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Influence of social support within a physical activity and psychosocial program for at-risk girls: Findings from the GUM feasibility trial.

Nicole Hargreaves^{1,*}, Tanya Forneris¹, Catherine M. Sabiston², Stephen Berg³, Kent C. Kowalski⁴, Leah J. Ferguson⁴, and Cristina Caperchione⁵

1 School of Health and Exercise Science, University of British Columbia, Kelowna, BC, Canada, V1V1V7

2 Faculty of Physical Education, University of Toronto, Toronto, ON, Canada, ONM5S

3 Okanagan School of Education, University of British Columbia, Kelowna, BC, Canada, V1V1V7

4 College of Kinesiology, University of Saskatchewan, Saskatoon, SASK, Canada, S7N5A2

5 School of Sport, Exercise and Rehabilitation, Human Performance Research Centre, University of Technology Sydney, Sydney, NSW, Australia, NSW2007

*Corresponding Author: n.hargreaves@alumni.ubc.ca

Abstract

Purpose: Girls United and on the Move (GUM) is a multi-component feasibility project aimed at enhancing physical activity (PA) and perceived social support among 'at-risk' adolescent girls. The purpose of this study was to explore changes in and relationships between PA participation, commitment, enjoyment, social support, and basic psychological needs (BPN) support among participants. **Methods:** A quasi-experimental design was utilised. Participants ($N=83$) aged 11-15 years were recruited from schools within British Columbia, Canada. PA participation, commitment, enjoyment, social support, and BPN were measured at baseline (T1), 6-weeks (BPN only; T2), and 9-weeks post intervention (T3). Semi-structured interviews ($N=30$) were conducted to explore the importance of social support for PA. **Results:** Self-report data indicated no significant differences from T1 to T3 in PA participation ($p=0.92$), commitment ($p=0.61$), enjoyment ($p=0.44$), or social support ($p=0.81$). BPN support was predictive of PA commitment ($F_{(2,80)}=3.62$, $p \leq 0.05$) and enjoyment ($F_{(2,80)}=4.53$, $p \leq 0.05$), above social support. Interview data revealed three themes: 1) Role of peer and family support, 2) Importance of trustworthy role models, and 3) Empowering at-risk youth through new opportunity. **Conclusions:** The GUM program provided opportunities for at-risk girls to engage in PA in a socially accepting environment, whilst teaching them valuable life skills. **Health & Fitness Journal of Canada 2021; 14(2):3-17.**

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Introduction

Physical activity (PA) participation has been shown to provide a number of physical and mental health benefits for adolescent girls, including the prevention/reduction of non-communicable diseases (e.g., cardiovascular disease, type 2 diabetes,

obesity) and improvements in mental health and psychosocial well-being (e.g., depression, self-esteem) (Kantanista, Bronikowski, Laudańska-Krzemińska, Król-Zielińska, & Osiński, 2017; McNamee, Timken, Coste, Tompkins, & Peterson, 2017; Ranøyen, Stenseng, Klöckner, Wallander, & Jozefiak, 2015; Springer,

Sharma, de Guardado, Nava, & Kelder, 2006). Despite these positive health outcomes, more than 80% of the world-wide adolescent population is reportedly physically inactive (World Health Organization, 2018), with as little as 6% of Canadian adolescent girls currently meeting the recommended PA guidelines of 60-minutes of moderate-vigorous PA (MVPA) per day (Statistics Canada, 2017). This inactivity epidemic is further highlighted among adolescent girls who are classified as 'at-risk' and are thought to experience additional hardships which may further impede PA participation and lead to debilitating mental health and psychological outcomes (Santos, Hardman, Barros, da Franca, & Barros, 2015). An 'at-risk' adolescent girl may be classified as such due to a number of preceding disadvantaged lifestyle conditions, such as low socioeconomic status, history of abuse or sexual exploitation, and social isolation (Santos, Hardman, Barros, da Franca, & Barros, 2015; Schneider & Cooper, 2011; van den Berg, Mond, Eisenberg, Ackard, & Neumark-Sztainer, 2010).

PA has the potential to provide an outlet to alleviate many of the hardships experienced by at-risk youth. When done with peers, it can increase levels of social engagement and provide a sense of positive behavioral progression, while effectively promoting confidence, self-esteem, intrapersonal skills (Chen, Sun, & Dai, 2017), and enabling at-risk youth with a sense of belonging (Chen et al., 2017; Ranøyen et al., 2015). Peer support can also aid in the underlying enjoyment and commitment to engage in PA behaviors (Chen et al., 2017; Dishman et al., 2005; King, Tergerson, & Wilson, 2008). Other adult figures (i.e., other than parents and/or guardians) can also have a meaningful impact on levels of PA. In

particular, building relationships with health instructors and making connections with local community group support leaders has been identified as beneficial in mediating PA participation and enjoyment, as well as fostering self-worth and self-efficacy for this sub-population (Bean, Forneris, & Fortier, 2015; Gibbons, 2014; Gruno & Gibbons, 2016). For instance, Bean et al. (2015) explored the effects of empowering disengaged adolescent girls from low socio-economic households, through an intervention focused on enhancing PA participation and supporting basic psychological needs (BPN) (Bean et al., 2015). They found that trained and experienced program facilitators were crucial for developing a supportive environment, facilitating a sense of trust amongst the group, and engaging participants throughout the program (Bean et al., 2015). Further, they highlighted the importance of providing after school youth programs led by compassionate and supportive non-familial adults.

The Self-Determination Theory (SDT)(Ryan & Deci, 2000) highlights that learning environments which support and promote the three basic psychological needs of autonomy, competence, and relatedness help to assist the healthy progression of psychological development and self-concept (Mitchell, Gray, & Inchley, 2015). More specifically, these three psychological determinants have demonstrated positive associations with PA engagement in underserved youth (Lawman, Wilson, Van Horn, Resnicow, & Kitzman-Ulrich, 2011; Mitchell et al., 2015; Vierling, Standage, & Treasure, 2007), and assists to enhance opportunities for social interaction. This may further lead to increased levels of self-esteem and reduced anxiety and depression, which are common

traits frequently associated with those classified as 'at-risk' (Mitchell et al., 2015; Vierling et al., 2007). SDT was the underlying theoretical framework utilized in the development of the Girls United and on the Move (GUM) program. Although there are a number of PA interventions with the central aim of enhancing levels of PA among adolescent girls (Lubans, Plotnikoff, & Lubans, 2012; Okely et al., 2017; Rosenkranz, Behrens, & Dzewaltowski, 2010), few have focused on the impact of social support specifically within an 'at-risk' sub-population, or the potential effects that an integrated PA and psychosocial program may have on improving the physical, psychological and social health of this population. Hence, a combined PA and psychosocial program, such as the GUM program, may offer promise as it targets both physical and psychosocial facets which impact the health and wellbeing of this under-studied population. Therefore, although the overarching purpose of the GUM project was to assess overall program feasibility, the purpose of this study was to explore the change in and the relationship between PA participation, commitment, enjoyment, social support, and BPN support among GUM participants.

Methods

Design, Setting, and Participants

A detailed description of the study design and methodological protocol has been reported elsewhere (Caperchione et al., 2020). In brief, a quasi-experimental design employing a mixed-methods approach (i.e., self-report questionnaires and semi-structured interviews) was utilised. The study period was December 2017-December 2018. Self-report data collection occurred at baseline (T1), 6 weeks (T2), and post-intervention (9

weeks) (T3). Semi-structured interviews were conducted one-week post T3.

Purposeful sampling was used to recruit at-risk adolescent girls ($N=83$) between 11-15 years of age from five middle schools throughout British Columbia, Canada. To ensure a population identified as 'at-risk' was represented, school counsellors facilitated participant recruitment. School counsellors were able to effectively identify and invite any girls whom they had a previous history working with on a one-to-one basis and were classified as 'at-risk' (i.e., issues regarding home life, depression, anxiety, or behavioral inadequacies, etc. (Collingwood, 1997; Sandford, Armour, & Warmington, 2006) or any other student they felt could benefit from program participation. Interested participants were then provided with further details of the GUM program (including a parental consent and youth assent form) and the school counsellors prompted the participants to discuss the program with their parents and/or guardians.

Procedure

The GUM program included nine, weekly 90-minute group sessions comprised of a 45-minute PA component and a 45-minute psychosocial component. A total of eight groups participated in the intervention, with each group ranging from 7 to 14 participants per group. Each group had varying start dates, with some groups running simultaneously at various schools; however, no two groups from the same school received the intervention at the same time. The program design and delivery were co-facilitated by a trained PA researcher (i.e., lead researcher) and a registered social worker. Regarding the PA component, the lead researcher would provide the participants with a range of options regarding PA (e.g., swimming or

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rock climbing; obstacle course or capture the flag, etc.) with the youth making the final decision. The psychosocial component followed a schedule led by the registered social worker, and included interactive group discussions and activities (e.g., crafting or storyboarding to deliver information, personalised journaling) on topics such as building healthy relationships, conflict resolution strategies, substance use, and others. Each program session took place at the participating schools' location during the select schools' enrichment blocks, unless an off-campus activity was scheduled for a given day. Table 1 provides an example of a typical schedule of events. Further details of the GUM program components and intervention design have been previously reported (Caperchione et al., 2020).

residence, mode of transportation to/from school, and current and previous PA or sport both inside and outside of school time, were collected at T1.

Physical Activity Participation

PA participation was measured using the Physical Activity Questionnaire for Children (PAQ-C) (Crocker, Bailey, Faulkner, Kowalski, & McGrath, 1997), which assesses the frequency of PA participation over a 7-day recall period. The PAQ-C has shown to provide good internal consistency ($\alpha = 0.76 - 0.84$) and been known to provide acceptable measures of MVPA among both children and adolescents (Crocker et al., 1997). PA participation was assessed at T1 and T3.

Table 1. Girls United and on the Move (GUM) typical program components.

	Physical Activity Component (45 minutes)	Psychosocial Component (45 minutes)
Week 1	• Introductions & questionnaires (T1)	
Week 2	• Yoga	• Emotional wellness
Week 3	• Dance	• Self-awareness, self-esteem & body image
Week 4	• Self-defense	• Healthy relationships
Week 5	• Hike/walk outdoors	• Healthy sexuality
Week 6	• Rock climbing	• Communication skills, conflict resolution & boundaries
* Learning Climate Questionnaire (LCQ) administered during week 6 (T2)		
Week 7	• Kickboxing	• Sexual exploitation & abuse
Week 8	• Free play & outdoor games (e.g., capture the flag, scavenger hunt, etc.)	• Media & gender issues
Week 9	• Questionnaires & wrap-up (T3)	
Post-Intervention	• Interviews conducted with a sub-sample of participants	

Instruments

Demographics

Demographic information, including age, grade, number of siblings, area of

Physical Activity Commitment and Enjoyment

PA commitment and enjoyment was measured using the valid and reliable ($\alpha = 0.77 - 0.94$) Sports-Commitment Model (SCM) (Scanlan, Carpenter, Schmidt, Simons, & Keeler, 1993). The SCM addresses five subscales that are thought to impact sport/PA commitment, including enjoyment, involvement alternatives, personal investments, social constraints, and involvement opportunities. The SCM was administered at T1 and T3.

Social Support

Perceived social support was measured using the reliable ($\alpha = 0.93 - 0.96$) Child and Adolescent Social Support Scale (CASSS) (Malecki & Demaray, 2002). The CASSS consists of five, 12-item subscales (equating to a total of 60-items) which measure social support from teachers, parents, classmates, close friends, and the school environment, as well as the type of social support (i.e., emotional, appraisal, informational, or instrumental). For the purposes of this study, the 'school environment' subscale was eliminated as it may have led to issues of uncertainty, since the actual sources of support in this environment are rather ambiguous and not well defined. Therefore, the current CASSS instrument consisted of a total of 48-items, with each subscale scored individually and as a whole, giving a total score of social support. The CASSS was administered at T1 and T3.

Basic Psychological Needs

The Learning Climate Questionnaire (LCQ) (Bowen & Kilmann, 1975), which has been deemed valid and reliable ($\alpha = 0.84 - 0.92$) with youth in a sport context, measures perceptions of BPN support (e.g., autonomy, competence, and relatedness)

delivered by instructors in specific settings (Bean, Rocchi, & Forneris, 2019). As per protocol, the LCQ was administered at T2 (midpoint of intervention) only.

Semi-Structured Interviews

Select participants ($N=30$) were invited by the lead researcher to complete a voluntary, individual, in-person interview one week post program completion (T3). Those who attended at least 80% of the program sessions were invited to participate. The interviews were conducted by the lead researcher on the project. Questions were developed to provide insights into participants' PA experiences and perceived social support. (e.g., "What made GUM different from your regular physical education class in school?", "Have you found that participating in GUM had helped you feel better, or that it's easier for you to discuss your thoughts and feelings with others?") Duration of the interviews varied between 15 – 20 minutes, occurred at convenient time at the participant's school, and were audio-recorded.

Data Analysis

Quantitative Analysis

Nine participants did not complete follow-up measures (T3) due to program drop-out (i.e., moving schools or lack of school attendance); therefore, principles of intention-to-treat were employed during analysis. In addition, another nine participants had missing data at week 1 (T1) due to late program enrolment and were therefore dropped from the analysis, but continued to participate in the GUM study with provided parental consent and youth assent forms.

Descriptive data for participant characteristics are presented as means (M) and standard deviations (SD). A series of paired-samples t-tests assessed changes over time from baseline to post-

intervention among PA participation, commitment, enjoyment, and perceptions of social support. Additionally, three hierarchical regression analyses were conducted to determine whether BPN support (assessed by LCQ) predicted PA participation, commitment, and/or enjoyment, above and beyond perceptions of social support. A hierarchical regression was chosen as a method of analysis since it can be used to assess the unique influence of a new variable on the outcome. Within the hierarchical analyses, predictor variables known to be related to the dependent variable were entered into the model first (e.g., total score of social support was entered into the model before the BPN score in order to predict PA participation). Analyses were conducted using IBM's Statistical Package for Social Sciences (SPSS Version 21.0). Level of confidence was set at $p < 0.05$.

Qualitative Analysis

Inductive thematic analysis (Braun & Clarke, 2006; Creswell, Hanson, & Clark, 2007) was conducted once all the interviews were completed and transcribed using NVivo10™. This involved inductively generating initial codes by identifying important information that was aligned with the study objectives (Braun & Clarke, 2006), such as relevant information pertaining to various social support constructs and insights into feasible program components. As detailed and consistent description of each theme was generated, refinements were made, and the appropriate quotes were used to provide confirmation of the themes within the data. Pseudonyms were used in place of the participant's names in order to ensure confidentiality and anonymity. To mitigate bias and enhance validity and reliability of results, strategies of rigor (e.g., external

peer review of the data and analysis techniques, etc.) were undertaken during

Table 2. Participant characteristics (N=83).

Variable	Participants %, (n)
Age (years)	
11-12	41, (34)
13-15	59, (49)
Grade	
6-7	45, (37)
8-10	55, (46)
Siblings	
0	10, (8)
1-2	60, (50)
3-4	22, (18)
5+	8, (7)
Area of residence	
Low SES Regions	83, (69)
High SES Regions	17, (14)
Transportation to school ^a	
Walk	(46)
Bike	(9)
Drive (get a ride)	(45)
Bus	(27)
PA outside of school ^a	
Individual	(24)
Team sports	(19)
Leisure	(21)
PA in school ^b	
Sports team(s)	(28)
Club(s)	(5)
None	(50)

^aParticipants were able to indicate more than one option; ^bParticipants (N=3) indicated yes, but did not specify; Both PA measures required either a 'yes' or 'no' response.

analysis (Creswell et al., 2007).

Results

Quantitative Results

The study sample consisted of 83 participants at baseline, with a mean age of 13 years (SD = ± 0.72). Majority of the participants (83%) resided in areas classified as low socioeconomic status (e.g., areas in the region identified with assisted or low-income housing). Table 2 provides further details of participant

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characteristics. Although there were favorable developments noted within the data, there were no significant differences found from baseline to post-intervention for PA participation, commitment, enjoyment, or total perceptions of social support (i.e., total score on CASSS), and small effect sizes were found for all variables (as indicated by Cohen's d ; see table 3 below). There was a significant difference with a small effect size ($d = 0.27$) for social support provided by teachers ($t_{(82)} = 2.53$, $p \leq 0.05$) declining from baseline ($M = 4.30$, $SD = \pm 1.16$) to post-

Qualitative Results

Three overarching themes were generated, including: 1) *Role of peer and family support*, 2) *Importance of trustworthy role models*, and 3) *Empowering at-risk youth through new opportunity*

Role of Peer and Family Support

Participants believed that the social aspect amidst PA and sport engagement was important in engaging and encouraging them to participate because “you still get an opportunity to talk to people

Table 3. Results of t-tests and descriptive statistics for numerous variables.

Outcome Variable	Baseline		Post-intervention		t	d	p
	M	SD	M	SD			
PAQ-C (n=83)	1.96	.48	1.97	.54	-.107	-.02	.92
PA Commitment (n=80)	3.76	1.13	3.83	1.19	-.52	-.06	.61
PA Enjoyment (n=80)	4.23	1.01	4.13	1.20	.77	.09	.44
CASSS (n=83)	4.14	1.09	4.30	1.19	-1.67	-.14	.10
parent support							
CASSS (n=83)	4.29	1.16	3.95	1.32	.62	.27	.01*
teacher support							
CASSS (n=83)	3.23	1.24	3.38	1.35	-1.19	-0.12	.24
classmate support							
CASSS (n=83)	5.04	1.12	5.15	.99	-.81	-.10	.42
close friend support							

Significant main effects are denoted by an asterisk (*) ($p \leq 0.05$).

intervention ($M = 3.95$, $SD = \pm 1.32$). The hierarchical regression analyses revealed that when the models were adjusted for total score of social support, BPN as provided by the program leaders (assessed by LCQ) was a significant predictor of both commitment ($F_{(2,80)} = 3.62$, $p \leq 0.05$, $R^2 = .08$) and enjoyment ($F_{(2,80)} = 4.53$, $p \leq 0.05$, $R^2 = .10$). See Table 4.

while you can still do activities” (Rachel). Other girls voiced that when doing activities with friends, they felt as though their friends are more “my level of doing sports. So, I feel like we can do the same thing and then I won’t feel left out” (Kendra). Many participants voiced that being surrounded by friends instilled them with a sense of comfort and emotional support during an activity. Katrina added:

“I guess it’s just more confidence to go into it kind of thing, because when you know someone then it’s easier because it’s

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Table 4. Results for hierarchical multiple regression analyses and descriptive statistics for numerous variables

Variable of Interest at T2	B	SE B	β	R-square value	p
PA Participation					
CASSS T2	.00	.07	.00	.00	.99
LCQ	-.01	.09	-.02	.00	.88
PA Commitment					
CASSS T2	.11	.16	.08	.02	.48
LCQ	.40	.18	.25	.08	.03*
PA Enjoyment					
CASSS T2	.09	.16	.07	.03	.53
LCQ	.46	.18	.29	.10	.01*

CASSS T2 variable was entered into the model first in all cases (model 1) (control), followed by LCQ scores (model 2). Significant main effects are denoted by an asterisk (*) ($p \leq 0.05$).

like ‘we can do this together’. But if I do something on my own, like if I join a sports team by myself, then I will feel a little bit like ‘I don’t really know anyone’. But when my friends join stuff, then it makes it a lot easier, like emotionally I guess? They kind of help you through it and motivate you”

Many girls also discussed how family members provided a major source of encouragement, and were largely responsible for the ongoing and underlying commitment for engaging in PA. Some participants explained that they frequently engaged in family-friendly activities such as evening walks, stating that this was a great way to spend time together to strengthen their relationships. The girls continued to explain that their parents just “want us to be healthy so they encourage us to do physical activity” (Sarah), such as joining school and/or community sports teams, or to be active regularly. Not only were peers and family members noted as important motivators for captivating the interest in PA among the girls, but the program leaders played a significant role in generating enthusiasm for engaging in these behaviors.

Importance of Trustworthy Leaders

Many participants indicated that they felt “comfortable” around the leaders, and that the leaders were able to help them to just “feel better”. The girls indicated that being able to approach the leaders and discuss things confidentially was a vital component of the program. Building rapport between the program leaders and participants facilitated feelings of openness and trustworthiness. One participant explained that she felt as though “I could tell you guys stuff, and like I know I can trust you guys” (Kandace). Many participants also felt that the program leaders served as respective role models and motivated them in various aspects. For example, Jennifer explained:

“You guys were always so happy and like, joyful, and it’s just like awesome. You guys always spread positive vibes to everybody and I think I could do the same more often because I’m kind of a sad person, like a lot of things in my life go wrong. You guys have showed me that even if something’s wrong, you should always stay positive because something good is going to happen, and everything will turn out okay.”

Additionally, having leaders introduce and teach the girls new activities was

perceived to be very impactful in terms of continued PA participation as some of the girls found themselves more willing to participate in other activities, like PE class during school hours. *"I find myself kind of wanting to participate in more stuff and in gym. Like before I kind of just wanted to sit in the corner and like not do anything,"* (Stephanie).

Empowering At-Risk Youth Through New Opportunity

The girls expressed that the GUM program was different than just regular PE class because they had the opportunity to try new activities they had not previously participated in. Activities such as rock climbing, Pound fitness classes (i.e., an exercise approach that incorporates both cardio and body weight exercises into a rhythmic routine), self-defense, and yoga were all activities identified as new and appealing to the girls. Both individualized activities, (i.e., yoga, fitness classes, etc.) and team-based activities (i.e., competition-based games, outdoor sports, etc.) were recognized as enjoyable to the girls, and not one appeared more prominently likeable than the other. One participant highlighted her experience:

"Never doubt yourself and if you get the opportunity to do something, just take it. Even though I hated yoga to begin with, I still tried it and didn't like it but I'm proud of myself for trying things that I didn't like. But snowshoeing though, I felt like I didn't like it all and then at the end, it turned out to be okay and I loved it" (Lauren).

Additionally, one pivotal idea that emerged was providing the participants with a sense of choice of activities, providing them with an opportunity to undertake activities that they enjoyed. They also emphasized the importance of a

'boy-free' zone, due to the fact that this created a "safe" and accepting environment and allowed them to feel more "understood by one another" and *"I can be myself, unlike when we're around boys"* (Alex). Some participants also voiced that they felt more comfortable about their physical appearance just being around girls; *"it feels like the guys are judging us, and like, watching us. Or like, bragging about how they can like, do whatever that they want and we can't, and looking at our bodies"* (Kendra). The small (girls only) group environment was also allowed the girls to feel as though they could be more open and *"share things, and just feel more comfortable"* (Kayla). Abby noted:

"We could say more, like more personal stuff and like, stuff about our well-being. Because around boys it's just more awkward to talk about your period, and stuff like that. So I feel like we can say more and do more."

Lastly, participants unanimously voiced that the active group discussions and exposure to sensitive topics was a vital component of the program as it provided an opportunity for them to open up with others. Shelby shared:

"It's easier for me to discuss how I feel with others now. Since I've shared so much in [GUM]. It made me feel like I could just tell people how I feel whenever. Like, if I'm feeling sad or something, it's not hard for me to express my feelings anymore. Before it was, and then now it's not"

Brooke indicated that by participating in the GUM program, she realized *"that there are people [girls] in the same place as me and I'm not alone with what we're dealing with"*. The open group discussions facilitated by the program leaders contributed to building trust in the group and taught the girls how to properly cope

with their emotions, with some girls stating that *“it was good to let my feelings out because I don’t usually let my emotions out”* (Paris). Having experienced leaders who were knowledgeable and capable of dealing with any imminent concerns among the girls was a huge asset to the program. The girls identified these individuals as resources for teaching them valuable life skills and strategies.

Discussion

The purpose of this study was to explore the change in and the relationship between PA participation, commitment, enjoyment, social support, and BPN support among GUM participants. This unique and innovative program was able to reach a population that is frequently neglected and provided an inclusive environment that focused on bettering their health and personal lifestyle choices. By having leaders with extensive knowledge and expertise in each individual field of physical health and psychosocial development, the GUM program was able to effectively cater to the participants needs and help teach them the importance of various health related behaviours in the process. The GUM program shows promise for engaging at risk adolescent girls in PA, albeit there were no significant differences from baseline to follow-up regarding levels of PA participation. One confounding factor to consider is previous participation in sport or PA engagement prior to the GUM program start date. It may have been unlikely that engaging in the program would result in significant increases in PA participation given a majority of the participants were already classified as being active (i.e., participating in sport or PA inside and/or outside of school hours). However, this further emphasises the importance of enhancing PA enjoyment

and commitment during the early stages of life, as these factors are important for long-term PA participation throughout the lifetime (Barnett, Ridker, Okechukwu, & Gortmaker, 2019).

Moreover, previous research suggested that by introducing PA programs that capture the specific interest of adolescent girls and/or introducing same-gendered initiatives, may enhance PA participation (Fitzgerald, Fitzgerald, & Aherne, 2012; Salvy et al., 2009; Timken, McNamee, & Coste, 2017). The qualitative findings also reflected that at-risk adolescent girls are more accepting of PA that is unstructured and delivered in a small group environment, making these especially important factors to consider when designing PA programs for this specific population. Given that the self-report measures did not explicitly account for different PA contexts (i.e., inclusive of small group environments) and types, then this could be a factor that contributed to lack of significance in the quantitative findings. If these measures had been more intricate, then it is possible that significant differences could have been observed from T1 to T3. However, this highlights the importance of using both qualitative and quantitative measures, so where one method may fail to provide insights, another may pick these up. Drawing from the findings observed, attention should especially focus on enhancing PA commitment and PA enjoyment. If adolescents perceive an activity as enjoyable, it is more likely to result in positive health-behavior change and predict future PA participation (Chen et al., 2017; Timken et al., 2017). The peer relationships and comfortable environment initiated through the GUM program helped to facilitate enjoyment and commitment for engaging in PA.

Additionally, Mitchell et al. (2015) highlighted that when health leaders provide activity choices, this has the ability to enhance the autonomy of adolescent girls. Because the girls exhibited a sense of control (i.e., the program leaders providing a range of options to the participants in terms of dictating which PAs they could participate in) over the activities implemented during GUM, this may have further facilitated feelings of comfort and confidence in their own personal abilities (Mitchell et al., 2015). Also, introducing new but appropriately challenging activities may aid in targeting physical competence, or the belief in ones' abilities to perform an activity (Cox, Smith, & Williams, 2008; Okely et al., 2017). The semi-structured interviews were able to highlight this, where the participants voiced that they came out of the program feeling as though they had the confidence to participate in new and unfamiliar activities.

The results highlight that the experiences and relationships that participants form with program leaders is exceptionally meaningful for at-risk adolescent girls. Having qualified program leaders who were competent in PA and effectively able (and knowledgeable) to facilitate discussions around sensitive social issues, was essential in productively delivering an effective program. Further, PA programs catered towards youth should have a central focus on program process and refinement, rather than solely focusing on enhancing PA participation. Specifically, emphasis should focus on meeting the BPN among youth if future PA programs are to be met with success (Cox et al., 2008; van Aart, Hartman, Elferink-Gemser, Mombarg, & Visscher, 2017). Additional research is needed to understand exactly what health program

leaders can or should do to facilitate and support the needs of 'at-risk' youth in PA programming (van Aart et al., 2017). Attention should be drawn to the programming context if health professionals want to create long-term health behavior change among youth, as opposed to primarily focusing on the overarching goal of enhancing PA.

In addition to the successful support received from the program leaders, the qualitative results also emphasized the essential role of an effective social support system. The participants highlighted the importance of being surrounded by like-minded peers while engaging in PA, and how engaging in PA with friends enabled willingness to participate in the program. It has been demonstrated within the literature that peer support is related to PA among adolescents, and that peer support has been found to be related to increased self-efficacy for overcoming potential barriers associated with activities (i.e., feeling tired, muscle pain, etc.) (Chen et al., 2017; Fitzgerald et al., 2012). Additionally, peers who promote PA involvement is linked to enhanced participation amongst individuals (Fitzgerald et al., 2012), as well it is linked to enhanced PA enjoyment and self-efficacy for a given activity (Chen et al., 2017; Mitchell et al., 2015).

Limitations

Despite these encouraging outcomes from the GUM study, there are a number of limitations that should be considered. The heavy reliance on subjective measures of self-report may be problematic as the ability to recall PA engagement can be rather deceptive among adolescents (Pearson, Braithwaite, & Biddle, 2015). Moreover, the PA researcher assisted with program delivery and data collection inclusive of conducting the semi-

structured interviews, thus there is potential for desirability bias within the interview results. Additionally, the GUM study did not include a control group; therefore, it is more difficult to establish a causal relationship. Finally, a common issue for many of the girls who attended the GUM program was low school attendance, which directly impacted program adherence given that the sessions were delivered at school, during or immediately after school hours, thus making it difficult to genuinely interpret if the program had an impact on them.

Conclusions

The GUM program provided an opportunity to engage in new and exciting PAs among at-risk adolescent girls and fostered a new liking for PA whilst also enhancing their perceptions of social support. With continued program refinements based on these promising results, the GUM program has the potential to influence positive behavior change in the physical, psychological, and social lifestyle domains of at-risk adolescent girls.

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Author contributions

CMC, CMS, SB, KCK, and LJF conceived the project and procured the project funding. NH, CMC, CMS, SB, KCK, and LJF assisted with the protocol design. NH managed the project, including participant recruitment, program delivery, and data collection, with assistance from CMC and SB. NH, TF, and CMC drafted the manuscript and all authors read, edited and approved the final manuscript.

Human participant's approval statement

All participants provided informed parental consent and assent prior to participation and ethical approval was

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Trial registration

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Declaration of conflicting interests

The authors declare that they have no affiliations with or involvement in any organization or entity with any financial or non-financial interest in the subject matter, or with the materials discussed in this manuscript.

Authors' qualifications

The authors' qualifications are as follows: Nicole Hargreaves., BHK, MSc; Tanya Forneris., BA, MSc, PhD; Catherine M. Sabiston., BSc, MHK, PhD; Stephen Berg., Bed, MEd, PhD; Kent C. Kowalski., BA, BFA, MSc, PhD; Leah J. Ferguson., BA, MSc, PhD; Cristina Caperchione., BHK, MHK, PhD

References

- Barnett, E. Y., Ridker, P. M., Okechukwu, C. A., & Gortmaker, S. L. (2019). Integrating children's physical activity enjoyment into public health dialogue (United States). *Health Promot Int*, 34(1), 144-153. doi:10.1093/heapro/dax068
- Bean, C. N., Forneris, T., & Fortier, M. (2015). Girls Just Wanna Have Fun: Understanding perceptions of effective strategies and outcomes in a female youth-driven physical

- activity-based life skills programme. *J Sport Develop*, 3(4), 28-40.
- Bean, C. N., Rocchi, M., & Forneris, T. (2019). Using the Learning Climate Questionnaire to Assess Basic Psychological Needs Support in Youth Sport. *J Appl Sport Psychol*. doi:10.1080/10413200.2019.1571537
- Bowen, D. D., & Kilmann, R. H. (1975). Developing a comparative measure of the learning climate in professional schools. *J Appl Psychol*, 60(1), 71-79.
- Braun, V., & Clarke, V. (2006). Using thematic analysis in psychology. *Qual Res Psychol*, 3(2), 77-101. doi:10.1191/1478088706qp063oa
- Caperchione, C. M., Hargreaves, N., Sabiston, C. M., Berg, S., Kowalski, K., & Ferguson, L. J. (2020). Exploring the effectiveness of an integrated physical activity and psychosocial program targeting 'at-risk' adolescent girls: The GUM intervention study protocol. *JMIR Res Protoc*, 9(6), e15302. doi:doi: 10.2196/15302.
- Chen, H., Sun, H., & Dai, J. (2017). Peer Support and Adolescents' Physical Activity: The Mediating Roles of Self-Efficacy and Enjoyment. *J Pediatr Psychol*, 42(5), 569-577. doi:10.1093/jpepsy/jsw103
- Collingwood, T. R. (1997). Providing fitness programs to at-risk youth. *Quest*, 49, 67-84.
- Cox, A. E., Smith, A. L., & Williams, L. (2008). Change in physical education motivation and physical activity behavior during middle school. *J Adolesc Health*, 43(5), 506-513. doi:10.1016/j.jadohealth.2008.04.020
- Creswell, J. W., Hanson, W. E., & Clark, V. (2007). Qualitative research designs: selection and implementation. *Counsel Psychol*, 35(2), 236-264.
- Crocker, P. R., Bailey, D. A., Faulkner, R. A., Kowalski, K. C., & McGrath, R. (1997). Measuring general levels of physical activity: preliminary evidence for the Physical Activity Questionnaire for Older Children. *Med Sci Sports Exerc*, 29(10), 1344-1349. doi:10.1097/00005768-199710000-00011
- Dishman, R. K., Motl, R. W., Saunders, R., Felton, G., Ward, D. S., Dowda, M., & Pate, R. R. (2005). Enjoyment mediates effects of a school-based physical-activity intervention. *Med Sci Sports Exerc*, 37(3), 478-487. doi:10.1249/01.mss.0000155391.62733.a
- Fitzgerald, A., Fitzgerald, N., & Aherne, C. (2012). Do peers matter? A review of peer and/or friends' influence on physical activity among American adolescents. *J Adolesc*, 35(4), 941-958.
- Gibbons, S. L. (2014). Relatedness-supportive learning environment for girls in physical education. *LEARNIng Landscapes*, 7(2), 139-150.
- Gruno, J., & Gibbons, S. L. (2016). Developing a relatedness-supportive learning environment in dance: Small group learning activities. *Phys Health Educ J*, 82(4), 1.
- Kantanista, A., Bronikowski, M., Laudańska-Krzemińska, I., Król-Zielińska, M., & Osiński, W. (2017). Positive effect of pedometer-based walking intervention on body image and physical activity enjoyment in adolescent girls. *Biomedical Human Kinetics*, 9(1), 34. doi:10.1515/bhk-2017-0006
- King, K. A., Tergerson, J. L., & Wilson, B. R. (2008). Effect of social support on adolescents' perceptions of and engagement in physical activity. *J Phys Act Health*, 5(3), 374-384. doi:10.1123/jpah.5.3.374
- Lawman, H. G., Wilson, D. K., Van Horn, M. L., Resnicow, K., & Kitzman-Ulrich, H. (2011). The relationship between psychosocial correlates and physical activity in underserved adolescent boys and girls in the ACT Trial. *J Phys Act Health*, 8(2), 253-261. doi:doi.org/10.1123/jpah.8.2.253
- Lubans, D. R., Plotnikoff, R. C., & Lubans, N. J. (2012). A systematic review of the impact of physical activity programmes on social and emotional well-being in at-risk youth: Review of physical activity programmes for at-risk youth. *Child Adolesc Ment Health*, 17(1), 2-13. doi:10.1111/j.1475-3588.2011.00623.x
- Malecki, C. K., & Demaray, M. K. (2002). Measuring perceived social support: Development of the child and adolescent social support scale (CASSS). *Psychol Sch*, 39(1), 1-18.
- McNamee, J. B., Timken, G. L., Coste, S. C., Tompkins, T. L., & Peterson, J. (2017). Adolescent girls' physical activity, fitness and psychological well-being during a health club physical education approach. *Eur Phys Educ Rev*, 23(4), 517-533. doi:doi.org/10.1177/1356336X16658882

- Mitchell, F., Gray, S., & Inchley, J. (2015). 'This choice thing really works.' Changes in experiences and engagement of adolescent girls in physical education classes, during a school-based physical activity programme. *Phys Educ Sport Pedagogy*, 20(6), 593-611. doi:doi:10.1080/17408989.2013.837433
- Okely, A. D., Lubans, D. R., Morgan, P. J., Cotton, W., Peralta, L., Miller, J., . . . Janssen, I. (2017). Promoting physical activity among adolescent girls: the Girls in Sport group randomized trial. *Int J Behav Nutr Phys Act*, 14(1), 81. doi:10.1186/s12966-017-0535-6
- Pearson, N. P., Braithwaite, R. E. D., & Biddle, S. (2015). The effectiveness of interventions to increase physical activity among adolescent girls. *Acad Pediatr*, 15(1), 9-18.
- Ranøyen, I., Stenseng, F., Klöckner, C. A., Wallander, J., & Jozefiak, T. (2015). Familial aggregation of anxiety and depression in the community: the role of adolescents' self-esteem and physical activity level (the HUNT Study). *BMC Public Health*, 15(1), 78. doi:10.1186/s12889-015-1431-0
- Rosenkranz, R. R., Behrens, T. K., & Dziewaltowski, D. A. (2010). A group-randomized controlled trial for health promotion in Girl Scouts: healthier troops in a SNAP (Scouting Nutrition & Activity Program). *BMC Public Health*, 10, 81. doi:10.1186/1471-2458-10-81
- Ryan, R. M., & Deci, E. L. (2000). Self-determination theory and the facilitation of intrinsic motivation, social development, and well-being. *Am Psychol*, 55(1), 68-78. doi:10.1037//0003-066x.55.1.68
- Salvy, S. J., Roemmich, J. N., Bowker, J. C., Romero, N. D., Stadler, P. J., & Epstein, L. H. (2009). Effect of peers and friends on youth physical activity and motivation to be physically active. *J Pediatr Psychol*, 34(2), 217-225. doi:10.1093/jpepsy/jsn071
- Sandford, R. A., Armour, K. M., & Warmington, P. C. (2006). Re-engaging disaffected youth through physical activity programmes. *Br Educ Res J*, 32, 251-271.
- Santos, S. J., Hardman, C. M., Barros, S. S., da Franca, C., & Barros, M. (2015). Association between physical activity, participation in physical education classes, and social isolation in adolescents. *J Pediatr*, 91, 543-550. doi:x.doi.org/10.1016/j.jpmed.2015.01.008
- Scanlan, T. K., Carpenter, P. J., Schmidt, G. W., Simons, J. P., & Keeler, B. (1993). An introduction to the sport commitment model. *J Sport Exerc Psychol*, 15(1), 1-15.
- Schneider, M., & Cooper, D. M. (2011). Enjoyment of exercise moderates the impact of a school-based physical activity intervention. *Int J Behav Nutr Phys Act*, 8(1), 64. doi:10.1186/1479-5868-8-64
- Springer, A. E., Sharma, S., de Guardado, A. M., Nava, F. V., & Kelder, S. H. (2006). Perceived parental monitoring and health risk behavior among public secondary school students in El Salvador. *Scientific World Journal*, 6, 1810-1814. doi:10.1100/tsw.2006.284
- Statistics Canada. (2017). *Directly measured physical activity of children and youth, 2012 and 2013* (82-625-X). Retrieved from Ottawa: <https://www150.statcan.gc.ca/n1/pub/82-625-x/2015001/article/14136-eng.htm>
- Timken, G. L., McNamee, J. B., & Coste, S. C. (2017). 'It doesn't seem like PE and I love it': Adolescent girls' views of a health club physical education approach. *Eur Phys Educ Rev*, 25(1), 109-124. doi:doi:10.1177/1356336X17706382
- van Aart, I., Hartman, E., Elferink-Gemser, M., Mombarg, R., & Visscher, C. (2017). Relations among basic psychological needs, PE-motivation and fundamental movement skills in 9-12-year-old boys and girls in Physical Education. *Phys Educ Sport Pedagogy*, 22(1), 15-34.
- van den Berg, P. A., Mond, J., Eisenberg, M., Ackard, D., & Neumark-Sztainer, D. (2010). The link between body dissatisfaction and self-esteem in adolescents: similarities across gender, age, weight status, race/ethnicity, and socioeconomic status. *J Adolesc Health*, 47(3), 290-296. doi:10.1016/j.jadohealth.2010.02.004
- Vierling, K. K., Standage, M., & Treasure, D. C. (2007). Predicting attitudes and physical activity in an "at-risk" minority youth sample: a test of self-determination theory. *Psychol Sport Exerc*, 8, 795-817.
- World Health Organization. (2018). *Global action plan on physical activity 2018-2030: more active people for a healthier world*. Retrieved from Geneva: <https://www.who.int/ncds/prevention/p>

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