

Incorporating a Sense of Community in a Group Exercise Intervention Facilitates Adherence

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Abstract

Participant attrition is detrimental for exercise intervention studies, particularly if dropout is not random. Community engagement has helped facilitate participant adherence, which is particularly applicable for group exercise programs. Developing a sense of community (SOC) helps participants feel that they belong and provides ongoing social support. This paper reports on strategies used during an 11-week high intensity functional training (HIFT) intervention with exceptionally high adherence (96.7%) that involved 30 participants (57% women, age 36.7 ± 4.5 years). Participants recorded their heart rate variability using a smartphone app daily throughout the study, completed three different weeks of fitness assessments, and attended six weeks of five days/week HIFT group exercise sessions led by a certified coach. Coaches used strategies to facilitate group interactions and individual feedback and engagement. Participants completed a follow-up survey that included 14 items from the SOC in sport scale (SCS), eight questions about group dynamics, and three open-ended study feedback questions that were coded using the SOC categories. All SCS items were highly rated (mean range = 4.51-4.93/5) as were the group dynamics items (mean range = 4.30-4.85/5). Common interests were the most mentioned SOC category in open-ended responses, and while the participants reported really enjoying the study, they provided constructive feedback for improving future studies. Using specific strategies to facilitate a SOC in exercise intervention research (e.g., group exercise, social media connections, and facilitating participant interactions) are recommended for both researchers and practitioners to avoid attrition and encourage adherence, particularly for programs with high daily participant burden.

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Introduction

Attrition, defined as participant dropout over the course of a scientific study, is a consistent concern when conducting intervention and longitudinal research, especially when dropouts differ from retained subjects (Barry, 2005). While some attrition is unavoidable, attrition rates over 20% are problematic because they increase the likelihood that dropouts are not random and threaten internal and external validity

(McQuaid et al., 2003). In the best case, when due to chance, attrition will lower a study's statistical power. However, when those who dropout have unique characteristics, the remaining sample no longer represents the original sample, potentially biasing results (Barry, 2005). These biases can translate to overestimating an intervention's effectiveness, and reducing generalizability outside the sample (Barry, 2005; McQuaid et al., 2003).

Exercise interventions are especially prone to high attrition (Marcus et al., 2006) with several literature reviews reporting mean attrition rates between 11.5% and 50% among exercise intervention studies (Hacker & Mjukian, 2014; Linke et al., 2011; Schmidt et al., 2000), and individual studies reporting rates as high as 76% (Jancey et al., 2007). Compared to retained participants, exercise intervention dropouts have reported greater disease burden, worse self-perceived physical health, less physical activity, and poorer performance in exercise-related tasks at baseline (Schmidt et al., 2000). These findings align with additional studies purporting those who drop out of exercise interventions are usually less physically active at baseline and report poorer overall health compared to those who complete the exercise interventions (Arikawa et al., 2012; Courneya et al., 2010; Irwin et al., 2004). Given this trend, attrition in exercise interventions is likely not random, increasing the prospect of biased results (Barry, 2005; Marcus et al., 2006). Further, because those who are dropping out of exercise interventions tend to be less healthy than those retained, dropouts could be the greatest beneficiaries from study participation due to the positive effects of exercise on disease burden, physical functioning, and overall health and wellbeing (Anokye et al., 2012; Penedo & Dahn, 2005).

Strategies to Minimize Attrition in Exercise Interventions

Researchers have studied strategies to improve retention within exercise interventions. In a review of sustained versus intermittent exercise interventions, Linke and colleagues (2011) found the highest adherence rates for studies that included some sort of community engagement throughout. For example, a 16-week study with a 12% attrition rate included weekly

feedback between participants and a counselor as well as problem solving with other participants (Coleman et al., 1999). Similarly, a 20-week study with a 7% attrition rate included weekly group-based behavioral sessions with participants (Jakicic et al., 1995).

Other researchers also credit a sense of community (SOC) for better participant retention within exercise interventions (Dionigi & Lyons, 2010; Heinrich et al., 2017; Lautner et al., 2020; Pickett et al., 2016). Sarason (1974) defines SOC as an environmental or community characteristic that leads to individuals feeling a sense of belonging and social support at the group level. McMillan and Chavis (1986) developed the SOC theory to identify the key elements that produce the experience of SOC, namely membership (i.e., feeling of belonging or personally relating to others in the group), influence (i.e., feeling that you matter to and/or can make a difference within the group), integration and fulfillment of needs (i.e., feeling your needs will be met by group participation), and shared emotional connection (i.e., commitment and belief of sharing commonalities and experiences over time). Thus, while there are several strategies to prevent attrition from a research design perspective (e.g., follow-ups with participants, incentives), creating a SOC might be a way to facilitate strong participant retention within exercise interventions.

High-intensity Functional Training

High-intensity functional training (HIFT), defined as “a training style [or program] that incorporates functional, multimodal movements, performed at relatively high intensity, and designed to improve parameters of general physical fitness and performance” (p. 1), is an increasingly popular exercise modality used in the general public and as part of exercise interventions (Feito et al.,

2018). Studies using HIFT-interventions consistently report retention and adherence rates of 80% or higher (Eather et al., 2016; Heinrich et al., 2012, 2015; Murawska-Cialowicz et al., 2015; Nieuwoudt et al., 2017). Similarly, research shows HIFT participants often report greater enjoyment in and adherence to exercise, as well as a stronger SOC, than participants in other exercise modalities (Heinrich et al., 2014; Pickett et al., 2016). Thus, HIFT could offer a solution to several of the attrition-related issues in the exercise intervention literature. First, because HIFT can be modified to accommodate any fitness level and experience (Claudino et al., 2018; Feito et al., 2018), those who are less physically active to start might be retained more readily. Additionally, because participants report greater enjoyment and SOC when engaging in HIFT (Heinrich et al., 2017; Lautner et al., 2020; Whiteman-Sandland et al., 2016), HIFT-style interventions might be more efficacious in retaining participants for the duration of a study.

Purpose of the Present Study

Herein, we present a retrospective assessment of the impact of SOC on participation in an 11-week-long HIFT intervention that achieved an exceptional participation rate. Specifically, across the 11-week study, the overall adherence rate was 96.7%. Only one participant dropped out after week 7, due to the need for emergency mouth surgery (not due to the intervention). Prior to outlining the methods used to assess SOC and study participation we briefly discuss the HIFT intervention and describe who participated.

Methods

The HIFT intervention was a two-site randomized-control trial, designed to assess

whether modulating exercise training intensity in response to individuals' daily resting heart rate variability (HRV) would positively affect various physiological, morphological, and perceptual responses to a HIFT program (Crawford et al., 2020; DeBlauw et al., 2021). The study required high participant burden as there were 70 consecutive days of involvement required including daily monitoring and reporting of resting HRV and 30 days of HIFT workouts. Participants were reimbursed \$10 for purchasing the phone app used to track HRV but were otherwise not compensated for their study participation. All procedures were vetted and approved by the university's Institutional Review Board (#9131).

Participants

Participants were 30 recreationally active adults; 57% were women ($n = 17$) and average age was 36.7 ± 4.5 years. Participants were recruited via flyers, a university email newsletter, social media pages, and word of mouth. All participants completed written informed consent.

Exercise Program

The 30 HIFT sessions were conducted as group exercise led by a coach with at least a CrossFit Level 1 certificate and assisted by a researcher. Each session included a check-in, review of the session plan and the workout of the day, a warm-up, skill practice, workout of the day, and a cool-down. During sessions, coaches fostered community through supportive and encouraging positive interactions (e.g., asking how participants were feeling, fun plans for the weekend), provided individualized feedback and coaching, and encouraged participants to cheer each other on during the workouts. Coaches modeled behaviors such as celebrating accomplishments (e.g., finishing

a difficult workout, learning a new skill), while allowing for supportive competition during workouts (Heinrich et al., 2017). Efforts to build trust included frequent interactions to ensure participants felt valued, as well as a sense of belonging and social support at the group level. Participants were also engaged daily via a social media app (i.e., GroupMe) to debrief their workout experience across all three of the day's classes; providing encouragement and humor with each other.

Sense of Community Assessment

To better understand the study's exceptionally low attrition rate, all 29 adherent participants completed an online Qualtrics survey. To assess the development of community during the intervention, we used the Sense of Community in Sport scale (SCS) (Warner et al., 2013). The SCS has yielded reliable and valid data in previous studies, with Cronbach's alphas ranging from 0.76 – 0.86 and average variance extracted (AVE) scores from 0.62–0.72 for the 6 subscales (Warner et al., 2013). We made slight wording modifications to fit the HIFT context. We chose not to include four questions from the *leadership* subscale as they were not relevant for the intervention format (e.g., "I have influence over what the intervention is like"). Participants answered the 14 SCS questions by rating each item from "strongly agree" (1) to "strongly disagree" (5), and items were reverse scored for analysis (see Table 1). The four *administrative consideration* questions addressed how coaches expressed care or concern for participants. Three *common interest* questions addressed networking, group dynamics, and friendships that resulted from program participation. Three *competition* questions addressed the chance to excel via internal and external rivalries. Two *social spaces* questions asked

about the common area(s) within the facility where participants could interact. Finally, two *equity of administrative decisions* questions addressed whether participants felt they were treated equally.

In order to further assess group dynamics effects of the intervention related to SOC, we asked participants to answer eight questions developed for the study using the same answer scale from "strongly agree" (1) to "strongly disagree" (5); these items were also reverse-scored for analysis. The items (see Table 2) addressed key intervention aspects such as a competitive atmosphere, group training, accountability, friendships, social support, community environment, and enjoyment. Finally, participants were asked three open-ended questions to explain: what they liked most about participating in the study; what could be improved based on their experience as a study participant; and any other comments they had.

Results

Sense of Community

As shown in Table 1, all SOC items were rated as "strongly agree" (i.e., 4.51–4.93/5). Having social spaces including places and times to interact with other participants were the highest rated items (all were rated 4.93 ± 0.27). The next highest rated items comprised administrative consideration, which addressed coaches caring and supporting participants, feeling comfortable talking with coaches, and feeling like a valued participant (means ranging from 4.63–4.81). The equity in administrative decisions subscale had the next highest average rating ($m = 4.61 \pm 0.58$) and reflected decisions and considerations of coaches, followed closely by competition ($m = 4.60 \pm 0.42$), which reflected enjoying the level of competition during the study and bonding with other study participants through competition. Finally, while still highly rated,

having common interests with other participants had the lowest average rating ($m = 4.51 \pm 0.68$) and reflected feelings of

belonging, sharing values with other participants, and gaining friends who were committed to the study.

Table 1

Scores for Sense of Community Subscales and Individual Items (N = 29)

Subscales and Items	Range^a	Mean (SD)
<i>Administrative Consideration</i>		
CrossFit coaches cared about other participants	4-5	4.78 (0.42)
CrossFit coaches supported other participants	4-5	4.81 (0.40)
I felt comfortable talking openly with the CrossFit coaches	4-5	4.63 (0.49)
The CrossFit coaches made me feel like a valued participant of this study	3-5	4.70 (0.61)
<i>Common Interest</i>		
I shared similar values with other participants in this study	2-5	4.51 (0.68)
I felt like I belonged in the group in this study	2-5	4.52 (0.70)
The HRV CrossFit Study provided me with friends who shared a strong commitment to the training program	2-5	4.60 (0.69)
<i>Equity in Administrative Decisions</i>		
CrossFit coaches made decisions that benefited everyone	3-5	4.61 (0.58)
CrossFit coaches considered everyone's needs when making decisions	2-5	4.59 (0.57)
<i>Social Spaces</i>		
When going to the CrossFit gym, there were places where I could interact with other participants	4-5	4.63 (0.69)
When going to the CrossFit gym, there were times when I could interact with other participants	4-5	4.93 (0.27)
<i>Competition</i>		
I felt a bond with other participants of HRV CrossFit study when I was competing against them	4-5	4.60 (0.42)
I liked the level of competition during the HRV CrossFit study	2-5	4.63 (0.69)
Competing with other participants during the HRV CrossFit study was fun	4-5	4.59 (0.50)
4-5	4.59 (0.50)	4.59 (0.50)

^aRating scale: 1 = strongly disagree to 5 = strongly agree.

Group Dynamics

Like the SOC items, participants “strongly agreed” with all but one group dynamics effects item (see Table 2). Of interest, participants demonstrated strong reciprocal social support, as “wanting other group members to succeed” ($m = 4.85 \pm 0.36$) and

“other group members wanted me to succeed” ($m = 4.81 \pm 0.40$) were two of the highest rated items. Having accountability from working out with a group was also highly rated ($m = 4.81 \pm 0.40$), although participants were not as excited about having group workouts ($m = 4.30 \pm 0.72$). They did find the group workouts enjoyable ($m = 4.74$

± 0.53) and the competitive atmosphere motivated their effort during workouts ($m = 4.70 \pm 0.67$). They found the exercise more

enjoyable due to the community environment ($m = 4.67 \pm 0.48$) and making friendships with other group members ($m = 4.62 \pm 0.70$).

Table 2

Scores for Group Dynamics Effects (N = 29)

Item	Range ^a	Mean (SD)
I wanted other group members to succeed	4-5	4.85 (0.36)
I felt like other group members wanted me to succeed	4-5	4.81 (0.40)
Working out with a group made me feel accountable to come to class every day	4-5	4.81 (0.40)
Working out with a group made training each day more enjoyable than if I had worked out alone	3-5	4.74 (0.53)
The HRV CrossFit study created a competitive atmosphere that made me want to work harder	2-5	4.70 (0.67)
The HRV CrossFit study provided a community environment that would make exercising long-term more enjoyable	4-5	4.67 (0.48)
I made friendships with other group members that made training more enjoyable	2-5	4.62 (0.70)
Working out with a group made me excited to come to class each day	3-5	4.30 (0.72)

^aRating scale: 1 = strongly disagree to 5 = strongly agree.

Qualitative Responses

Two researchers identified 34 unique datapoints from qualitative responses that aligned with at least one of the SOC subscales. The most common subscale mentioned was common interests ($n = 13$), while competition ($n = 3$) was the least mentioned. Some responses fit more than one SOC theme and some comments did not fit any of the themes, and were categorized as “other,” including ways to improve future studies ($n = 19$), participant satisfaction ($n = 7$), personal improvements ($n = 4$), and study-related opportunities ($n = 2$).

As mentioned, common interests were clearly a key component to many participants’ study experiences. Participants expressed feeling a bond when they spent quality time with each other doing beneficial activities. One participant said “*I loved the supportive group environment! Everyone*

started out at a different place, but I felt that I created a bond with the people I was in class with daily. It was great for accountability and made me want to push myself harder.” Similarly, another participant stated, “*The coaches and group were my people for the summer, and I had the best time!*”

Participants strongly agreed that administrative considerations ($n = 8$) were reflected within the intervention, suggesting participants appreciated the coaches’ presence, encouragement, and support. One participant commented, “*The coaches were also fantastic at creating a positive, yet challenging atmosphere.*” Their comments also reflected appreciation for learning, “*I was able to learn how to weightlift correctly and made significant improvements throughout the study.*”

Equity in administrative decisions ($n = 6$) was addressed when participants expressed

how they liked having workouts planned for them and the effort coaches put in behind the scenes to offer a structured and effective workout. For example, one participant commented, “[I liked having] a *planned workout*” and another said, “*having someone else make a workout for me instead of me having to make one for myself.*” Another stated, “*I enjoyed having a structured workout and being held accountable.*” A participant also mentioned that there was excellent communication between the coaches and participants.

Surprisingly, participants did not comment on social spaces to interact, but they did mention interactions with other participants ($n = 4$). Four participants remarked about liking, “*the group workouts*” and “*getting to work out with a group.*” Three comments reflected aspects of competition including, “*Working out with others gave me a push to work harder and longer.*” Another participant remarked, “*I also really enjoyed that the group had a fun yet competitive atmosphere.*”

In addition to responses relative to SOC subscales, participants provided useful feedback regarding ways to improve study offerings in the future, such as having more information about the workouts ahead of time, including “*Knowing the workouts the day before to dress accordingly,*” or even more information about HIFT itself (e.g., “*I had no idea what it was when I signed up*”). Some suggestions were about the workouts themselves, such as having “*harder workouts,*” “*less kipping practice,*” and “*some of the workouts could of [sic] been longer/more intense.*” Other participants asked for more individual coaching, “*I think that there could be more coaching on an individual basis to ensure that participants are completing exercises with the correct form,*” and “*...it seemed like some days (especially early on) more trainers to help coach individually would have been*

beneficial.” Some were interested in additional information such as to “*...include take home workouts and meal plan options conducive to CrossFit workouts for participants to continue working out and trying to improve their health after the study.*” A few participants also thought the time demands of the study could be reduced, “*try to stick to a 45 minute rather than 1-hour total time*” and “*5 days a week was a lot for me. I’d prefer spreading times out more.*”

Overall, participants expressed satisfaction with the study, such as the participant that stated, “*The study was great and I’m so glad I was able to participate!*”, or the participant who had an “*Excellent experience and I would love to do it again.*” Participants also noted improvements they experienced from their study participation. They also appreciated the opportunities the study provided for “*getting to do the workouts I wouldn’t normally be able to,*” and “*...very appreciative of the free classes and great coaching.*”

Discussion

This case study contributes to the literature on attrition prevention and adherence to exercise interventions. Specifically, we described strategies used to facilitate participant interactions and experiences during an 11-week exercise intervention with extremely high participant adherence and low attrition. Strategies used during the study were designed to facilitate group interactions and individual feedback and engagement. We also reported on participants’ experiences using a SOC context. Overall, participants rated all SOC aspects highly as well as highly rating group dynamics effects of the study. The largest group of participant comments addressed common interests, with multiple comments mentioning developing bonds with each other

through the community aspects of the study and workout sessions.

Our study results reflect previous HIFT research that had high retention rates ($\geq 80\%$) (Eather et al., 2016; Heinrich et al., 2012, 2015; Murawska-Cialowicz et al., 2015; Nieuwoudt et al., 2017), as well as research showing high SOC among HIFT participants (Heinrich et al., 2014; Pickett et al., 2016). Although our study participants had participated in resistance and aerobic training in the past year, they had not been regularly participating in structured exercise. Due to the strategies we employed in our 5-days/week HIFT program, along with the flexibility of scaling each workout to any fitness/experience level (Claudino et al., 2018; Feito et al., 2018), we were able to not only get the participants to initiate exercise but also to retain them for the entire 11-week study. And, since our intervention utilized a popular HIFT program (i.e., CrossFit[®]), they could continue participation following the study.

Qualitative comments from participants did not exactly reflect average ratings for SCS items, as the largest number of comments mentioned aspects of common interests while the highest mean ratings were for the social spaces subscale. Study participants felt motivated by the competitive atmosphere facilitated by coaches during the study, as it allowed them to push themselves while also supporting each other. This reflects previous research suggesting that competition can actually lead to high intrinsic (i.e., internalized) motivation (Frederick-Recascino & Schuster-Smith, 2003). Additional group dynamics ratings and qualitative comments reflected the value of accountability for several participants, which has previously been identified as a key enabler for exercise adherence (McArthur et al., 2014).

Retaining participants by generating a SOC is not unique to HIFT interventions. The

ability to create a sense of belonging and provide group-level social support to participants (Sarason, 1974) have been identified as a key characteristic for exercise interventions with high retention rates (Linke et al., 2011). For example, a successful walking study included interactions between study participants and a counselor (akin to our HIFT coach) (Coleman et al., 1999). In sum, because of its notable quality of life enhancing benefits, (Berkman et al., 2000) along with the potential for increased program retention and satisfaction (Kellett & Warner, 2011), the construct of SOC in group exercise interventions should be of interest for those looking to maximize behavior maintenance as well as to be useful for practitioners who offer group exercise programs.

When reporting attrition, it is vital to identify the reasons for attrition (Barry, 2005). Specifically, researchers should not only report their attrition rate, but also list the specific reasons participants did not complete an intervention. In doing so, future research can seek to account for and address common reasons for attrition across studies. This should become common practice, because it is important to understand why participants do not continue exercise and determine their individual characteristics, as differential dropout by less healthy participants (Arikawa et al., 2012; Courneya et al., 2010; Irwin et al., 2004; Schmidt et al., 2000) can unnecessarily skew study results as well as fail to benefit from the exercise programs themselves (Anokye et al., 2012; Penedo & Dahn, 2005).

Some considerations should be noted that may have influenced our study adherence rate. Specifically, it is possible that the format of the HIFT intervention affected participation. Recent findings (Feito et al., 2018) note a relationship between CrossFit participants' enjoyment and training frequency, including two studies that

reported higher enjoyment among CrossFit participants than those engaging in more traditional resistance programs (Fisher et al., 2017; Heinrich et al., 2014). Additionally, a qualitative study targeting CrossFit coaches identified social facilitation and SOC constructs as important factors for initiation and adherence (Heinrich et al., 2017).

Implications for Health Behavior Theory

Although SOC theory was originally developed within the field of community psychology, it is clearly applicable to group exercise. After qualitatively and quantitatively exploring the SOC experienced by participants, we believe it played a major role in preventing attrition and promoting adherence in this study. The theory-based strategies employed within this investigation may be useful to for researchers designing exercise intervention studies with a high degree of participant burden. Specifically, to promote adherence and prevent attrition, researchers should consider strategies to foster a SOC among study participants including, but not limited to, providing group-based training opportunities, establishing a social media platform for communication, and creating time and space for social interactions within study facilities.

Discussion Question

While our study focused on a group-exercise program, it is likely that developing a sense of community might facilitate adherence to other types of health behavior interventions. How might the sense of community theory constructs be applied for other health behaviors?

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