4	5	6	7	8	9
2. This physical activity group provides me with a good opportunity to improve in areas of fitness I consider important.	1	2	3	4	5	6	7	8	9
3. I am happy with the intensity of this physical activity program.	1	2	3	4	5	6	7	8	9
4. I like the program of physical activities done in this group.	1	2	3	4	5	6	7	8	9
5. I enjoy new exercises done in this physical activity group.	1	2	3	4	5	6	7	8	9
6. This physical activity group provides me with good opportunities to improve my personal fitness.	1	2	3	4	5	6	7	8	9
7. This physical activity group is an important social unit for me.	1	2	3	4	5	6	7	8	9
8. I enjoy my social interactions within this physical activity group.	1	2	3	4	5	6	7	8	9
9. I like meeting the people who come to this physical activity group.	1	2	3	4	5	6	7	8	9
10. If this program was to end, I would miss my contact with the other participants.	1	2	3	4	5	6	7	8	9
11. In terms of the social experiences in my life, this physical activity group is very important to me.	1	2	3	4	5	6	7	8	9
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13. Our group is united in its beliefs about the benefits of the physical activities offered in this program.	1	2	3	4	5	6	7	8	9
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16. Members of our group enjoy helping if work needs to be done to prepare for the activity sessions.	1	2	3	4	5	6	7	8	9
17. We encourage each other in order to get the most out of the program.	1	2	3	4	5	6	7	8	9
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21. We spend time socializing with each other before and after our activity sessions.	1	2	3	4	5	6	7	8	9