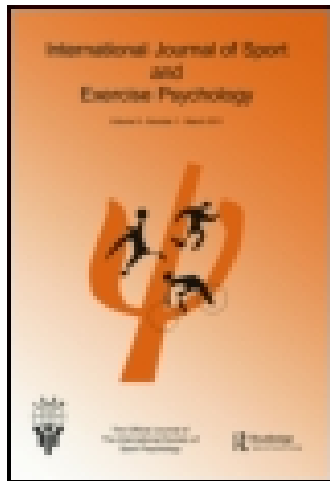


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Publisher: Routledge

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International Journal of Sport and Exercise Psychology

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rjjs20>

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Published online: 05 Aug 2015.



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To cite this article: Christopher K. Forrest & Mark W. Bruner (2015): Evaluating social media as a platform for delivering a team-building exercise intervention: A pilot study, International Journal of Sport and Exercise Psychology, DOI: [10.1080/1612197X.2015.1069879](https://doi.org/10.1080/1612197X.2015.1069879)

To link to this article: <http://dx.doi.org/10.1080/1612197X.2015.1069879>

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Evaluating social media as a platform for delivering a team-building exercise intervention: A pilot study

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(Received 20 June 2014; accepted 19 June 2015)

The group-based intervention of team building (TB) has been found to foster group cohesion and exercise adherence. To date, TB interventions have typically used a leader who is present within the exercise setting to deliver the intervention. Given the high accessibility and global popularity of the Internet, a TB intervention delivered online has the potential to effectively reach populations at risk of physical inactivity such as first-year university students. Yet, to our knowledge research has not examined the efficacy of a TB exercise intervention delivered online. The purpose of the study was to evaluate the efficacy of an online TB exercise intervention to enhance cohesion, group task satisfaction, physical fitness and exercise adherence. The purpose was explored in two phases. In Phase 1, first-year university students ($n=27$) completed questionnaires assessing cohesion and group task satisfaction in addition to physical fitness tests pre- and post-an eight-week online TB exercise intervention. Results revealed that post-intervention, cohesion increased along with group task satisfaction and measures of physical fitness. In Phase 2, adherers ($n=15$), dropouts ($n=4$) and exercise leaders ($n=4$) participated in focus-group interviews. Themes emerged revealing reasons for adherence, such as cohesion, as well as reasons for dropout, such as perceived lack of time. Collectively, the findings support the efficacy of an online TB exercise intervention to foster cohesion, increase group task satisfaction and improve physical fitness.

Keywords: team building; exercise; online intervention; group cohesion

A growing body of literature indicates that when an individual adheres to a regular programme of physical activity, many health benefits (physical and psychological) will follow (Warburton, Nicol, & Bredin, 2006). Consequently, increasing an individual's commitment to a physical activity programme becomes important. A number of approaches have been used in an attempt to increase adherence to physical activity programmes. One approach that has received considerable attention is the use of groups (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006; Bruner & Spink, 2011; Estabrooks, Harden, & Burke, 2012). It has been shown that group-based approaches lead to higher adherence levels among exercisers than individual programmes (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006). This finding may be attributed to a general preference by individuals to be active with a group as opposed to on their own (Wilson & Spink, 2009). Therefore, a group-based intervention appears to be an effective approach to increase adherence to a physical activity programme.

Cohesion is an important construct for physical activity adherence and is commonly defined as "a dynamic process that 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

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needs” (Carron, Brawley, & Widmeyer, 1998, p. 213). It has been found that individuals attending group-based exercise classes with higher perceptions of cohesion have greater exercise adherence; thus, fostering a cohesive physical activity environment can be an effective approach to promoting adherence (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006).

One way to improve exercise adherence by enhancing group cohesiveness is through the group intervention of team building (TB). TB in an exercise setting has drawn on the definition of Newman (1984) who defined TB as an intervention designed to “promote a greater sense of unity and cohesiveness, and to enable the team to function together more smoothly and effectively” (p. 27). Research examining TB, cohesion and exercise adherence has displayed a positive relationship among these concepts (Carron & Spink, 1993; Spink & Carron, 1993). Specifically, TB has been associated with increased attendance (Estabrooks & Carron, 1999), decreased tardiness (Spink & Carron, 1993) and reduced dropout (Spink & Carron, 1993) in studies with adults. Furthermore, in a recent study examining the effect of TB on youth, exercise session attendance increased following the introduction of a TB exercise intervention (Bruner & Spink, 2011).

During the transition from high school to university, many individuals see a decline in their physical activity levels as they face real and perceived barriers such as lack of time (e.g. busy school and work schedules) and lack of accessibility (e.g. cost of gym memberships and lack of facilities; Bray & Born, 2004; Gyurcsik, Bray, & Brittain, 2004). This decrease in physical activity is a contributing factor to a significant weight gain for both men and women during first-year university (3.5 and 4.0 pounds, respectively; Holm-Denoma, Joiner, Vohs, & Heatherton, 2008). Therefore, research is warranted to examine the effect of a TB exercise intervention on the physical fitness of this population.

An important distinction within the TB research in physical activity settings is the implementation strategy used. TB interventions may be delivered directly or indirectly. TB interventions in which the intervention specialist (e.g. exercise or sport psychology consultant) works directly with the group uses a direct approach (e.g. Yukelson, 1997). Alternatively, an indirect approach refers to situations in which the TB interventionist does not work directly with the team or group; rather, the intervention specialist trains the exercise or sport leader to implement the TB strategy with his/her respective exercise group or team (Carron, Spink, & Prapavessis, 1997). Both approaches have been found to be equally effective (Martin, Carron, & Burke, 2009; Paradis & Martin, 2012).

Much of the TB exercise research to date has used an indirect approach in which a leader who is physically present within the exercise setting delivers a TB intervention designed with a intervention specialist at a TB workshop (e.g. Bruner & Spink, 2011; Carron & Spink, 1993). An indirect TB approach has been found to be an effective strategy to promote physical activity adherence with a wide age range of populations (e.g. youth, adults and older adults; Bruner & Spink, 2011; Carron & Spink, 1993; Watson, Martin-Ginis, & Spink, 2004). Although as stated by Brawley and Paskevich (1997), specific leaders may not have the patience, time or commitment to fully facilitate a TB intervention, therefore reducing the effectiveness of the TB intervention. In addition, given the increasing costs of in-person interventions, lower cost interventions reaching larger audiences are becoming more and more important to improving public health (Napolitano et al., 2003). With advances in technology over the past decade, connecting with the rest of the world has become a much easier task. Currently, there are 845 million active users on Facebook (2012), yet to our knowledge researchers have not used social media to increase group cohesion in an exercise setting. It is believed that a tool of this magnitude can overcome the barrier of accessibility and increase the amount of people that can be affected by a TB intervention at one time.

When looking at first-year university students specifically, the potential behind using social media to deliver an online TB exercise intervention becomes even more apparent. In fact 93%

of young adults use the Internet and 81% access the Internet wirelessly, meaning access to social media from almost anywhere in the world at any time (Lenhart, Purcell, Smith, & Zickuhr, 2010). Evidence shows that health interventions delivered online can foster effective behaviour change, improving dietary and physical activity patterns (Baranowski et al., 2003). This is encouraging given the high accessibility and global popularity of the Internet, suggesting that well-designed online interventions have the potential to effectively reach large populations at risk of physical inactivity and foster behaviour change. A recent study indicated that 72% of people already access the Internet for health or medical information (Fox & Duggan, 2013). These findings illustrate a shift towards Internet-based health and fitness programmes rather than traditional in-person programmes. Compared to in-person programmes, Internet-based interventions have the potential to reach larger audiences, as they can better overcome the barriers of accessibility and cost (Marcus et al., 2007). In addition, they offer flexibility as individuals can read, digest and use information on their own schedules, addressing barriers to participation such as lack of accessibility which may emerge within in-person interventions (Dunn, Andersen, & Jakicic, 1998). Collectively, these three empirical studies highlight the growing importance of further research examining the efficacy of the Internet (i.e. social media) as a platform for the delivery of a TB exercise intervention. Therefore, the overall purpose of the present research was to evaluate the efficacy of an online TB exercise intervention to enhance cohesion, group task satisfaction, physical fitness and programme adherence. To address the overall purpose, two distinct, yet related phases of research were conducted. The objective of Phase 1 was to determine if group cohesion, group task satisfaction and physical fitness could be improved through a TB exercise intervention delivered online. The objective of Phase 2 was to examine what led individuals to complete or dropout of the programme and to conduct an evaluation of the online TB exercise intervention.

Phase 1

Methods

Participants

Twenty-seven first-year university students ($M_{\text{age}} = 18.62$, $SD = 1.31$) were recruited through a combination of presentations and posted recruitment notices targeting first-year university students at a Canadian university. Given the target population of the study, participants had to be between 18 and 24 years old, entering their first year of university and be interested in improving or maintaining their physical fitness levels. To be eligible participants also had to answer “no” to all seven questions of the Physical Activity Readiness – Questionnaire (Thomas, Reading, & Shepard, 1992) indicating that they were healthy enough to adopt a programme of physical activity. Initially 80 students were contacted and 27 participants agreed to participate. All 27 were declared eligible to complete the programme and were randomly assigned into 4 fitness groups (6–7 participants per group) led by 1 of 4 fitness leaders. Of the 27 participants, 25 were females and 2 were males suggest that females were more interested in joining the advertised group-based exercise programme. The largely female sample is indicative of previous TB, cohesion studies in group exercise settings (Bruner & Spink, 2010; Carron & Spink, 1993). In addition, previous research conducted by Burke, Carron, and Eys (2006) found that exercising in structured exercise classes was the least preferred context for exercising for males while it was the second most preferred for females. Twenty participants ($M_{\text{age}} = 18.34$, $SD = 0.82$) completed the intervention (i.e. adherers) and seven participants ($M_{\text{age}} = 19.04$, $SD = 1.83$) did not complete the intervention (i.e. dropouts). At the conclusion of the intervention, one fitness group had six participants left, two fitness groups had five participants left and one fitness group had four participants remaining.

Measures

Group cohesion, group task satisfaction and physical fitness were assessed at baseline and two weeks following the completion of the eight-week online TB exercise intervention.

Group cohesion. A modified version of the positively worded Group Environment Questionnaire (GEQ; Carron, Widmeyer, & Brawley, 1985) adapted for an exercise setting was used to assess cohesion. Although the GEQ was originally written for sport teams, the items have been modified slightly to reflect the exercise context (e.g. Carron, Widmeyer, & Brawley, 1988, Study 4). Internal consistency values for the modified version have been shown to be similar to those reported for the original sport measure (Carron & Spink, 1992) and the modified GEQ has been used in group exercise investigations (Bruner & Spink, 2010; Spink & Carron, 1994; Watson et al., 2004). An example of a modified GEQ item is “for me this fitness group is one of the most important social groups in which I belong”. The original sport item was “for me this team is one of the most important social groups in which I belong”.

Four cohesion subscales were assessed including: Individual Attractions to the Group-Task (ATG-T), Individual Attractions to the Group-Social (ATG-S), Group Integration-Task (GI-T) and Group Integration-Social (GI-S). The 18 items were answered using a 9-point scale anchored by 1 (*strongly disagree*) and 9 (*strongly agree*). An example of each item is as follows: ATG-T, “I’m happy with the amount of physical activity I get in this program”, ATG-S, “I do enjoy the social interaction occurring in this fitness program”, GI-T, “Our fitness program group is united in trying to reach its goals for fitness” and GI-S, “Members of our fitness program group often socialize together”.

Group task satisfaction. A subscale of the Athlete Satisfaction Questionnaire (Reimer & Cheladurai, 1998) was used to assess the group task satisfaction of participants. The 4 items were answered using a 7-point scale anchored by 1 (*not satisfied at all*) and 7 (*extremely satisfied*). An example group task satisfaction item is “Fitness group member’s dedication to work together towards group goals”.

Physical fitness. Three tests from the Canadian Physical Activity, Fitness & Lifestyle Approach Protocol (CPAFLA; Canadian Society for Exercise Physiology, 2003) were used to assess the physical fitness levels of participants. The three fitness tests completed were push-ups, partial curl-ups and vertical jump height. The number of successful repetitions of push-ups and partial curl-ups (following CPAFLA guidelines for proper technique) were recorded, along with vertical jump height in inches.

Procedure

The intervention included two unique components: a standardised exercise programme and an online TB exercise protocol. Leaders ($N=4$) were trained on the implementation, delivery and teaching of the standardised exercise programme, entitled *Freshman Fit-teen*. The standardised exercise programme consisted of 30-minute, body weight workouts which leaders delivered in-person. Each workout contained 12 exercises – 4 upper body exercises (e.g. decline push-ups), 4 lower body exercises (e.g. wall sit) and 4 core exercises (e.g. plank). Exercise sessions were observed by a research assistant to ensure that the standardised exercise programme was delivered correctly. All participants followed the same eight-week schedule. There were two exercise sessions per week completed in university residence fitness rooms. The intervention contained three phases: baseline (sessions 1–5), implementation (sessions 6–10) and integration (sessions 11–16).

The second component that took place in addition to the standardised exercise programme was the online TB exercise protocol. The four leaders (two men and two women) participated in a TB workshop. The workshop followed a TB model developed by Carron and Spink (1993), which consists of a four-stage process involving an introductory, a conceptual, a practical

and an intervention stage. Stages one through three took place at a workshop led by one of the researchers. The fourth stage took place online in a closed Facebook group which was made specifically for each fitness group.

The introductory stage provided leaders with a basis for introducing a TB programme. To this end, benefits for both groups in general and for exercise classes were specifically outlined. In the conceptual stage, leaders were presented with the linear TB model consisting of inputs, throughputs and outputs. Cohesiveness was the desired output and two broad categories – the group’s structure and the group’s environment – were identified as inputs. These two inputs influence the throughput, group processes, which contribute to the development of the output, group cohesiveness (Carron et al., 1997). The practical stage of the TB workshop was the development of TB strategies that exercise leaders would implement with their own fitness groups. To do this the five specific factors outlined within Carron and Spink’s (1993) TB model were targeted, including in the group structure category – group norms and group positions, in the group environment category – distinctiveness, and in the group processes category – individual sacrifices and communication/interaction (see Figure 1). For each factor, leaders were given an operational definition and a research-based rationale as to why the factor was included in the TB model. Each exercise leader then developed a TB protocol using the five TB factors in the model as a template. The TB protocol was tailored so that it could be delivered online utilising the many unique tools of social media that may be beneficial for TB. The reason for allowing exercise leaders to develop their own strategies rather than using one standardised one was twofold. The first reason is that the leaders differ in personality and preferences, so one strategy that may be effectively implemented by one leader may not be by another. The second reason is that DeCharms’ (1979) origin-pawn research and Deci and Ryan’s (2008) self-determination theory suggest that motivation is enhanced when individuals are given greater control (autonomy) over personal behaviours, and this could be accomplished by allowing leaders to select their own strategies. At the end of the workshop, the researcher examined and approved the final online TB protocol that would be implemented by each instructor. Examples of the specific strategies suggested by the leaders are presented in Table 1.

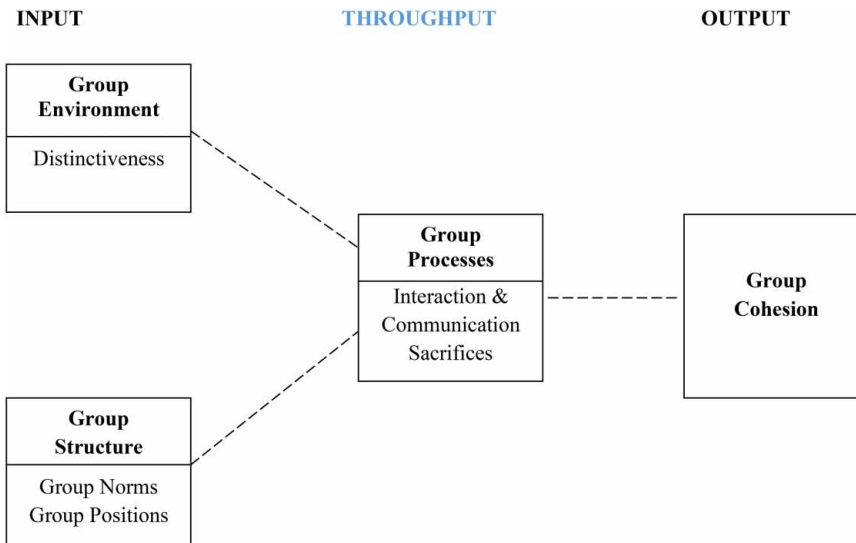


Figure 1. TB conceptual framework. Source: Carron and Spink (1993).

Table 1. Online TB intervention strategies identified by fitness leaders.

Category		Example of intervention strategies used
Group environment	Distinctiveness	Creating a Facebook group name Creating a group logo Creating an exclusive (closed) group
	Group structure	Members took a profile picture depicting group/group logo Creating a point system for attendance (visual to all who are online)
Group processes	Group norms	Having different leaders every week who post motivational videos and encourage others
	Interaction/communication	“Liking” and commenting on member’s posts Online voting (e.g. most improved member and best effort) Posting motivational quotes, pictures and videos and workout songs
	Individual sacrifices	Chatting to different people within the group Posting the sacrifices they made to stay in the programme

The five TB factors addressed in the online TB protocol were implemented on specific sessions during Phase 2 (implementation) of the intervention. All participants received the TB content exclusively through social media (Facebook) following their exercise sessions. Participants joined a closed Facebook group which was exclusive to the members of their group and moderated by their leader. Through a group chat the leader implemented the online TB exercise protocol. Research assistants continuously monitored the Facebook groups and were present during survey administration and fitness testing to ensure that the intervention was implemented by the leaders as planned. In addition, during the 10–15-minute online meetings, attendance was recorded by noting who was online. When additional messages were posted outside of the meeting times it could be observed who viewed the message through Facebooks “seen by” feature. This allowed information to be gained relating to how much/often individuals accessed the Facebook group. Leaders were also observed by a research assistant during the exercise sessions to make sure that no TB strategies were being employed during the exercise sessions by the leaders. This was done to ensure that the TB protocol was delivered exclusively online. Following the completion of the intervention participants completed the follow-up survey and were invited to return two weeks post-intervention to participate in a focus group (Phase 2).

Results

To evaluate internal consistency, Cronbach’s alpha values were computed for each of the measures and included in the results if the alpha values were greater than .70 (Nunnally & Bernstein, 1994). The Cronbach’s alpha values were .81 and .76 for the ATG-T subscale, .80 and .84 for the GI-T subscale and .95 and .90 for the GI-S subscale, at pre-test and post-test, respectively. ATG-S was not included in the results, as it was found to have poor internal consistency (.58 and .51). The Cronbach’s alpha values for the group task satisfaction subscale were .89 and .93, at pre-test and post-test, respectively.

Based on the recommendations for analyses of pilot studies (Arain, Campbell, Cooper, & Lancaster, 2010; Lancaster, Dodd, & Williamson, 2004), a focus on descriptive results was reported for the study variables. An examination of the pre–post means in Table 2 revealed improvements in three subscales of cohesion (ATG-T, GI-T and GI-S), group task satisfaction and the three physical fitness variables (push-ups, vertical jump height and curl-ups).

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Table 2. Descriptive statistics.

	Pre	Post
ATG-T	7.49 (1.05)	7.87 (.88)
ATG-S	6.95 (1.22)	7.62 (.87)
GI-S	7.25 (1.39)	7.6 (1.07)
GI-T	6.96 (2.07)	7.2 (1.52)
Group task satisfaction	6.03 (.77)	6.31 (.65)
Push ups	27.5 (13.48)	36.93 (12.36)
Partial curl-ups	38.56 (16.58)	43.75 (10.68)
Vertical jump height	29.47 (7.37)	34.20 (10.27)

Paired sample *t*-tests revealed that the ATG-T subscale of cohesion improved significantly ($t(19) = -2.46, p = .04, d = -1.13$). Group task satisfaction also improved significantly from pre-test to post-test ($t(15) = -2.22, p = .02, d = -1.15$) as well as two of the physical performance measures, push-ups ($t(15) = -5.74, p < .01, d = -2.97$) and vertical jump height ($t(15) = -3.34, p < .01, d = -1.72$). All variables had a medium to large effect size. A *post hoc* comparison between adherers and dropouts revealed no differences on baseline measures of cohesion, group satisfaction and physical fitness.

Discussion

This study is the first, to our knowledge, to evaluate the efficacy of a TB exercise protocol delivered through an online platform. Findings indicated a significant increase in group task cohesion (ATG-T) following the implementation of an online TB exercise protocol. These findings support the past TB literature and its positive impact on cohesion specifically task cohesion in exercise settings (Bruner & Spink, 2010; Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006; Carron & Spink, 1993; Spink & Carron, 1994). The significant perceptions of task cohesion are consistent with other cohesion research comparing university versus private fitness club settings. Spink and Carron (1994) found task cohesion to be a significant discriminator for exerciser adherence, while in private fitness club settings, social cohesion was a more salient predictor of adherence (Spink & Carron, 1994). In addition, the findings are consistent with a meta-analysis on social influence by Carron, Hausenblas, and Mack (1996) which found a moderate to large effect on adherence for young adults exercising in task cohesive groups. The study findings also extend the previous literature examining the relationship between TB and exercise adherence (e.g. attendance, dropout; Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006) to TB and measures of physical fitness. Finally, the results support past research linking TB and group task satisfaction (Bruner & Spink, 2011).

Phase 2

Phase 1 demonstrated the efficacy of an online TB exercise intervention to foster group cohesion, increase group task satisfaction and improve physical fitness. The objective of Phase 2 was to determine what may have led individuals to complete or dropout of the programme and to conduct an evaluation of the online TB exercise intervention.

Methods

Participants

In Phase 2, seven focus groups were conducted: four focus groups were conducted with participants classified as adherers who had completed the entire eight-week online TB exercise intervention,

one focus group was conducted with participants classified as dropouts who did not complete the intervention, and one focus group was conducted with the exercise leaders. In total, 23 individuals participated in the interviews: 15 adherers, 4 dropouts and 4 exercise leaders. Each focus group contained three to four participants. Although typical focus groups have 6 to 10 people (Patton, 2002), the small size of the focus groups is in keeping with Krueger and Casey's (2000) suggestion that the researcher may gain an enhanced level of understanding with smaller groups of participants. Further, smaller groups are recommended when the participants have a great deal to share about the topic (Krueger & Casey, 2000). Participants were recruited through presentations following the completion of the intervention. Interested participants had to have completed at least the baseline phase of the eight-week online TB exercise intervention (sessions 1–5).

Procedure

Phase 2 used a semi-structured open-ended focus-group format, which is similar in style to an ordinary conversation with the interviewees doing most of the talking (Patton, 2002). This allowed the interviewer to focus the topic of discussion but allowed the interviewees the freedom to answer openly without restrictions. Each focus group took place at a mutually agreed upon time and location (i.e. classroom) and was audio recorded. Focus groups were conducted instead of individual interviews because focus groups draw upon participants' attitudes, feelings and experiences in a way in which would not be feasible using other methods (Morgan & Krueger, 1993). Compared to individual interviews, which aim to obtain individual attitudes, feelings and experiences, focus groups elicit a multiplicity of views and emotional processes within a group context (Morgan & Krueger, 1993). Focus groups are also particularly useful when exploring the degree of consensus on a given topic which is important when conducting an evaluation of a group-based intervention (Morgan & Krueger, 1993).

A three-section interview guide was created specifically for the study participants by members of the research team. A copy of the interview guide can be obtained by contacting the first author. The first section of the interview guide contained open-ended questions intended to introduce the topic and initiate discussion (e.g. could you tell us about the exercise programme that you took part in?). The second section addressed the main questions concerning possible determinants of adherence or dropout (e.g. what factors related to the group/programme/outside of the programme contributed to you completing or dropping out of the exercise programme?). The second section also evaluated the online TB exercise intervention (e.g. can you describe any strengths or weaknesses of the online TB exercise intervention?). Finally, the third section contained concluding questions that allowed participants the opportunity to include additional information they felt was relevant (e.g. is there anything that could have been done to help those who dropped out of the programme stay with it?). A similar three-section interview guide was created for exercise leaders with questions reworded to reflect their role as leaders. To ensure consistency all participants were interviewed by the same interviewer. Each focus group lasted between 30 minutes and 45 seconds and 45 minutes and 12 seconds with the average length being 36 minutes and 10 seconds.

Data analysis

The current study used thematic content analysis to identify, analyse and report emerging themes from within the data (Braun & Clarke, 2006). First, the audio-recorded interviews were transcribed verbatim. This yielded 36 pages of single-spaced transcripts. This process allowed the first author to become immersed in the data and become familiarised with the depth and breadth of its content. Second, each interview was analysed and broken down into meaning units. Pang and Ha (2008) described meaning units as a segment of text composed of words,

sentences or entire paragraphs that convey the same idea. Meaning units were organised and stored using the Nvivo 10 computer software program. Third, each meaning unit received a tag relevant to its content. Once tags were assigned to each meaning unit they were examined for similarities and grouped together forming properties. Finally, each property was examined and grouped into similar units called categories. Trustworthiness was operationalised based upon credibility, transferability, dependability and confirmability and was established for data collection, analysis and conclusions (Lincoln & Guba, 1985). Credibility for this research was achieved through participant observation during the focus-group sessions by the moderator and also through triangulation. The triangulation took place between the informants' comments, field notes and transcripts. Transferability was achieved through purposeful sampling and obtaining thick descriptive data which facilitated the comparison of the findings between the seven focus groups. In addition, field notes and analysis notes were kept to ensure a continuous audit trail for the dependability of the findings. The field and analysis notes were also utilised in the confirmability audit conducted by the second author following the seven interviews to demonstrate the neutrality of the research findings (Lincoln & Guba, 1985). To ensure the trustworthiness of the data analysis, the second author conducted a reliability check on 20% of the responses. This process yielded an inter-rater reliability of more than 85% between researchers. These levels of agreement are considered acceptable levels of inter-rater reliability (Banerjee, Capozzoli, McSweeney, & Sinha, 1999; Riffe, Lacy, & Fico, 1998). Any discrepancies between the researchers were resolved during a meeting between the two researchers.

Results

The objective of Phase 2 was to examine the factors that led individuals to complete or dropout of the fitness programme and to evaluate the effectiveness of an online TB exercise intervention. The reasons for adherence or dropout and an evaluation of the effectiveness of an online TB exercise intervention are included in this manuscript as they emerged as higher order categories. Quotes from the interviews are provided; each quote is followed by a label to credit the participant who provided the quotation. PL indicates the quote came from a leader (PL1–PL4), PA indicates the quote came from an adherer (PA1–PA15) and PDO indicates the quote came from a dropout (PDO1–PDO4).

Reasons for adherence

Participants stated a variety of explanations as to why they completed the online TB exercise intervention. A number of commonalities emerged in their responses. The most frequently coded explanation was a sense of cohesion.

I think our group is the reason I stuck with the program. I really enjoyed the social aspect and actually became friends with the other girls in our group so it was great motivation to keep going. (PA10)

In addition to the reported social cohesion influencing programme attendance, many of the adherers also commented on the important role task cohesion played in their participation.

I really liked the program because of the fact that everyone was together. If one person was going really hard it kind of pushed all of us to go really hard as well. (PA11)

If participants completed the online TB exercise protocol (implementation phase) they were more likely to adhere to the exercise programme, as noted in one of the focus groups:

The Facebook group was really good. We came up with a team name and made a logo. We would talk about our team and what we would be doing next week and it was something to look forward to, like we had pink day or high school spirit day. (PA 15)

Reasons for dropout

Participants who dropped out of the programme before the end of the online TB exercise intervention also offered a variety of reasons as to why they were unable to adhere to the programme. Although there were a variety of reasons presented, no participant stated that the standardised exercise programme or the online exercise TB protocol was the reason for dropping out. Reasons for dropout included lack of time, injury and lack of accessibility:

Lack of Time. It was around midterms I think, yes I would say right around midterms (when I stopped going). There was a lot of studying and work piling up. I fell behind in a few classes so I had to stop and focus on school. (PDO3)

Injury. We had gone to the gym on the Sunday and then I went to Insanity on the Monday and then literally like landed flat on my leg and I had to go to the doctor and he said just to stay off it for a little bit or I would probably have to do physio. But ya I would hope to do it (the exercise program) again next semester. (PDO2)

Lack of accessibility was noted as a barrier to the programme, as the exercise sessions were done in-person and only held at two residence locations. Lack of accessibility was not a barrier to the online TB component however, as participants could access the virtual group from anywhere:

Lack of Accessibility. I know some people did not do it (exercise program), because they would have to go all the way down to lower residence to take the class ... they wanted to join but it was a pain to go down (to lower residence) for just half an hour because it would turn into an hour or an hour and a half trip. (PA11)

Online TB exercise intervention evaluation

A variety of strengths and weakness surrounding the use of this novel platform for delivering TB exercise interventions were presented. The commonalities in terms of strengths of the online TB exercise intervention were improved communication and accessibility, as illustrated by the following quotes:

Improved Communication. I thought it was another way we were all connected and communicated. So after our workouts we would meet on the Facebook chat and we would say comments about our goals and what we did and what we need to work on. We also posted motivational things to keep us going, like motivational pictures of each other. It was always funny to look back at the pictures and use them as motivation. (PA2)

Improved Accessibility. It was good because we could workout in person and then just all talk on Facebook at night, which we are always on anyways [laughter]. (PA1)

In addition to the support received for the online TB exercise intervention, constructive criticism was provided which will be the key to improving the effectiveness of future online TB exercise interventions. Suggestions included starting the online TB exercise intervention at the beginning of the exercise programme and holding the 30-minute workouts at each residence building on campus, as illustrated by the following quotes:

Start at Beginning. Ya like we did not start it until middle of the way through (the program). Right at the beginning I think could have been more effective and more motivation to continue with the program because I did enjoy using the Facebook group once we started it. (PA6)

Multiple Locations. I really enjoyed the 30 minute workouts, the problem was that it took a long time to get down to lower residence because of the buses. It would have been better if the classes could have been held at every residence building. (PA7)

Further insight into the strengths and weaknesses of delivering a TB exercise intervention online was provided by the leaders. The strengths of improved communication, accessibility and content delivery were reiterated in addition to a newly identified strength, documented content, as illustrated by the following quote:

Also it's documented if it's online rather than if it is in-person. Once it's said (in-person) it is kind of gone. When it's on Facebook it is there forever, so you can go back to it and you can still see it and learn from it. (PL2)

There were no cons for delivering the TB exercise protocol online identified by the leaders, but suggestions were made to further improve the effectiveness of the intervention. Leaders, similar to participants suggested starting the Facebook groups at the very beginning of the intervention, as shown in the following quote:

Ya I think once Facebook was introduced with the group it got them together even more, not only because we were talking about the class but because it made everyone more comfortable. It made them want to come more, so starting right from the beginning would have been even better. (PL3)

This improved sense of cohesion resulting from an earlier introduction of the Facebook groups could have led to more participants adhering to the programme.

Discussion

The results of the current study provide preliminary support for the benefits of an online TB intervention to foster cohesion in an exercise setting. In particular, participants enjoyed the online TB experience and improved their physical activity adherence through the content that was delivered. Likewise, participants felt that they were more a part of a team and enjoyed exercising in a group setting. Finally, the participants noted that they bonded during the online meetings and improved their sense of belonging, which is a benefit of group-based interventions (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006). In terms of reasons for not completing the programme a variety of explanations were presented and they were in line with the common reasons why individuals would dropout of a physical activity programme. Reasons such as lack of time and accessibility are well-documented deterrents of physical activity in first-year university students (Gyurcsik, Spink, Bray, Chad, & Kwan, 2006). These deterrents arose in this intervention, but participants were able to offer some suggestions as to how to improve adherence and minimise the impact of these real and perceived barriers. Suggestions, such as 30-minute workouts at all residence buildings on campus provided insight into how to design the most effective programme to improve the physical activity levels of first-year university students. Participants also noted that the primary outcome of the online TB exercise intervention was group cohesion and this helped to overcome some of the other barriers of physical activity, such as lack of motivation.

General discussion

The overall purpose of the study was to evaluate the efficacy of an online TB exercise intervention to improve cohesion, group task satisfaction, physical fitness and exercise adherence. This purpose was explored in two phases. Phase 1 found that task cohesion (ATG-T) significantly

increased following the implementation of an online TB exercise protocol. The use of an online TB exercise protocol was also found to effectively increase group task satisfaction and improve physical fitness. Quantitative findings supporting an online TB exercise protocol were followed up with a qualitative evaluation conducted through a semi-structured open-ended focus-group format. Adherers who completed the online TB exercise intervention, dropouts who did not complete the online TB exercise intervention and exercise group leaders participated in the focus groups. Findings from the focus groups provide additional support for the efficacy of an online TB exercise intervention to foster cohesion and improve group task satisfaction and physical fitness. In general, participants stated that they enjoyed the online TB experience and improved their exercise adherence through the content that was delivered. The use of a virtual group allowed participants to receive content delivered through the Internet, allowing participants to take part in the TB intervention from anywhere with Internet access while still feeling like they were a part of a group. In addition, the TB content delivered by leaders was documented in the virtual groups allowing participants to revisit the content. This allowed participants to view discussions from previous online TB sessions, allowing for a better understanding of the TB content that was delivered.

Reasons for not completing the programme did not pertain to the structure of the two components of the intervention, the standardised exercise programme or the online TB exercise protocol; rather, they were traditional barriers to physical activity. Lack of time and lack of accessibility to the in-person workouts were cited as reasons for dropping out. The evaluation generated suggestions as to how to overcome these barriers to physical activity. Suggestions in terms of time and location were made (i.e. 30-minute workouts in each residence). Finally, with the increased sense of cohesion participants noted a reduction in perceived barriers to physical activity resulting in improved exercise adherence.

Phase 1 and 2 findings provide additional support for TB and its positive impact on cohesion in an exercise setting (Bruner & Spink, 2010) and provide new support for delivering TB exercise protocols online. When looking at work from McFadzean and McKenzie (2001) it can be noted that an online TB exercise protocol aligns well with their suggestions on how to effectively facilitate virtual learning groups. The use of an online TB exercise protocol allows a leader to support a collaborative learning process between group members and encourage them to work as a team online. Online TB exercise protocols also fit well within McFadzean and McKenzie's (2001) model, as they promote an environment that allows for "any time/any place learning" in which participants can log on to the system at anytime from anywhere, surmounting the constraints of time and distance.

Phase 1 findings also offer further support for a link between TB and an individual measure of task satisfaction (Carron & Spink, 1993). This also builds on other research that has shown a positive relationship between cohesion and group and individual satisfaction (Bruner & Spink, 2011; Spink, Nickel, Wilson, & Odnokon, 2005) offering further support for online TB as a way to foster cohesion and correspondingly group task satisfaction. Finally, Phase 1 findings build on past research that has shown that other online interventions have effectively improved physical activity by reaching at-risk populations (Jago et al., 2006). Improved physical fitness can be further explained by looking at the relationship between TB and several measures of exercise adherence. TB has been found to effectively improve attendance, decrease tardiness and reduce dropout in an exercise class setting (Bruner & Spink, 2011; Carron & Spink, 1993; Estabrooks & Carron, 1999). Adherence to a programme of regular physical activity has been found to bring about many physical, psychological and health benefits (Warburton et al., 2006) offering an explanation for the improvements in physical fitness.

In Phase 2, it was found that participant reasons for enjoying the online intervention were that the use of a virtual group allowed them to receive content delivered through the Internet, allowing

them to take part in the intervention from anywhere with Internet access while still feeling like they were a part of a group. This is practical because it has been found that young adults use the Internet more than any other demographic population (Purcell, Smith, & Zickuhr, 2010). In addition young adults are also the most frequent users of social media (Chou, Hunt, Beckjord, Moser, & Hesse, 2009). Furthermore, there was additional support for the beneficial effects of TB to foster cohesion as a primary outcome (Bruner & Spink, 2010). With this increased sense of cohesion came a reduction in perceived barriers to physical activity resulting in improved exercise adherence, which is a goal of group-based physical activity interventions (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006).

This study is not without its limitations. The study design precluded the use of a control group. While the preliminary results of this pilot study appear promising (e.g. medium to large effect sizes of study variables, qualitative findings of participants and leaders), the addition of a control group in a larger future study will strengthen the design of the intervention and the conclusions that could be drawn (Arain et al., 2010). Inclusion of a control group will allow future researchers to determine the effect of the online TB protocol on cohesion, group task satisfaction and physical fitness. From the evaluation, it can be noted that participants expressed a high level of support for online TB exercise interventions, citing ease of accessibility, improved content delivery and improved communicative capabilities as reasons for their support. In addition, several participants noted that they felt like they were a part of a team, offering further support to an online TB exercise protocol as a viable method to foster cohesion. A second limitation was the absence of an assessment of the exercise instructors' leadership styles by the participants. Although fitness sessions were observed by a research assistant ensuring that no TB strategies were employed in-person, the instructors' leadership styles as observed by the participants could possibly have contributed to the heightened levels of cohesion and group task satisfaction reported during the intervention (Loughead & Carron, 2004).

Despite these limitations, the study possesses a number of strengths. The study is the first, to our knowledge, to examine the relationship between an online TB exercise protocol and cohesion in an exercise setting. The study also addressed the relative absence of evaluation in the TB activity literature (Brawley & Paskevich, 1997; Bruner & Spink, 2010) and considered multiple perspectives when doing so (i.e. adherers, dropouts and leaders). Other strengths included a number of improvements upon existing online physical activity interventions. First, the study improved upon past online physical activity interventions that had limited evidence of their efficacy, as their outcomes were reported through indirect measures such as stages of motivational readiness (Van Den Berg, Schoones, & Vlieland, 2007). In our study, the primary measure of physical activity was measured through physical fitness testing, giving an accurate indication of physical activity levels pre- and post-intervention. The final strength of our study included the use of focus groups to evaluate the programme and identify the reasons behind participant dropout and adherence. These strengths combine to provide support for social media as a platform for delivering TB interventions in an exercise setting. This finding could be a major component in the design of future physical activity interventions targeting young adults (Michie, Abraham, Whittington, McAteer, & Gupta, 2009).

Future directions

Based on the qualitative findings from the study, future research should start the TB intervention at the beginning of the intervention and offer 30-minute workouts at multiple locations near campus. To obtain more in-depth information from future interventions, researchers may wish to evaluate each of the five TB factors to assess the effect that each individual TB factor had on cohesion. Moreover, advances in technology have led to the creation of different software packages that can better

track a user's engagement on social media. For example, engagement tracking tools such as Botlenose, can track more than 150 metrics related to user engagement across multiple social media platforms (Yang, 2013). By incorporating a software that can track user engagement in future interventions, researchers may be able to collect more detailed information on participant engagement, including time spent in virtual groups, interactions with fellow group members and leaders, and engagement on other social networks. Monitoring engagement across multiple social media platforms is becoming more important because platforms such as Twitter and Instagram are increasing in popularity (Stokes, 2014). More importantly, Instagram now has the highest rate of engagement among all major social networks (Stokes, 2014). Researchers may want to incorporate multiple social networks into future interventions in order to further increase the effectiveness of the intervention and gain additional insights.

When a TB intervention is delivered in-person, limitations such as space and accessibility become a factor. The limitations of space and accessibility are non-existent in social media, as exemplified in the statistics that there are currently 845 million active users on Facebook (2012). An interesting future direction would be to examine how large we can make virtual groups across different social networks and still foster cohesion. Researchers may also want to compare an online TB group to an in-person control TB group in order to determine which platform is more effective with this specific population in an exercise context.

Similar to previous TB interventions using Carron and Spink (1993) conceptual model, task cohesion was the focus of the TB intervention. The significant finding of the two task cohesion subscales aligns with the previous research. Although not significant the social cohesion subscales did increase in the predicted direction and participant insights about their experiences indicate that they felt more socially integrated with other participants following the intervention. The lack of significance of social cohesion in Phase 1 may be attributed to the task focus of the TB intervention, low alpha values for the ATG-S subscale, and that the majority of the participants were strangers at the beginning of the intervention. Perhaps with a greater focus on social elements in the online TB protocol and a longer intervention, social cohesion may have emerged. Given that both task and social cohesion have been associated with exercise adherence (Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006) this is an important area of future research. A related area of future research may involve expanding the measurement of group task satisfaction to group social satisfaction. Group social satisfaction is operationalised as satisfaction with how members get along as a group. If an intervention is designed to target social cohesion via an online TB protocol, team social satisfaction (Reimer & Chelladurai, 1998) would warrant measurement, as an online TB protocol may foster group social satisfaction in addition to group task satisfaction.

In addition, studies should examine how to effectively use social media to improve the physical activity of older populations (55 and over) and adolescents. Presently social media has the broadest reach and impact when the target population is young adults but there is relatively low penetration into older populations (Chou et al., 2009). Future studies should look at how to introduce this highly accessible tool to older populations as a way to promote physical activity behaviour change. Studies should also evaluate how to effectively tailor an online TB protocol to improve the physical activity of adolescents as only a small percentage (7%) of Canadian adolescents meet the Canadian Physical Activity Guidelines (Colley et al., 2011).

While group research has been well documented in the activity domain (e.g. Burke, Carron, Eys, Ntoumanis, & Estabrooks, 2006), minimal research has attempted to understand how online groups can influence exercise behaviour. This study provides preliminary support for the efficacy of a group-based online TB exercise intervention to enhance group cohesion, group task satisfaction and physical fitness of young adults. With groups having such powerful effects on human

behaviour (McGrath, 1984), it will be important to further investigate the efficacy of delivering group-based interventions online to positively impact the exercise behaviours of individuals.

Acknowledgements

The authors also wish to thank Dr. Christopher Shields and Dr. Mark Eys for their insightful comments on an earlier version of this manuscript.

Funding

This research was supported through an internal research grant from the Schulich School of Education at Nipissing University.

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