

Cohesion in exercise groups: an overview

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The purpose of the present paper is to outline the results from research that has focused on cohesion effects in exercise groups. The review contains six sections. In the first section, the constitutive definition of cohesion is provided and typical operational definitions used to assess the construct in physical activity contexts are outlined. In the second section, the question of whether cohesion is relevant in exercise groups is addressed. In the third section, we focus on the results from research that has focused on individual preferences for group- versus individual-based contexts for physical activity. Finally, the next three sections focus on results associated with the *explanation* (why is it?), *prediction* (what will be?), and *intervention/control* (how can we?) stages of science in relation to cohesion and physical activity-related behaviors, cognitions, and affective responses.

Keywords: cohesion; exercise; physical activity; group dynamics

There can be no question, my dear Watson, of the value of exercise before breakfast (Sherlock Holmes in Doyle, 1989).

Over 100 years ago, Sir Arthur Conan Doyle had his central character, Sherlock Holmes, express this insightful sentiment about exercise. In the late 19th century, there were people like Sir Arthur Conan Doyle who just knew intuitively that exercise was valuable. In the 100 plus years since, a considerable amount of research has been undertaken that allows us to go beyond intuition. That body of research clearly shows that there is virtually no system in the body that does not benefit from physical activity (see Carron, Hausenblas, & Estabrooks, 2003 for a summary).

According to Booth and his colleagues (2000), this should hardly come as a surprise because:

the human genome evolved within an environment of high physical activity. Accordingly . . . exercise biologists do not study ‘the effect of physical activity’ but in reality study the effect of reintroducing exercise into an unhealthy sedentary population that is generally programmed to expect physical activity. On the basis of healthy gene function, exercise research should thus be viewed from a nontraditional perspective in that the ‘control’ group should actually be taken from a physically active population and not from a sedentary population with its predisposition to modern chronic diseases. (p. 774)

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What Booth and his colleagues pointed out, of course, is that humankind has evolved over millions of years to a point where it's natural, healthiest state is to be physically active. When people are not physically active, they become susceptible to a large number and variety of chronic diseases including hypertriglyceridemia (i.e., high levels of triglycerides in the blood), hypercholesterolemia (i.e., high levels of cholesterol in the blood), hyperglycemia (i.e., high blood sugar), insulin resistance, increased resting blood pressure, increased risk of myocardial ischemia, increased incidence of lethal ventricular arrhythmias, decreased cardiac stroke volume and maximal cardiac output, obesity, Type 2 diabetes, breast and colon cancer, osteoporosis, sarcopenia, back pain, gallstone disease, and decreased psychological well-being. The onset and development of these diseases can go unnoticed for years until the victim crosses a *clinical horizon* threshold – a sudden heart attack, the appearance of symptoms associated with Type 2 diabetes, or a fall and the subsequent diagnosis of osteoporosis (Booth *et al.*, 2000).

Not surprisingly, governments, the fitness industry, health care professionals, and researchers, have focused considerable resources on the issue of physical activity – principally on how to get more individuals either to initiate a program of physical activity and/or become more physically active, or to insure that more individuals sustain their physical activity level over the life span. Despite these efforts, the World Health Organization (2002, 2003) has estimated that around the world, 60% of adults do not participate in sufficient levels of physical activity to accrue health-related benefits.

The issue of individual involvement in physical activity (or, perhaps more accurately, the lack of involvement, the minimal involvement, or the intermittent involvement) is complex – there are no quick fixes or simple prescriptions. One of the many avenues investigated – one that has interested our research group for the past 20 years – pertains to the role that individual perceptions of group cohesiveness might have on behaviors, cognitions, and affective responses of physical activity participants.

The purpose of the present paper is to outline the results from research that has focused on cohesion effects in exercise groups. The discussion is subdivided into six sections. In the first section, the constitutive definition of cohesion is provided and then the typical operational definitions used to assess the construct in physical activity contexts are outlined.

In the second section, a concern voiced by some scholars – the question of whether cohesion is even relevant in exercise groups – is addressed. The basis for this concern is the fact that most exercise classes possess almost none of the characteristics generally associated with 'real' groups (see McGrath, 1984). The question is reasonable. Conveniently, there are empirical criteria that group dynamics researchers use to determine whether group phenomena are present; initially, we discuss those empirical criteria in relation to cohesion in exercise groups.

Typically, people engage in activities and/or situate themselves in environments for which they have a preference. In the third section, we focus on the results from research that has focused on individual preferences for group- versus individual-based contexts for physical activity.

Finally, the next three sections successively focus on results that fall within the various stages of scientific inquiry. That is, science in any cognate area, including the scientific analysis of physical activity involvement, typically proceeds sequentially through four stages (Kerlinger, 1986); *description* (what is?), *explanation* (why is it?), *prediction* (what will be?), and *intervention/control* (how can we?). For the purpose of the present discussion, we have assumed that the descriptive phase has progressed to the point where we know that exercise involvement is problematic. Thus, in the fourth section of the present paper, we

focus on research associated with explanation – the ‘why is it?’ stage of science. Specifically, we summarize research that has examined the degree to which perceptions of cohesiveness are associated with physical activity related to behaviors, cognitions, and affective responses.

Some research has also been concerned with *prediction* – examining the relationship between early perceptions of cohesiveness and later adherence behavior (i.e., ‘what will be?’). This research is presented in the fifth section while research emanating from group-based intervention programs (i.e., the ‘how can we?’ stage) is discussed in the sixth section.

Cohesion defined, conceptualized, and measured

Carron, Brawley, and Widmeyer (1998) have defined cohesion as ‘a dynamic process which is reflected in the tendency for a group to stick together and remain united in the pursuit of its instrumental objectives and/or for the satisfaction of member affective needs’ (p. 213). Using this definition as a foundation, Carron and his colleagues advanced a conceptual framework to account for the nature of the construct (Carron, Brawley, & Widmeyer, 2002; Carron, Widmeyer, & Brawley, 1985). In their conceptual model, Carron and his colleagues distinguished between the individual- and group-based perceptions of both the task and social manifestations of cohesion. The product of this distinction is four dimensions thought to account for the majority of variance in cohesiveness: Individual Attractions to the Group-Task, Individual Attractions to the Group-Social, Group Integration-Task, and Group Integration-Social.

The original operational definition that emanated from the conceptual model, *The Group Environment Questionnaire (GEQ)*, was developed to measure these four cohesion dimensions in sport teams. When they became interested in studying physical activity groups, Carron, Widmeyer, and Brawley (1988) made minor changes to the target stimulus (e.g., changed ‘team’ to ‘exercise class’). Subsequently, however, Estabrooks and Carron (2000a) discovered that the negatively worded items were both confusing and/or disconcerting for older adults. Thus, *The Physical Activity Group Environment Questionnaire (PAGEQ)* was developed by retaining some items from the GEQ, developing some new items, removing some items, and rephrasing appropriate but negatively worded items.

Exercise classes as real groups

There is minimal consensus among group dynamics theoreticians on the definition of a group (see Carron, Hausenblas, & Eys, 2005). The criteria identified in various definitions can vary from experiencing a common fate (e.g., win, lose) to having a social structure (e.g., roles, norms) to manifesting group processes (e.g., interaction, communication) to exhibiting social categorization (i.e., identifying the unit as *we* and differentiating *we* from multiple *they*). Are exercise classes groups? Is cohesion even a relevant construct in exercise classes?

From a group dynamics perspective, three sets of statistical criteria help to determine the degree to which groupness is present. These three criteria reflect the *degree*, *uniqueness*, and *amount* of *shared beliefs* within the collective. Typically, one way the *degree* to which shared beliefs are present in a group is estimated through the index of agreement (James, Demaree, & Wolf, 1984). In essence, the index of agreement provides a statistical measure of the degree to which members of a unit such as an exercise class show consensus in their perceptions of a target stimulus such as their class’s cohesiveness.

Although values can vary from 0 to 1.00, the index of agreement should not/cannot be subjected to the same interpretations as reliability or correlation coefficients. That is, values in the .40 to .60 range are interpreted to reflect moderate consensus in sport teams (Carron *et al.*, 2003).

Burke and her colleagues (2005), using data sets from multiple studies (yielding a total of 130 exercise classes) examined shared beliefs about cohesion. Seven of the eight index of agreement values found by Burke *et al.* – for the four cohesion scales of both the Group Environment Questionnaire and the Physical Activity Group Environment Questionnaire – were in the moderate range (see Table 1); four were .845 or better.

The index of agreement is a necessary but not sufficient condition to conclude that groupness exists – for example, groups of strangers at various bus stops might be expected to have consensus about a target stimulus such as the bus schedule. Thus, a second statistical criterion –one that reflects the *uniqueness* of the shared beliefs within specific groups must be present (i.e., between-group differences must be present). Burke *et al.* (2005) found that 87.5% of their analyses confirmed the presence of between-group differences in perceptions of cohesiveness in exercise classes.

The *amount* of cohesion present is also an important barometer. That is, it is possible to have perfect consensus that no cohesion is present in an exercise class; that is, all members present might agree that everyone present is a virtual stranger. In their analyses, Burke *et al.* (2005) found that for the 9-point Likert scale used (1 = *low cohesion*, 9 = *high cohesion*), 62.5% of the average scale scores were above 6.0 and 87.5% were above 5.0. Thus, based on the three lines of evidence pertaining to shared beliefs, it does seem reasonable to conclude that exercise classes possess a sense of groupness, and that perceptions of cohesiveness can be considered in this domain.

Individual preferences for physical activity contexts

As Burke, Carron and Eys (2006) have pointed out, ‘understanding individual preferences is important; physical activity preferences are linked to both adherence behaviors and various psychological responses related to physical activity’ (p. 3). There has been some evidence from Abby King and her colleagues that ‘most Americans prefer to engage in physical activity on their own, outside a formal group structure’ (King *et al.*, 1991, p. 1536). For example, Wilcox and colleagues (1999) found support for exercising alone versus in a group-based setting in both middle-aged (69% versus 31% respectively) and older adults

Table 1. Index of agreement values for the four cohesion scales of the Group Environment Questionnaire (*n* = 31 classes) and the Physical Activity Group Environment Questionnaire (*n* = 99 classes)

Cohesion Scale	Group Environment Questionnaire		Physical Activity Group Environment Questionnaire	
	Mean	S.D.	Mean	S.D.
Individual attractions to the group-task	.738	.24	.962	.04
Individual attractions to the group-social	.369	.30	.882	.18
Group integration-task	.683	.25	.925	.04
Group integration-social	.572	.25	.845	.14

From Burke *et al.* (2005). Used with permission.

(67% versus 33% respectively). Similarly, in a population-based study of women over the age of 40, King and her colleagues (2000) reported that 62% of participants rated exercising on one's own as more appealing than exercising in a group.

Burke and her colleagues (2006a) also examined the question of preferences but expanded upon the number of contexts queried beyond the dichotomy examined by Wilcox *et al.* (1999) and King *et al.* (2000). They had 601 undergraduate university students (between the ages of 19 and 25) identify their *most* and *least* preferred contexts for aerobic physical activity from four possible response options: exercising in a structured class, exercising with others outside of a structured class setting, exercising on one's own in an exercise setting, and exercising completely alone. Both males and females identified exercising with others outside of a structured class setting as the most preferred context (54.8% and 39.8% respectively). Interestingly, exercising completely alone was the least preferred context for females (43.5%), whereas exercising in a structured exercise class was the least preferred context for males (78.7%).

Subsequently, Burke, Carron, and Eys (2008) conducted a similar study with middle-aged adults ($N = 280$) between the ages of 30 and 60. In contrast to the results reported for university students, the preferences of male and female adults were *not* found to differ. Both males and females identified two contexts as their most preferred: (a) exercising completely alone (41.2% and 29.2%, respectively), and (b) exercising with others outside of a structured setting (37.3% and 29.8%, respectively). With regard to the least preferred context, the dominant choice for both male and female adults was exercising in a structured class (60.8% and 52.2%, respectively).

Beauchamp, Carron, McCutcheon, and Harper (2007) tested the propositions that (a) both older and younger adults would exhibit a preference for exercising in groups composed of participants of a similar age to themselves (i.e., birds of a feather prefer to flock together), and (b) both older and younger adults would show significantly less preference for exercising in groups composed of participants dissimilar in age from themselves. Their results garnered from 124 participants in their 30s, 222 participants in their 40s, 364 participants in their 50s, 185 participants in their 60s, and 52 participants in the 70 plus age group consistently supported their two propositions.

The explanatory role of cohesion in exercise outcomes

Attitudes toward exercise

Courneya and McAuley (1995) conducted one of the first studies examining the relationship between cohesion and attitude. Participants in a university physical activity program were assessed. All four cohesion dimensions from the GEQ were found to be positively correlated to attitude with the strongest relationship reported for Individual Attractions to the Group-Task.

To determine the generalizability of these results, Estabrooks and Carron (1999b) examined the relationship between cohesion and attitude towards physical activity in a sample of older adults. The results showed that both Individual Attractions to the Group-Social and Individual Attractions to the Group-Task were positively related to attitude. However, contrary to the results from the younger sample assessed by Courneya and McAuley (1995), the strongest relationship was between attitude and Individual Attractions to the Group-Social.

Exercise behavior

A considerable amount of research has examined the association between cohesion and individual exercise behavior (e.g., Annesi, 1999; Spink & Carron, 1992). A recurring theme throughout the literature is that perceptions of group cohesion are positively related to exercise adherence. One of the first studies examining this relationship was carried out by Carron, Widmeyer, and Brawley (1988). Participants were university-level fitness class adherers (individuals currently involved in a physical activity program) and non-adherers (individuals who voluntarily stopped attending a physical activity program). Using their class as a target stimulus, participants completed the GEQ modified for exercise classes. When compared to the non-adherers, exercise adherers had stronger perceptions of Individual Attractions to the Group-Task and Individual Attractions to the Group-Social.

A subsequent study by Spink and Carron (1992) examined the relationship between cohesion and non-adherence (i.e., absenteeism and lateness) in university-aged females participating in exercise classes. During the 13-week program, attendance and punctuality were assessed during Weeks 8 to 12. The GEQ was administered in the final week of the program. Two dimensions of cohesion – Individual Attractions to the Group-Task and Individual Attractions to the Group-Social – were negatively associated with absenteeism. Insofar as punctuality was concerned, the Individual Attractions to the Group-Task dimension accounted for the largest difference between participants who were never late and those who were late four or more times.

The studies cited above were conducted within university-based aerobic exercise classes. Annesi (1999) hypothesized that in larger fitness centers (e.g., YMCA, private fitness centers) where the exercise leader-participant ratio is greater, the cohesion-adherence relationship might not be present. In the Annesi study, participants in a 15-week exercise program exercised on their own but carried out their warm-up and cool-down in groups led by a qualified instructor. Attendance, drop-out rates, and perceptions of cohesion were measured throughout the program. Contrary to Annesi's hypothesis, cohesion in the form of Individual Attractions to the Group-Task was positively related to attendance.

Cognitions about exercise

In several areas, groups have been shown to have an influence on members' cognitions and self-conceptions (Hogg & Williams, 2000). Within the domain of exercise, groups have been found to influence cognitions such as self-efficacy and intentions to be physically active. Furthermore, perceptions of cohesion have been found to be positively associated with a number of cognitions. For example, Brawley, Carron, and Widmeyer (1988) found that perceptions of Group Integration-Task significantly discriminated between exercisers with high and low perceptions of the class's ability to withstand the negative impact of disruptive events (e.g., decrease in productivity, development of cliques).

Also, a study by Hill and Estabrooks (2000) examined the link between the perceptions of cohesion in physical activity groups of older adults ($n = 185$, mean age = 73.78) and those adults' perceptions of cooperation, communication, and competition. A strong positive relationship was found between perceptions of competition and both task dimensions of cohesion – Individual Attractions to the Group-Task and Group Integration-Task. In contrast, communication had the strongest positive relationship with Individual Attractions to the Group-Social. Lastly, perceptions of cooperation were most positively related to Group Integration-Social. Hill and Estabrooks concluded that when developing physical activity interventions for older adults, care should be taken to

foster an atmosphere that provides an opportunity for friendly competition and open lines of communication. Estabrooks and Carron (1999b) also examined the relationship between perceived behavioral control (assessed as self-efficacy to schedule physical activity) and cohesion in older adults (mean age = 67). The results showed that the Individual Attractions to the Group-Task dimension was positively related to perceived behavioral control.

More recently, Christensen, Schmidt, Budtz-Jorgensen, and Avlund (2006) employed a multi-method approach to examine the relationship between cohesion and intention to exercise. Participants ($n = 87$, mean age = 39.5) took part in a 32-week group exercise program. The authors adopted a unique approach by examining the intention to adhere quantitatively and group processes, such as cohesion, qualitatively. The interviews revealed that participants perceived three of the cohesion dimensions – Individual Attractions to the Group-Social, Group Integration-Social, and Group Integration-Task – to be integral to their exercise behavior. Furthermore, perceiving oneself to belong to a cohesive group was found to be a determining factor for future exercise behavior. Specifically, 37% of participants who did not feel a sense of unity/attraction to the exercise group indicated no intention to continue exercising. In contrast, only 13% of individuals who perceived themselves to be part of a cohesive group expressed an intention not to continue exercising. In addition, participants who perceived their group to be cohesive mentioned the emergence of shared beliefs toward mutual support in relation to exercise activities. In turn, these shared beliefs of mutual support facilitated the development of members' self-efficacy.

The predictive role of cohesion in exercise outcomes

Attitudes toward exercise

Research concerned with explanation (i.e., the research discussed in the previous section) is limited by its retrospective nature; it offers no insights into the direction of the relationship between group cohesion and physical activity involvement. Consequently, researchers have sought to enrich the literature – and our understanding of the relationship between cohesion and attitude – by investigating predictive relationships. For example, Courneya (1995) conducted a prospective study to examine the relationship between cohesion and affect. Cohesion was assessed within the first three weeks of an exercise program and a feeling scale was used to assess the general affect of participants over the final eight weeks of the program. Three of the four cohesion dimensions – Group Integration-Task, Individual Attractions to the Group-Task, and Individual Attractions to the Group-Social – were positively related to affect during the later weeks of the exercise program.

Exercise behavior

A substantial amount of research has been conducted to establish whether individual perceptions of cohesion can predict adherence in exercise programs. For example, Spink and Carron (1994) carried out two prospective studies – one in a university setting (Study 1) and another in a private fitness center (Study 2). In both, participants took part in a 13-week exercise program. Cohesion was assessed at Week 3 and adherence was measured by participant's attendance in the final four weeks of the program. The results for the university setting showed lower perceptions of task cohesion (Individual Attractions to the Group-Task) were associated with subsequent increased drop-out behavior. In the

private fitness center, lower perceptions of social cohesion (Individual Attractions to the Group-Social) were associated with subsequent increased drop-out behavior.

In the Spink and Carron (1994) research, exercise participants were young adults (i.e., <35 years of age). Research has also shown that perceptions of cohesion predicted older adults adherence behavior. Also, Estabrooks and Carron (1999a) assessed adherence of older adults (mean age = 67.7) in a 12-month exercise program. Participants completed the GEQ in the first month of the program and attendance was documented at months 1, 6, and 12. The authors found that three measures of cohesion – Individual Attractions to the Group-Social, Group Integration-Social, and Group Integration-Task – were positively related to attendance at one month while only Group Integration-Task was positively related to longer-term adherence (i.e., at months 6 and 12).

It is important to note that both Spink and Carron (1994) and Estabrooks and Carron (1999a) focused on individuals who were exercising on their own volition (typically referred to as ‘adherence’) as opposed to individuals in clinical settings who exercise because they are instructed to by a health professional (typically referred to as ‘compliance’). Brawley and Culos-Reid (2000) have pointed out that there are important motivational differences with regard to adherence and compliance behavior and both need to be investigated separately.

Fraser and Spink (2002) conducted one of the few studies examining the relationship between perceptions of cohesion and compliance behavior. Participants were adults with various medical conditions (e.g., diabetes, high blood pressure, arthritis, abnormal cholesterol, and obesity) who were instructed by a health care professional to exercise for the purpose of disease prevention and rehabilitation. Participants were assigned to a 12-week exercise program and perceptions of cohesion were measured using the GEQ at Week 4. Compliance behavior was assessed via subsequent program attendance and dropout behaviors. Attendance was operationalized as the number of classes attended divided by the total number of classes and dropouts included individuals who failed to complete the program. The researchers found that participants with higher perceptions of Individual Attractions to the Group-Task had higher attendance behavior. Interestingly, none of the cohesion measures were significantly related to dropout behavior. The authors explained this by referring to Spink and Carron’s (1993) suggestion that different types of adherence may be affected differentially by perceptions of group cohesion in exercise settings.

Cognitions about exercise

Estabrooks and Carron (2000b) investigated the predictive role of cohesion on cognitions – specifically perceived behavioral control. Participants ($n = 82$, mean age = 67.4) had been involved with the exercise program for a minimum of 4 months before the study began. Both task components of group cohesion were assessed in the first week of physical activity classes following a holiday break. During the 9th week of the 16-week program, perceptions of control (i.e., self-efficacy to schedule physical activity classes into ones regular routine) were assessed. The authors found that both task measures, Group Integration-Task and Individual Attraction to Group-Task, were positive predictors of perceptions of control. These results, in conjunction with Estabrooks and Carron’s (1999b) previous research, indicate that task cohesion has a consistent relationship with an exerciser’s perceptions of control.

Interventions based on enhancing class cohesiveness

Effectiveness of group-based interventions designed to promote physical activity

Reviews have been conducted that summarize the results related to the effectiveness of interventions that: (a) involve group-based physical activity, or (b) utilize a group-based approach (but not necessarily including a group-based exercise component) with the primary aim of increasing physical activity levels. For example, on behalf of the *United States Task Force on Community Preventive Services*, Kahn and colleagues (2002) conducted a systematic review of over 100 studies that examined the effectiveness of community-based interventions aimed at increasing physical activity. Based on a set of criteria outlined in their *Community Guide*, strong evidence was found for the effectiveness of a number of interventions, categorized into either informational approaches, behavioral and social approaches, or environmental and policy approaches. A recurring theme among many of these interventions was the inclusion of social support and/or group-based components. For instance, within the category of informational approaches, *community-wide campaigns* ($n = 10$ reports involving social support and self-help groups, counseling, risk factor screening, and other components) were found to be highly effective in increasing levels of physical activity. Speaking to their potentially broader scope of benefits, the authors suggested that 'through working together communities may develop a stronger sense of cohesion and collective self-efficacy. Social networks may be developed or strengthened to achieve intervention goals' (p. 78).

Within the behavioral and social approaches category, strong evidence was found for the effectiveness of *school-based physical education* interventions ($n = 10$ reports), as well as for *social support* interventions in community settings ($n = 9$ reports). Kahn and associates also reported that *individually-adapted health behavior change* interventions ($n = 20$ reports) – many of which were theoretically-based, included regular contact with researchers and other participants, and involved the recruitment of people into groups that worked toward physical activity goals – were highly effective in increasing levels of physical activity.

Among the reviews that have assessed the effectiveness of programs involving physical activity, group-based interventions are often compared to home- and/or individually-based physical activity interventions. In one such review, Dishman and Buckworth (1996) conducted an empirical synthesis of the physical activity intervention literature, including 127 studies containing a total of approximately 131,000 participants and 435 effect sizes. The locations of the interventions varied from communities to schools, worksites, homes, and health-care settings. Results provided support for the efficacy of group-based interventions; that is, interventions delivered to *groups* (i.e., in a group setting) produced much larger effects ($r = .75$) than interventions delivered to *individuals* (i.e., one-on-one, with little contact from other participants; $r = .16$), to the *family* (i.e., with individual family members and/or an entire family; $r = .05$), and to *individuals within a group* (i.e., participants receiving individual attention in addition to participation in group activities; $r = .04$).

Subsequent to the Dishman and Buckworth (1996) meta-analysis, Atienza (2001) conducted a narrative review of 39 studies containing 3,626 participants in which the efficacy of group- versus home-based physical activity interventions was examined in community settings. Interestingly, on the basis of his review, Atienza concluded that in comparison to group-based exercise programs, home-based programs were associated with greater adherence.

Finally, in a third review of the physical activity intervention literature, van der Bij, Laurant, and Wensing (2002) examined 38 studies including 57 physical activity

interventions and 16,403 participants. It was concluded that home-based, group-based, and education interventions were equally effective at promoting physical activity over the short-term.

Given that the purpose of the present paper was to review the literature pertaining to cohesion within the context of exercise groups, it should be noted that the reviews discussed above – with the exception of the Kahn *et al.* (2002) review – do not provide specific information about the influence of *cohesion* on exercise participation. For example, it is possible that a participant in a home-based exercise intervention could exercise in the presence of (or perceive to have high levels of social support from) a close-knit, cohesive family unit. Conversely, it is also possible that a participant in a group-based exercise program could complete an exercise class without communicating and/or interacting with other exercisers. Insofar as the latter scenario is concerned, some researchers (and anecdotally, many exercise instructors) have attempted to create exercise programs that foster enhanced cohesiveness among group members; that is, a variety of group dynamics principles (e.g., partner work, group goal setting, strategies to enhance communication and interaction) are incorporated into exercise classes with the primary aim of increasing task and/or social cohesion, and ultimately, program adherence. This type of ‘true group’ in an exercise situation represents a different psychological environment than a ‘standard’ exercise class where group dynamics principles are not used to increase cohesion among exercisers.

Support for the effectiveness of group-based exercise programs that utilize strategies to enhance cohesion was provided by Carron, Hausenblas, and Mack (1996). They conducted a meta-analysis (involving 87 studies with 49,948 participants) to quantify the effect of social influence (in the form of important others, family, class leaders, co-exercisers, and participation in groups characterized by higher social or task cohesiveness) on exercise adherence. They found that from an adherence perspective, exercising with others was superior to exercising alone (Cohen’s $d = .32$). Carron and colleagues also found that participation in classes characterized by higher task cohesiveness (i.e., the primary outcome of group dynamics strategies; Carron, Hausenblas, & Eys, 2005) was superior to participation in standard exercise classes (Cohen’s $d = .62$).

Taking into consideration the differences in group-based exercise interventions, and acknowledging that differences also exist in home-based interventions (e.g., some home-based programs include contact from researchers and health professionals while others do not), our research team conducted a meta-analysis to further explore the effectiveness of physical activity interventions (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006). In total, 44 studies were included containing 4,578 participants and resulting in 214 effect sizes. Physical activity interventions identified in the literature were screened for specific program characteristics and subsequently categorized into one of four contexts: (a) home-based programs that do not involve contact from researchers or health-care professionals; (b) home-based programs that involve some contact from researchers or health professionals; (c) exercise classes where group-dynamics principles are used to increase their cohesiveness (referred to as ‘true groups’); or (d) standard (‘typical’) exercise classes that do not involve the use of group-dynamics principles to increase cohesion.

The analyses revealed that for adherence, the *true group* interventions were superior to the standard exercise class interventions ($d = .74$), and in turn, the standard exercise class interventions were superior to the home-based interventions without contact from researchers or health professionals ($d = .72$). Finally, the collective and home-based interventions with contact did not differ from one another ($d = .09$). Thus, these findings

provide further support for the effectiveness of group-dynamics strategies used to promote cohesion (and a 'true group' atmosphere) in exercise classes.

An overview of group-based ('team building') physical activity interventions

One of the most widely used methods for enhancing perceptions of cohesion – whether in organizational teams, health care units, the military, sport teams, or exercise classes – is *team building*. Team building has been defined as 'a method of helping the group to (a) increase effectiveness, (b) satisfy the needs of its members, or (c) improve work conditions' (Brawley & Paskevich, 1997, p. 13). Within the context of exercise groups, the effectiveness of a team building intervention is typically measured in relation to its ability to enhance participants' adherence to the exercise program via increased perceptions of group cohesion.

For their research interventions in exercise settings, Carron and his colleagues have developed (Carron & Spink, 1993) and successfully utilized (Estabrooks & Carron, 1999a, Study 2; Spink & Carron, 1993) a four-stage model of team building to increase cohesiveness, and facilitate program adherence. In the first or *introductory stage*, the consultant provides the exercise instructor with a general understanding of the benefits of group cohesion (e.g., increased class attendance). In the second or *conceptual stage*, the instructor is introduced to a theoretical model consisting of three broad categories that are important to consider when attempting to increase the level of cohesiveness in an exercise class. These considerations surround the group's (a) *environment*, (b) *structure*, and (c) *processes*, and within each of these categories, a number of team building strategies are introduced. For example, the group environment category contains a principle entitled 'distinctiveness'. This relates to the idea that when exercisers perceive their class to be unique and clearly identifiable (typically as a result of strategies implemented by the instructor, such as creating a class name or logo), they are more likely to feel united. The group structure category contains two principles – 'group norms' and 'group positions', and the group processes category includes principles entitled 'interaction and communication' and 'sacrifice'. These principles were developed based on group dynamics theory which suggests that cohesion is facilitated when: (a) standards of behavior (norms) and group roles are clearly outlined, (b) group interaction and communication are facilitated, and (c) group members are encouraged to make personal sacrifices for other group members. A list of principles and corresponding strategies that can be used by researchers and exercise instructors to facilitate group cohesiveness in exercise classes is presented in Table 2.

The third stage of Carron and Spink's (1993) team building model is called the *practical stage*. Building upon the knowledge gained in the previous three stages, the exercise instructor works with the consultant to develop practical and relevant team building strategies for use throughout the exercise intervention. Finally, the fourth stage – the *intervention stage* – involves the delivery of the team building strategies generated by the instructor and sport psychology consultant in the exercise class. This final stage continues for the duration of the program and involves the ongoing implementation, monitoring, and re-evaluation of team building strategies.

The meta-analysis conducted by Burke and colleagues (2006b) provides evidence of the effectiveness of this team building approach through the superiority of the 'true group' interventions in relation to program adherence. More specifically – as was discussed previously in this review – physical activity interventions that have been developed based on Carron and Spink's (1993) team building model have been associated with such positive

Table 2. Examples of Team Building Strategies for Researchers and Group Exercise Instructors

Evidence-Based Principle	Intervention Strategies
Distinctiveness	^a Use a self-determined group name. Create group T-shirts. Hand out neon headbands and/or shoelaces. Make up posters or slogans for the class. ^c Recruit existing (self-selected) 'distinct' groups of friends, family members, and/or co-workers.
Individual positions/Proximity	^a Use three areas of the pool depending on fitness level. Use specific positions for low-, medium-, and high-impact exercisers. Let exercisers pick their own spot and encourage them to remain in it for the duration of the program. ^c Encourage self-selected groups (e.g., family members, friends, co-workers) to allow for geographic and/or emotional proximity. Recruit exercisers from locations where people aggregate in groups (e.g., work settings, community centers, religious institutions).
Group norms	^a Have group members introduce themselves to increase social cohesion. Promote a smart work ethic. ^b Establish positive group standards. Encourage exercise leaders in the class to set high standards of achievement.
Group goal setting	^c Encourage cooperative rather than competitive goals. Set group goals to figuratively and collectively walk a specified distance (e.g., 'across Kansas'), whereby a specific duration (e.g., 15 min) of moderate or vigorous physical activity is equivalent to a specific distance (e.g., 1 mile).
Individual sacrifices	^a Ask two or three people for a goal each day. Encourage regulars to help new people. Ask people who aren't concerned with weight loss to make a sacrifice for the group on some days (more aerobic activity) and people who are concerned with weight loss to make a sacrifice on other days (more flexibility training).
Interaction and communication	^a Use partner work and have participants introduce themselves. Divide into smaller sub-groups and take turns demonstrating a move. ^c Allow for weekly reporting of physical activity to a team captain. Promote occasional group social events. Recruit groups of friends, family members, or co-workers with pre-existing, regular interactions. ^c Provide information (e.g., weekly newsletters including benefits of physical activity and motivational tips) and feedback (e.g., weekly team updates in newsletters). ^c Encourage collective problem solving by identifying barriers to physical activity and creating solutions to overcome them.

^aAdapted from Carron and Spink (1993); Spink and Carron (1993).

^bWeinberg and Gould (2003).

^cEstabrooks, Bradshaw, Dziewaltowski, and Smith-Ray (in press).

outcomes as increased adherence (i.e., greater attendance during the program and higher return rates following a hiatus (Estabrooks & Carron, 1999a, Study 2), fewer dropouts and late arrivals (Spink & Carron, 1993), and greater levels of task cohesion (i.e., ATG-T; Spink & Carron, 1993) in both university students (Spink & Carron, 1993) and older adults (Estabrooks & Carron, 1999a, Study 2).

Another illustrative example of an intervention that has utilized the above-mentioned conceptual model as a template, with a particular emphasis on group goal setting, is a community-based program entitled 'Walk Kansas'. This large-scale physical activity promotion program was developed in 2002 by researchers and state and county program specialists, within the Kansas State University Agricultural Experiment Station and Cooperative Extension Service (Estabrooks, Bradshaw, Dzewaltowski, Smith-Ray, in press). According to the Walk Kansas website, this program consists of:

An 8-week walking program encouraging family members, schoolmates, co-workers, friends, and neighbors to come together as a team. Participants ... set goals for health and fitness. A Team Captain ... recruit[s] 5 people to make a 6-member team who ... collectively walk 423 miles, the distance across Kansas.

(<http://www.walkkansas.org/Welcome.aspx>)

Acknowledging the fact that a number of studies within the physical activity intervention literature do not report results related to generalizability or the application of evidence-based strategies into practice, Estabrooks and colleagues (in press) conducted a two-phase study to examine the individual (i.e., reach, effectiveness, and maintenance) and organizational (i.e., adoption and sustainability) impacts of Walk Kansas. With regard to effectiveness, results revealed that previously inactive and insufficiently active participants experienced significant increases in both moderate and vigorous physical activity from baseline to eight weeks. Insofar as reach is concerned, on average, Walk Kansas participants – in comparison to the adult population in the counties or state in which they lived – are more likely to be women (81% female), meet recommended guidelines for physical activity (57% vs. 44%), and be older in age (46 vs. 39 years). Results also revealed sustained behavior change (i.e., individual maintenance); participants assessed six months after the program did not experience significant decreases in moderate or vigorous activity. Finally, over a period of five years, the number of communities that adopted the program increased from 48 to 97, demonstrating program adoption and providing evidence for the sustainability of the program (i.e., organizational maintenance). Additional support for the organizational maintenance of the program stems from the fact that Walk Kansas is still (as of 2008) being implemented. Thus, the authors concluded that it is possible to increase physical activity in community settings using a group-based physical activity intervention that is based upon group dynamics theory, but does not consist solely of 'artificial' exercise groups (friends, family members, and co-workers were encouraged to join Walk Kansas), or group-based exercise classes.

Our research team (Burke, Shapcott, Carron, Bradshaw, & Estabrooks, 2008) used data collected from the 2003 Walk Kansas program to examine the relationship between group goal setting and group performance (i.e., miles walked by the group in total). A secondary purpose was to determine whether cohesion, self-efficacy, and previous physical activity level influenced the magnitude of the relationship. The sample consisted of 6,356 participants within more than 1,300 walking groups. Results revealed a positive relationship between group goal setting and group performance. Analyses also showed that both previous physical activity level and self-efficacy were moderators; the strength of the

relationship between group goal setting and group performance increased as the average self efficacy within the group and average level of previous physical activity increased. Interestingly, cohesion was not found to moderate the group goal setting-group performance relationship. Possibly, because participants enrolled in the program with family, friends and so on, there was insufficient variability in cohesion among the groups to be a significant factor.

On the basis of their statistical summary of the literature, Dishman and Buckworth (1996) noted several intervention components deemed to be important in the promotion and maintenance of physical activity. Specifically, they suggested that ‘... interventions based on the principles of behavior modification, delivered to healthy people in a community, are associated with large effects, particularly when the interventions are delivered to groups using mediated approaches ...’ (p. 712, as quoted in Brawley, Rejeski, & Lutes, 2000). On the other hand, a frequently cited criticism of group-based physical activity interventions is that once the group disbands, relapse will occur and physical activity levels will decline (Estabrooks *et al.*, 2008; King, Rejeski, & Buchner, 1998). Taking these strengths and the previously mentioned limitation into consideration, Brawley and colleagues have developed (Brawley, Rejeski, & Lutes, 2000) and successfully utilized a group-mediated cognitive behavioral (GMCB) approach to increase physical activity in a range of populations including older adults (Brawley *et al.*, 2000), older adults with (or at a heightened risk for) chronic disease (Rejeski, Brawley, Brubaker, Ambrosius, Fox, Focht, *et al.*, 2003; Rejeski, Foy, Brawley, Brubaker, Focht, Norris, *et al.*, 2002), and more recently, postnatal women (Cramp & Brawley, 2006). According to Brawley *et al.* (2000), this group-based intervention approach is based upon social cognitive theory (Bandura, 1986) and group dynamics (Cartwright & Zander, 1953), and was designed to ‘facilitate adherence to physical activity once participants had left the structure of formal exercise settings’ (p. 49). Thus, components of the GMCB approach incorporate both group- and individual-level strategies to promote physical activity both during and following involvement in a structured exercise program. Such strategies include: (a) self-monitoring of physical activity (e.g., using activity logs), (b) fostering distinctiveness/group identity (e.g., via group names and T-shirts), (c) individual and group goal setting (e.g., for number of steps taken per day), (d) group norms (e.g., for ‘age appropriate’ activity/sedentary time), (e) use of a ‘buddy system’, (f) engaging in group discussions related to identifying and overcoming barriers to physical activity, and finally, (g) an emphasis on promoting ‘independent exercise’ (e.g., via group discussions related to strategies for safely and effectively incorporating home-based activity into participants’ lives).

A specific example of a group dynamics-based team building intervention that has utilized the GMCB approach to facilitate physical activity both during and *following* program completion is the ‘Move More’ program (Estabrooks *et al.*, 2008). This intervention incorporates several principles and strategies outlined in Carron and Spink’s (1993) conceptual model, as well as others designed to promote independent/home-based activity, including: educational handouts; collective goal setting and problem solving; action plans for physical activity; demonstration of exercises to be completed at home; and group interaction and communication.

To examine the effectiveness of this intervention within a healthcare organization (i.e., Kaiser Permanente Colorado [KPCO]), Estabrooks and colleagues (2008) randomly assigned participants ($n = 115$, mean age = 48.8 years) to the Move More intervention or an enhanced standard care control group. Participants in the Move More condition attended two 2-hour group sessions and received one follow-up telephone call, while participants in the enhanced standard care control group received the same amount of

contact but were provided with a self-help guide to personal action planning, information pertaining to physical activity and goal setting, and a reference guide for local physical activity resources. Results indicated that while participants in both conditions increased their physical activity over the three-month intervention, only those in the team building condition maintained (or further increased) their initial changes in physical activity at the nine-month follow up period.

Summary

Based on the literature reviewed above, a number of conclusions can be advanced. First, it is reasonable to suggest that, in general, exercise classes can in fact be considered 'true groups', and that an examination of cohesion within this domain is a valid protocol. Second, an examination of the literature related to physical activity preferences has shown that for the most part, individuals prefer exercising with others rather than exercising alone. Third, research has provided strong evidence of the explanatory and predictive associations between perceptions of cohesion in exercise classes and physical activity-related behaviors, cognitions, and affective responses. Finally, with regard to group-based physical activity interventions, meta-analytic summaries have provided support for a general conclusion that exercising with others – and in a 'true group' specifically – is associated with superior adherence behavior. Additionally, Carron and Spink's (1993) conceptual model of team building has provided the foundation for several studies that have reported positive results in terms of cohesion and adherence *during* exercise programs (and in one study, following a 10-week break; Estabrooks & Carron, 1999a, Study 2). However, subsequent research has also provided support for the conclusion that it is important for researchers and exercise instructors to develop and utilize strategies to promote independent (i.e., home-based) exercise behavior upon completion of formal exercise programs. Taken together, these group dynamics approaches have proven to be effective in the promotion and maintenance of physical activity in a wide range of populations.

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