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EMPIRICAL RESEARCH

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Benefits of Extracurricular Participation in Early Adolescence: Associations with Peer Belonging and Mental Health

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Abstract

Extracurricular participation plays an important role in positive youth development. Yet, little is known about the stability and change in extracurricular participation from middle childhood to early adolescence. Also, there is a gap in knowledge about the underlying processes that drive developmental outcomes associated with extracurricular participation. The present study examined transitions in extracurricular participation from grade 4 to 7, and investigated whether shifting from non-participation to participation in activities was associated with better mental health, considering peer belonging as a mediator. Latent Class Analyses of early adolescents' (50% female) self-reports on the Middle Years Development Instrument in grades 4 and 7 ($N =$ 10,149) revealed four clusters of extracurricular involvement at both grade levels (i.e., "no activities", "all activities", "sports only", "individual activities"). Latent Transition Analysis showed that young people were most likely to stay in the same activities cluster from grade 4 to 7. About 10% were non-participants in grade 4 and had moved to activities by grade 7. In this subgroup, moving from non-participation to both sports and to all activities was associated with better mental health over time; this pathway was fully mediated by higher levels of peer belonging. The results suggest that supporting non-participants to join extracurricular activities can have implications for their mental health. Practical implications for communities, such as removing potential barriers to involvement before the onset of adolescence, are discussed.

Keywords Extracurricular activities · Middle childhood · Early adolescence · Positive and negative mental health · Latent transition analysis

Introduction

There is good evidence that participation in extracurricular activities after school is beneficial for young people's positive development in life (Deutsch et al. 2017). Extracurricular activities have been defined as activities that are organized, structured, involve adult supervision, and take place outside of school hours (Mahoney et al. 2005). Different types of extracurricular activities include participation in sports, the arts, and community programs. A common goal of extracurricular participation is to promote participants' development in one or more domains (Simpkins 2015). Based on more than a decade of research linking extracurricular participation to important developmental outcomes (e.g., academic achievement, friendships and connectedness, behavioural and mental health), extracurricular activities have been considered an ecological asset that contributes to children's and adolescents' wellbeing, and thriving (Agans et al. 2014; Mahoney et al. 2005; Zarrett et al. 2009).

Even though researchers have made much progress in discerning the ways in which extracurricular activities contribute to positive development (e.g., skill development, sense of purpose, availability of adult mentors), several limitations remain. Though opportunities for positive peer relationships is assumed to be a central underlying process through which extracurricular activities foster positive development, few researchers have examined this indirect link (Fredricks and Simpkins 2013). Furthermore, the majority of previous studies on extracurricular involvement have been conducted with

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older adolescents, examined participation at one point in time, and focused on single types of activities (Agans et al. 2014; Mata and Van Dulmen 2012). Finally, most research has examined involvement in extracurricular activities in relation to academic performance and educational outcomes (Crosnoe et al. 2015; Hee Im et al. 2016), and as a protective factor for negative social and behavioural outcomes (Aumètre and Poulin 2018; Wood et al. 2017). Fewer studies have investigated extracurricular participation in relation to mental health; positive mental health in particular has been understudied (Gilman et al. 2004). The present study addresses these limitations.

The first goal was to establish extracurricular activity profiles that reflected typical clusters of participation in grades 4 and 7, and to identify common changes in extracurricular participation from middle childhood (i.e., grade 4) to early adolescence (i.e., grade 7). The second goal was to examine whether the shift from non-participation (grade 4) to participation (grade 7) was associated with positive and negative mental health in grade 7, controlling for mental health in grade 4 and using those who were non-participants at both time points as a reference group. The third goal was to test whether the hypothesized improvements in mental health associated with this shift were mediated through young people's perceived peer belonging.

Taking a person-centred (Linver et al. 2009; Pederson 2005) and longitudinal approach to extracurricular involvement is important because it allows to identify common extracurricular activity clusters and to investigate changes in cluster membership from grade 4 to 7. Only few studies have examined extracurricular participation through this lens. With respect to comparing non-participants to participants, previous research has typically compared developmental outcomes between these groups at a given time point (Linver et al. 2009; Metzger et al. 2009). The present study expands on this research by examining within-person changes, testing whether the shift from earlier non-participation to later participation in different types of activities predicted later mental health. The present study was conducted with a population-based sample. Population-based research on extracurricular activities is of interest, because it provides a representative snapshot of extracurricular involvement among young people in society; revealing current patterns of participation in society serves as a baseline and supports monitoring changes over time. As such, it can practically inform program development and implementation in communities (Noll 2004).

Extracurricular Activities and Positive Youth Development

In a positive youth development (PYD) framework (Theokas et al. 2016), extracurricular involvement contributes to thriving by providing a context for pursuing personal interests, engaging with purpose, and developing skills and competencies (Lerner et al. 2010). From a social relationship perspective, extracurricular involvement provides opportunities for positive relationships with peers and adults (Grossman and Bulle 2006; Schaefer et al. 2011). Participation in extracurricular activities is characterized through multiple dimensions: type/s of involvement (e.g., social, physical, cognitive), dosage (i.e., frequency, intensity, consistency, and continuity) and the number of different activities individuals participate in (i.e., breadth) (Bohnert et al. 2010). Previous research has found an overall positive relation between greater involvement in extracurricular activities and positive academic (Peck et al. 2008), psychological (Darling 2005), and behavioural outcomes (McCabe et al. 2016). Comprehensive reviews on the positive links between extracurricular participation and developmental outcomes can be found elsewhere (Feldman and Matjasko 2005; Shulruf 2010; Vandell et al. 2015).

Several previous studies have investigated associations between extracurricular involvement and developmental outcomes over time. However, most of them have examined later outcomes in relation to earlier participation, and fewer studies have tracked changes in participation throughout a given time period in relation to changes in developmental outcomes. One longitudinal study has been conducted in the context of Canada; specifically, extracurricular participation trajectories of 548 children (extracurricular activities were reported annually by parents from Kindergarten to grade 4) were related to internalizing and externalizing symptoms (teacher- and parent-reports) and academic skills (teacher reports) in grade 4 (Aumètre and Poulin 2018). The authors found that children in the stably high and the increasing trajectories were rated as significantly more academically competent in grade 4; children in the high participation trajectory displayed significantly lower externalizing problems in grade 4 than children in the no participation trajectory, and lower internalizing problems than children in the no participation and decreasing trajectories (Aumètre and Poulin 2018).

Furthermore, latent transitions in extracurricular activities over time have been investigated using data from the 4-H Study of Positive Youth Development (Agans et al. 2014). A total of 927 students reported on their involvement in seven different types of activities (e.g., sports, music, arts, religious groups) at six different time points in grades 7 through 12. The authors found that at each time point, participants were grouped into one of two clusters signalling either lower or higher probability of participation across activities. Compared to being consistently in the lower levels of participation cluster, being consistently in the higher levels of participation cluster was related to a higher PYD index (i.e., a composite score of the Five Cs:

competence, confidence, connection, character, and caring (Phelps et al. 2009) and a higher contributions score (i.e., items signaling social contributions in the community and in society, such as helping and leadership). Further, youths whose levels of participation fluctuated throughout the six waves reported significantly higher levels of depressive symptoms, substance use, and risk behaviours, and lower levels of contributions compared to those whose participation was consistently high (Agans et al. 2014). The authors noted two of their limitations to be their non-representative sample, and that processes through which the benefits of extracurricular activities support positive development (e.g., positive relationships with peers) were not examined. Furthermore, the study compared developmental outcomes for youths on trajectories of higher versus lower levels of participation; it did not provide insight into the role of participation in particular types of activities (e.g., sports, arts).

Extracurricular Sports Participation

Among the different types of extracurricular activities, much research has focused on sports participation. Different types of sports (e.g., swimming, hockey, soccer, martial arts) offer a wide range of affordances for positive youth development. These include building physical strengths and fitness, taking leadership, developing self-regulation and—for team sports in particular—practicing social skills with peers and belonging to a group of teammates (Holt 2016). The social nature of team sports has been considered to be a key aspect that enhances positive youth development (Dimech and Seiler 2011). Specifically, participation in team sports involves managing relationships with teammates, communicating to work towards common goals, experiencing the pressures of competing as a group, and celebrating successes with teammates (Hansen et al. 2010).

In a systematic review of the psychological and social benefits of sports participation for children and adolescents, participation in team sports was associated with mental health benefits, lower levels of social isolation, and higher levels of social-emotional wellbeing (Eime et al. 2013). The social aspect of team sports was discussed as a central component that contributes to participants' better mental health and wellbeing. Furthermore, in a longitudinal study with 200 7- to 8-year old children in Switzerland, social anxiety decreased over time for those children who participated in team sports (Dimech and Seiler 2011). Similarly, in a study involving 449 youths in grades 8 to 10 in Canada, positive sports team involvement was a protective factor for mental health; it significantly mediating the effect of risk for depression and mental health outcomes (Boone and Leadbeater 2006). Positive sports team involvement included subscales for experiencing social acceptance by peers in the team and feeling a sense of belonging to peers on the team.

Extracurricular Activities and Peer Belonging in Adolescence

Even though opportunities to form positive peer relationships and to belong to a peer group are considered key benefits that extracurricular activities can offer, little research has systematically examined this assumption (Vandell et al. 2015). A special issue has been dedicated to conceptualizing the ways in which extracurricular activities can help youths to engage in positive peer relationships (Fredricks and Simpkins 2013). The editors emphasized the need for large-scale research that accounts for aspects of peer relationships when studying extracurricular participation in relation to child and youth development.

Peers often motivate each other to join extracurricular activities (Fredricks et al. 2002) and extracurricular activities also offer contexts for building relationships with new peers (Dworkin et al. 2003). Dworkin and colleagues note that through extracurricular activities, early adolescents have a chance to socialize across diverse groups in the community—including peers from different age-groups, different racial backgrounds, and those who attend different schools. This may also help youths who are marginalized or rejected by school-based cliques. Building on self-determination theory (Deci and Ryan 2011), extracurricular activities with a group- and team focus in particular can satisfy early adolescents' basic need for relatedness and belonging.

In a nationally representative research study with youths, participation in extracurricular activities was linked to having friendships across different social networks and promoted young people's social integration across ecological contexts (Schaefer et al. 2011). In a study with older adolescents, consistent participation in extracurricular activities over longer periods of time predicted friendship quality; specifically, consistency in extracurricular involvement was associated with having a higher proportion of peers who valued academic achievement and had strong educational goals, and with having a smaller proportion of peers who engaged in risky behaviours (e.g., substance use) (Fredricks and Eccles 2006). One of the few studies that examined peer relationships as a mediating variable between extracurricular involvement and developmental outcomes found that among adolescents in grades 9, 10, and 12, participating in extracurricular activities predicted having more prosocial friends than non-participation, and being part of a prosocial peer network partially mediated the link between extracurricular involvement and lower levels of depression and higher levels of school engagement (Fredricks and Eccles 2005). To date, there is a lack of research on extracurricular involvement during middle childhood and early adolescence that has examined relationships with peers as a factor that contributes to and possibly mediates the benefits of extracurricular participation.

Overall, longitudinal research on extracurricular participation is still at an early stage. Person-centred studies that consider combinations of different activities in which young people participate and how these combinations may change over time are sparse. In particular, little is known about shifts in activity patterns from middle childhood to early adolescence and how they may be linked to later mental health outcomes. Furthermore, research confirming the potentially mediating role of belonging to a peer group in relation to benefits of extracurricular activities is needed. The present study builds on previous cross-sectional research (Oberle et al. 2019), in which data from 27,000 grade 4 students were used to establish latent profiles of extracurricular participation in relation to concurrent positive mental health. Four latent profiles were identified (i.e., participation in "no activities", "sports only", "all activities" and activities with a predominately "individual focus"). Children in the "sports only" cluster and those in the "all activities" cluster had significantly higher levels of positive mental health than children in the other two clusters. A subset of these grade 4 students (about 10,000) completed the same set of questions again in grade 7 and are included in the longitudinal data set used in the present study. The present study extends the previous study in several ways. Using a longitudinal design, this study examines whether the same latent clusters of participation can be found in grades 4 and 7, how stable extracurricular profile membership is over time, whether within-person shifts from non-participation to activities are linked to improvements in mental health, and whether peer belonging plays a mediating role in the link from extracurricular participation to positive and negative mental health over time.

Current Study

This study examines changes in extracurricular participation patterns from grade 4 to 7 in relation to positive and negative mental health outcomes in early adolescence, considering peer belonging as a potential mediator. Based on previous findings with grade 4 children (Oberle et al. 2019), it was expected that four latent profiles would represent children's extracurricular participation in grade 4 in the present study: participation in no activities, in all activities, in sports only, and in activities with a predominant individual focus. Whether the same four profiles also represented activity patterns in grade 7 was an exploratory question. It was also explored whether profile membership tended to be stable across both grade levels, or if young people had shifted to different activity combinations from grade 4 to grade 7.

Among the possible shifts in participation, it was predicted that there would be a subgroup who had not participated in activities in grade 4 (i.e., non-participants) and who had moved to participation in activities (i.e., membership in one of the clusters indicating extracurricular participation) in grade 7. Given that previous research has found benefits of extracurricular participation for positive developmental outcomes over time (Agans et al. 2014), the predicted move from non-participation (in grade 4) to extracurricular activities (in grade 7) was expected to be associated with higher levels of positive mental health (i.e., satisfaction with life, optimism) and lower levels of negative mental health (i.e., anxiety and depressive symptoms) in grade 7, controlling for demographics and mental health in grade 4. This hypothesis was tested using those who were non-participants at both time points as a reference group. Based on previous theory (Fredricks and Simpkins 2013) and research (Fredricks and Eccles 2005), it was further hypothesized that the association between participation in extracurricular activities and mental health would be mediated through a sense of belonging to the peer group in grade 7. Data were drawn from a population-based data set of students who had completed the Middle Years Development Instrument (MDI) in grades 4 and 7 in public school districts in British Columbia (BC). The process of determining the sample size, the procedure, all data exclusions, all manipulations, and all measures in the study are reported.

Methods

Participants

The present study is based on a total of 10,149 students who participated in the Middle Years Development Instrument (MDI) survey (Schonert-Reichl et al. 2013) in grades 4 (i.e., MDI-4) and 7 (i.e., MDI-7). A subset of analyses that examined the shift from non-participation in extracurricular activities (grade 4) to later participation (grade 7) in relation to mental health outcomes, including non-participants at both time points as a reference group, were based on a subsample of 3045 students.

Students in this study came from 383 schools in 36 school districts in British Columbia (BC), Canada. There are different school structures across BC's school districts; in the present study, a total of 6804 students attended grades 4 and 7 in an elementary school; 3129 students attended grade 4 in an elementary school and grade 7 in a middle school; 216 attended grade 4 in an elementary school and grade 7 in a secondary school. The average student age was 9.21 years old (SD = 0.48) in grade 4, and 12.33 years old (SD = 0.45) in grade 7. Fifty percent of the students were female, 68% reported only English as a first language learned at home, 13% reported English and an additional

language, and 15% reported only a language other than English. The top five non-English languages learned at home were French (4%), Mandarin (3%), Cantonese (2%), Korean (2%), and Filipino/Tagalog (2%). This language diversity is representative of the ethnic diversity in the province of BC.

Procedure

The MDI was implemented at a population level in participating school districts. Implementation of the MDI-4 took place during the school year between 2010/11 and 2014/15; implementation of the MDI-7 took place between 2013/14 and 2017/18. Until the school year 2014/15, the MDI was implemented by school staff (e.g., teacher, principal) in January or February. For administrative reasons, implementation changed to November or December in the years following 2014/15. Implementation took place in schools and during the school day and was guided by a step-by-step implementation manual and videos provided to school staff. The MDI was administered electronically or on paper over one to two 40-minute class periods. Analyses examining differential item functioning and data missingness for data collected electronically versus on paper questionnaires found no significant differences. This research was approved by the university human subjects institutional review board of the University of British Columbia in Canada, and by the administration of each participating school district. The average school participation rate within districts was 84% for the MDI-4 and 82% for the MDI-7. Within participating schools, a passive consent procedure was used at both time points (i.e., grades 4 and 7); all students were included in the study unless they were absent at the time of the implementation or their parents chose to withdraw them from participation. Students were informed that participation was voluntary and that responses were confidential; student assent was obtained before participation.

Measures

All measures used in the present study were drawn from the MDI. The MDI assesses psychological wellbeing and mental health, health, supportive relationships, and use of out-of-school time in 4th and 7th grade students. Most MDI subscales are adapted versions of validated original scales. A detailed overview of the MDI, its development, scale adaptation, implementation, validation, and psychometric properties of all subscales is provided elsewhere (Schonert-Reichl et al. 2013). The MDI survey has also been validated in a sample of ~29,000 children between the ages 10 and 15 in Australia (Gregory et al. 2018), and Swiss-Italian translation of the MDI has been validated with 1942 6th and 7th grade student in Switzerland (Castelli et al. 2018).

Demographics

Participants reported their age and first language learned at home. Language responses were categorized into "English only" and "Other" (this included children reporting both another language than English and English as first languages learned). Information about sex (boy or girl) was obtained through school records.

Participation in extracurricular activities

Students reported how many days in the past week (ranging from "never" to "5 times per week") they participated in each of the following extracurricular activities during the after school hours (i.e., between 3pm and dinner time): (1) educational lessons or activities (e.g. tutoring, math, language school), (2) art or music lessons, (3) youth organizations (e.g., Scouts, Girl Guides, Boys and Girls Clubs), (4) individual sports with a coach or instructor, and (5) team sports with a coach or instructor. Responses were dichotomized for each item (no participation = 0, participation on one or more days in the week = 1). Creating binary variables for participation in extracurricular activities serves the purpose of distinguishing between participants and non-participants for each activity; this approach has previously been used in research identifying patterns of extracurricular participation (Feldman and Matjasko 2007; Jiang and Peterson 2012; Pederson 2005). In grade 4, the percentages of students who reported participation in an activity at least once in the past week was 33.14% for educational activities, 40.00% for arts/music, 18.45% for youth organizations, 48.96% for individual sports, and 46.61% for team sports. In grade 7, percentages were 28.75% for educational activities, 35.99% for arts/music, 16.80% for youth organizations, 42.49% for individual sports, and 55.64% for team sports. A breakdown for the frequencies of participation (i.e., never to 5 times a week) in activities included in subsequent analyses is provided in Table S1.

Positive and negative mental health indicators

Items for all four mental health indicators were rated on a scale from 1 ("disagree a lot") to 5 ("agree a lot").

Life satisfaction Life satisfaction was measured with the 5-item *Satisfaction with Life Scale-Adapted for Children* (Gadermann et al. 2010). Sample item: "In most ways my life is close to the way I would want it to be." Internal consistency of the scale was good (alpha grade 4 = 0.89; alpha grade 7 = 0.90). Life satisfaction scores ranged from 1 to 5 in grade 4 (Mean = 4.12, SD = 0.83) and in grade 7 (Mean = 3.97, SD = 0.88).

Optimism Optimism was measured with an adapted 3-item version of the Optimism subscale in the *Resiliency Inventory* (Noam and Goldstein 1998). Sample item: "I start most days thinking that I will have a good day." Internal consistency was good for this scale (alpha grade 4 = 0.81; alpha grade 7 = 0.80). Optimism scores ranged from 1 to 5 in grade 4 (Mean = 4.09, SD = 0.83) and in grade 7 (Mean = 3.86, SD = 0.88).

Anxiety and depressive symptoms Anxiety and depressive symptoms were measured with two 3-item subscales of the *Seattle Personality Questionnaire* (Kusche et al. 1988). The anxiety subscale captures social anxiety. Sample item: "I worry a lot that other people might not like me." Internal consistency was good for this scale (alpha grade 4 = 0.88; alpha grade 7 = 0.88). Anxiety scores ranged from 1 to 5 in grade 4 (Mean = 3.00, SD = 1.28) and in grade 7 (Mean = 2.75, SD = 1.27). The depressive symptoms subscale is also described as reflecting "sadness" (Thomson et al. 2018). Sample item: "I am unhappy most of the time." Internal consistency was good for this scale (alpha grade 4 = 0.84; alpha grade 7 = 0.82). Depressive symptoms scores ranged from 1 to 5 in grade 4 (Mean = 2.57 SD = 1.03) and in grade 7 (Mean = 2.71, SD = 1.03). Table S2 provides an overview of all intercorrelations among the mental health indicators in grades 4 and 7.

Peer belonging

Peer belonging was measured with an adapted 3-item version of the *Relational Provisional Loneliness Questionnaire* (Hayden-Thomas 1989) on a scale from 1 ("disagree a lot") to 5 ("agree a lot"). Sample item: "When I am with other kids my age, I feel I belong." Internal consistency was good for this scale (alpha grade 4 = 0.88; alpha grade 7 = 0.85). Peer belonging scores ranged from 1 to 5 in grade 4 (Mean = 4.15, SD = 0.90) and in grade 7 (Mean = 4.09, SD = 0.92).

Data Analytic Approach

Preliminary analyses were conducted to examine descriptive statistics for all variables and to inspect the data set for missing data. Cases that had missing values on all extracurricular participation items included in the latent class analyses (LCA) were removed. A total of 692 out of 10,149 (6.82%) observations were removed for grade 4, and 303 out of 10,149 (2.99%) were removed for grade 7. Cases were retained if data were not missing on all items (the percentage of missing values ranges from 7.89 to 8.67% on grade 4 items, and 4.02 to 5.06% on grade 7 items) and full information maximum likelihood (FIML) estimation was used because it is the recommended approach for handling missing values (Graham 2009).

Mplus 8.1 (Muthén and Muthén 1998–2017) was used to conduct Latent Class Analyses (LCA) and Latent Transition Analyses (LTA). Model selection was based on relative model fit indices: Akaike's Information Criterion (AIC), Bayesian Information Criterion (BIC), and Sample-Size Adjusted BIC, with lower values indicating better model fit (Collins and Lanza 2010). The Lo-Mendel-Rubin likelihood ratio test (LMR) and Bootstrap likelihood ratio test (BLRT) were used to compare the improvement between neighbouring models: a p value less than 0.05 as criterion indicates that the model with more identified latent classes (i.e., $n + 1$ vs. n) fit the data better (Berlin et al. 2014).

LCA and LTA

Two separate LCAs were conducted, one for extracurricular participation in grade 4 and one for participation in grade 7, to identify the latent classes of activities into which children were classified at the two time points. Next, it was examined whether the same LCA solution was found for grades 4 and 7 by testing for measurement invariance, holding item response probabilities constant across grade 4 and 7. This was necessary because an LTA requires that the latent clusters established at different time points (i.e., in grades 4 and 7) can be interpreted in a comparable manner. Last, a LTA was conducted to examine the transition patterns of latent class membership from grade 4 to grade 7. LTA is the longitudinal extension of LCA in which transition patterns between latent classes are modelled over time. Specifically, the number of "stayers" (i.e., children who were in the same latent classes in grades 4 and 7) and "movers" (i.e., children who moved to a different extracurricular cluster from grade 4 to 7) was determined. The transition patterns of students with initial (i.e., grade 4) non-participation status were of particular interest in the current study. Distribution of boys and girls across the latent clusters and across the latent transitions of main interest were also examined.

Path analyses with mediation test

To examine whether shifting from non-participation in grade 4 to different extracurricular clusters in grade 7 was associated with mental health in grade 7, two sets of path analyses were conducted with the subgroup of children who had initial non-participation status in grade 4. In the first model, pathways from the transition patterns to mental health in grade 7 were examined. Peer belonging in grade 7 was tested as a potential mediator in the model; control variables were peer belonging in grade 4, sex, and home language status. The second path model was similar to the first model, except that mental health in grade 4 was an additional control variable. Examining the model with and without grade 4 mental health allowed for testing how much of the variance explained in grade 7 mental

health was explained by previous mental health, and how much was explained by the variables of main interest—the shifts from non-participation to different clusters of extracurricular activities between grades 4 and 7. Estimates for direct pathways are reported, as well as estimates for indirect pathways that were mediated through peer belonging. The latent transition patterns were dummy coded. Children who were non-participants in both grade 4 and grade 7 were set as the reference group.

Results

Latent Class Models for Extracurricular Activities in Grades 4 and 7

The results of the LCA suggested that a 4-class solution was the best fitting model in grade 4 (see Table S3) and in grade 7 (Table S4). At both grade levels, the 5-class solution did not significantly improve model fit in comparison to the 4-class solution (LMR, $p = 0.21$ for grade 4, and $p = 0.41$ for grade 7; BLRT, $p > 0.999$ for both grade 4 and 7). The four extracurricular clusters found for grade 4 (see Table S5) and grade 7 (see Table S6) had similar features. Children in class 1 predominantly participated in team sports and individual sports, and were less likely to participate in educational programs and in arts/music programs. This subgroup was labelled "Sports only". Children in class 2 were more likely to participate in individual sports, arts/music, and educational programs and less likely to participate in team sports. This subgroup was labelled "Individual activities" because these activities tend to have an individual rather than a team/group focus. Children in class 3 had a low likelihood to participate in any of the extracurricular activities; this subgroup was called "No activities" (i.e., non-participants). Children in class 4 had a high likelihood to participate in all extracurricular activities; this class was labelled "All activities" (i.e., children highly involved in activities). Latent class prevalence and item response probabilities for each cluster are reported in Tables S5 and S6.

Measurement Invariance Testing

The non-significant likelihood ratio testing result ($p = 0.26$) between the model with freely estimated item response probability at both grade levels and the model with equal item response probability at both grade levels supported the measurement invariance assumption. In other words, each latent class could be interpreted in the same way for grade 4 and grade 7. This finding supported using a single set of parameter estimates (i.e., item response probabilities, and class prevalence) to interpret the identified 4-class models at both grade levels (see Table 1 and Fig. 1). Most grade 4

Table 1 Results of latent class analysis: latent class prevalence and item response probabilities for simultaneous grade 4/7 LCA ($n = 10{,}121$)

						n (percentage)				Proportion (%)	
						Grade 4		Grade 7			
	Educational programs	Arts/Music	Individual sports	Team sports	Girl	Boy	Girl	Boy	Grade 4	Grade 7
Class 1 (sports only)	0.134	0.164	0.370	0.805	1123 (0.40)	1719 (0.60)	1935 (0.43)	2583 (0.57)	28.10	44.60
Class 2 (individual activities)	0.468	0.766	0.536	0.165	1321 (0.65)	696 (0.35)	989 (0.64)	547 (0.36)	20.00	15.20
Class 3 (no activities)	0.123	0.094	0.239	0.000	1554 (0.51)	1491 (0.49)	1227 (0.52)	1113 (0.48)	30.00	23.10
Class 4 (all activities)	0.682	0.726	0.783	0.886	1005 (0.45)	1212 (0.55)	852 (0.49)	875 (0.51)	21.90	17.10

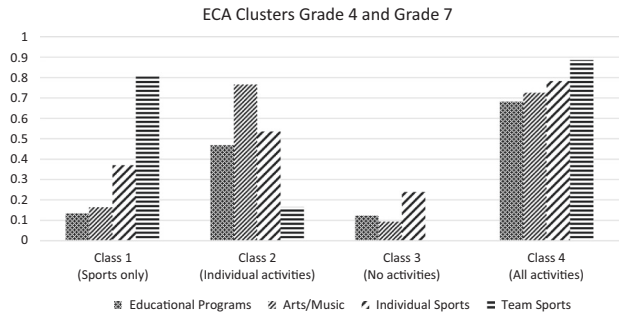

Fig. 1 ECA clusters in grade 4/7 ($n = 10{,}121$). *Note*: Children who were non-participants in both, grade 4 and 7 were used as a reference group in the analyses

children were in the latent class "no activities" (30%), followed by "sports only" (28%), "all activities" (22%), and "individual activities" (20%). In grade 7, most children were in the cluster "sports only" (45%), followed by "no activities" (23%), "all activities" (17%), and "individual activities" (15%).

Regarding gender distribution across the latent clusters, girls were over-represented in the cluster "Individual activities" and underrepresented in the cluster "sports only" compared to boys (see Table 1). Representation in the "all activities" and in the "no activities" clusters was similar for both genders. Table S7 shows the results of the multinomial logistic regression analysis in which gender (with male as reference group) predicted the membership of extracurricular latent class (with "No Activities" as reference group). The results showed that girls had significantly lower odds of membership in "sports only" and significantly greater odds of membership in "individual activities" in both grades.

Changes in Cluster Membership from Grades 4 to 7

Latent transition probabilities from extracurricular clusters in grade 4 to clusters in grade 7 are displayed in Table 2. There was a total of 16 possible transition patterns (i.e., 4 latent classes at each of grade levels); four of them reflected children staying in the same latent class at each time point (i.e., "stayers") and 12 of them reflected children moving to a different latent class from grade 4 to 7. For each extracurricular cluster, the probability was highest that students would stay in the same cluster from grade 4 to grade 7. Specifically, 88.7% of children who were classified in "sport only" in grade 4 stayed in this cluster in grade 7; in the "individual activities" cluster, 57.0% of children were "stayers"; in the "no activities" cluster, 56.7% of children were "stayers"; and in the "all activities" cluster, 45.0% of children stayed in the same cluster. Regarding the "movers", two transition patterns had relatively high conditional transitioning probability: moving from "all activities" in grade 4 to "sports only" in grade 7 (46.7%) and moving from "no activities" in grade 4 to "sports only" in grade 7 (25.1%). To address further research questions regarding the benefits of extracurricular participation, there was a particular interest in those children who moved from the "no activities" cluster in grade 4 to a cluster that reflected participation in activities in grade 7. A total of 3045 children did not participate in activities in grade 4; 2056 ($n_{girls} = 1050$, $n_{boys} = 1006$) of them were also non-participants in grade 7, whereas a total of 989 had moved to activities by grade 7. Of these 989 children, 528 ($n_{girls} = 248$, $n_{boys} = 280$) had moved to "sports only", 299 had moved to "all activities" ($n_{girls} = 162$, $n_{boys} = 137$) and 162 ($n_{girls} = 94$, $n_{boys} = 68$) had moved to "individual activities" by grade 7.

Mental Health and Transitions From Non-Participation to Participation

Four sets of path models were conducted – one for each positive and negative mental health indicator as a dependent variable (i.e., life satisfaction, optimism, anxiety, depressive symptoms) (see Fig. 2)[1]. The independent variables of main interest were the three extracurricular transition patterns for initial non-participants who had moved to activities in grade 7 and peer belonging in grade 7 as a mediator variable. Control variables were sex, home language (i.e., English only versus other), and peer belonging and mental health in grade 4. The models in which grade 4 mental health was included as a control variable explained 26.8% of variation in grade 7 life satisfaction, 27.5% of variation in grade 7 optimism, 20.8% of variation in grade 7 depressive symptoms, and 15.5% of variation in grade 7 anxiety. When grade 4 mental health indicators were removed, the variation explained in the mental health outcomes was reduced by 2–3% across the four outcomes, indicating that grade 4 mental health only explained a relatively small amount of the variation in grade 7 mental health outcomes.

Direct and indirect effects

Table 3 shows the parameter estimates for direct and indirect pathways, statistical significance of the pathways, and associated confidence intervals. The pattern of results was the same for the four mental health outcomes. Moving to the "all activities" cluster and moving to the "sports only" cluster was significantly and directly linked to higher levels of peer belonging in grade 7 (see estimates for pathways a1

[1] Note that the same set of path analyses was conducted for predicting self concept, an indicator for positive mental health. Results did not differ from those predicting optimism and life satisfaction; due to space restrictions and to avoid redundancy, results for self concept as a mental health outcome are not reported.

Table 2 Latent transition probability between clusters from grade 4 to 7

	Grade 7 ECA clusters			
Grade 4 ECA clusters	Sports only	Individual activities	No activities	All activities
Sports only	0.887	0.000	0.006	0.107
Individual activities	0.083	0.570	0.188	0.159
No activities	0.251	0.108	0.567	0.075
All activities	0.467	0.042	0.041	0.450

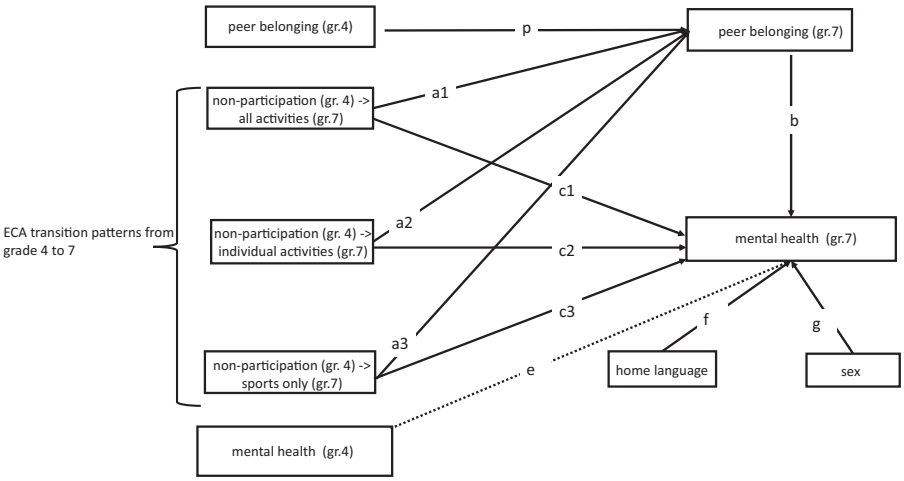

Fig. 2 Pathways from ECA transitions (from non-participation in grade 4 to ECAs in grade 7) to mental health (i.e., optimism, life satisfaction, anxiety, depressive symptoms) in grade 7

and a3 in Table 3); peer belonging in grade 7 was significantly related to higher levels of positive and lower levels of negative mental health in grade 7 (see estimates for pathway b). Further examination of indirect effects (see pathways a1 × b, a3 × b) showed that peer belonging significantly mediated the effect of two extracurricular transitions (i.e., "sports only" and "all activities") on grade 7 mental health. In other words, moving from "non-participation" in grade 4 to "sports only" in grade 7 was linked to higher levels of positive mental health and lower levels of negative mental health in grade 7 and this link was significantly mediated by higher levels of peer belonging in grade 7. The same pattern was found for the move to "all activities"[2]. The pathway from moving to "individual activities" to peer belonging was not significant, and none of the direct pathways from the extracurricular transition patterns to mental health (i.e., c1, c2, c3) were significant. Mental health in grade 4 was significantly and positively associated with mental health in grade 7 (e), and peer belonging in grade 4 was significantly and positively associated with peer belonging in grade 7 (p).

[2] When peer belonging was not taken into account in the analytic model, there were direct and significant effects from transitions to the "all" cluster and the "sports only" cluster to mental health; these direct effects dropped to non-significance when taking into account peer belonging, supporting peer belonging as a mediator in the model.

Discussion

Extracurricular activities have the potential to promote positive youth development by providing young people with opportunities to pursue their interests, acquire skills, receive adult mentoring, and build new friendships. The present study implemented a person-centered approach to identify common extracurricular participation patterns and to investigate changes in participation from middle childhood to early adolescence. Building on that foundation, the study examined mental health benefits associated with moving from non-participation to activities over time. There were four different profiles reflecting the combinations of activities in which young people participated. As hypothesized, shifting from non-participation to activities that involved team sports was associated with better mental health; peer belonging fully mediated this relationship. Shifting from non-participation to activities that tended to have an individual rather than team focus was not associated with better mental health. The findings from this study inform research and practice in three different ways. By shedding light on the kinds of benefits that different types of activities afford, by highlighting the importance of understanding underlying mechanisms (e.g., connectedness with peers) through which extracurricular participation contributes to positive youth development, and by providing direction for communities to support availability and access to extracurricular activities during the elementary years.

Table 3 Predicting positive mental health in grade 7 among children who had transitioned from non-participants in grade 4 to ECAs by grade 7 (direct and indirect effects as shown in Fig. 2)

		Life Satisfaction $R^2 = 0.268$				Optimism $R^2 = 0.275$				Depressive symptoms $R^2 = 0.208$				Anxiety $R^2 = 0.155$			
IVs	path	est	*p*	LL	UL	est	*P*	LL	UL	est	*p*	LL	UL	est	*p*	LL	UL
Direct effects																	
All activities	a1	**0.21**	0.00	0.09	0.32	**0.18**	0.00	0.06	0.29	**0.21**	0.00	0.10	0.33	**0.18**	0.00	0.05	0.29
Individual activities	a2	−0.05	0.54	−0.21	0.11	−0.02	0.82	−0.19	0.13	0.00	0.98	−0.16	0.14	−0.01	0.87	−0.16	0.14
Sports	a3	**0.18**	0.00	0.09	0.27	**0.18**	0.00	0.09	0.26	**0.19**	0.00	0.09	0.28	**0.18**	0.00	0.08	0.26
Peer belonging 4	p	**0.26**	0.00	0.22	0.31	**0.25**	0.00	0.21	0.29	**0.25**	0.00	0.21	0.30	**0.25**	0.00	0.21	0.30
All activities	c1	0.06	0.26	−0.04	0.16	0.07	0.16	−0.02	0.17	−0.08	0.20	−0.19	0.03	−0.02	0.81	−0.15	0.13
Individual activities	c2	0.09	0.15	−0.04	0.21	0.10	0.16	−0.04	0.24	0.00	0.96	−0.14	0.16	0.10	0.32	−0.09	0.30
Sports	c3	0.07	0.09	−0.01	0.14	0.06	0.09	−0.02	0.13	−0.08	0.11	−0.17	0.02	0.01	0.84	−0.11	0.12
Peer belonging grade 7	b	**0.41**	0.00	0.37	0.44	**0.45**	0.00	0.42	0.49	**−0.41**	0.00	−0.45	−0.37	**−0.31**	0.00	−0.36	−0.26
Mental health 4[a1]	e	**0.23**	0.00	0.19	0.28	**0.20**	0.00	0.16	0.24	**0.19**	0.00	0.15	0.22	**0.25**	0.00	0.21	0.28
Home language[b]	f	0.06	0.10	−0.01	0.12	0.04	0.23	−0.03	0.10	**−0.09**	0.02	−0.17	−0.01	−0.05	0.34	−0.14	0.05
Sex[c]	g	0.04	0.16	−0.02	0.11	0.03	0.39	−0.03	0.09	**−0.11**	0.00	−0.17	−0.03	**−0.36**	0.00	−0.45	−0.27
Indirect effects																	
All activities × peer bel. 7	a1 × b	**0.08**	0.00	0.04	0.13	**0.08**	0.00	0.03	0.13	**−0.09**	0.00	−0.13	−0.04	**−0.06**	0.00	−0.09	−0.02
Ind. Activities × peer bel. 7	a2 × b	−0.02	0.55	−0.09	0.05	−0.01	0.82	−0.08	0.06	0.00	0.98	−0.06	0.07	0.00	0.87	−0.04	0.05
Sports × peer bel. 7	a3 × b	**0.07**	0.00	0.04	0.11	**0.08**	0.00	0.04	0.12	**−0.08**	0.00	−0.11	−0.04	**−0.06**	0.00	−0.08	−0.03
Peer bel. 4 × peer bel. 7	p × b	**0.11**	0.00	0.09	0.13	**0.11**	0.00	0.10	0.14	**−0.10**	0.00	−0.12	−0.08	**−0.08**	0.00	−0.10	−0.06
Total effects																	
	c1 + (a1 × b)	**0.14**	0.01	0.03	0.25	**0.15**	0.01	0.05	0.26	**−0.16**	0.01	−0.29	−0.04	−0.08	0.34	−0.22	0.08
	c2 + (a2 × b)	0.07	0.32	−0.08	0.20	0.09	0.24	−0.06	0.25	0.00	0.97	−0.15	0.17	0.10	0.29	−0.09	0.30
	c3 + (a3 × b)	**0.14**	0.00	0.05	0.22	**0.15**	0.00	0.06	0.23	**−0.15**	0.00	−0.25	−0.05	−0.04	0.46	−0.16	0.07

Note: Children who were non-participants in grade 4 and stayed non-participants in grade 7 were used as a reference group in analyses. Estimates that were statistically significant at $p < 0.05$ are marked as bold. Sample sizes for analyses: $n = 2604$ for life satisfaction; $n = 2663$ for optimism; $n = 2651$ for anxiety; $n = 2641$ for sadness)

[a]For each mental health indicator we predicted in grade 7, we controlled for the same mental health indicator in grade 4

[b]English = 1, other = 0

[c]Female = 0, Male = 1

Profiles of Extracurricular Activities in Middle Childhood and Early Adolescence

In the present study, extracurricular participation in grades 4 and 7 was best represented by four profiles. There was a group that was unlikely to participate in any extracurricular activities, a group that was most likely to participate in all activities, a group that was predominately involved in sports, and a group that was most likely to participate in educational programs, arts/music, and individual sports—but not in team sports. This finding is in alignment with the latent class solution that was found in a previous study with more than 27,000 grade 4 students who had completed the MDI (Oberle et al. 2019); the sample in the present study was a sub-sample of the previous study for which longitudinal data were collected. Replicating the same extracurricular profile structure in a smaller sub-sample of grade 4 students in the present study is important because it supports the stability and reliability of the previously identified profiles in the population. Identifying the same extracurricular profile structure among early adolescents (i.e., grade 7) expands on the previous findings and suggests similar patterns of extracurricular participation for both age-groups. The extracurricular profiles established in the present study are also in alignment with previous research conducted in the US that identified groups of children and adolescents who were not involved in activities, those who participated in all activities, and those who mainly participated in sports (Linver et al. 2009; Metzger et al. 2009; Zarrett et al. 2009). Future research needs to explore whether these activity patterns persist at later stages of adolescence, since use of out-of-school time tends to change with the transition to high school (Feldman and Matjasko 2005).

At both grade levels, the majority of young people fell either into the sports only cluster (grade 4: 28%; grade 7: 45%) or the cluster of non-participants (grade 4: 30%; grade 7: 23%). The clusters for individual activities (grade 4: 20%; grade 7: 15%) and all activities (grade 4: 22%; grade 7: 17%) were comparable in size. Girls were under-represented in the sports only cluster at both time points and over-represented in the individual activities cluster.

These findings indicate that between middle childhood and early adolescence, overall participation in extracurricular activities increased (i.e., the number of non-participants decreased), and that this increase was mostly driven by an increased participation in sports. This finding corresponds with past research in which sports activities were also particularly prominent amongst the activities young people participated in (Linver et al. 2009). It also reflects the notion that sport is a central part of North American culture and that athleticism, sports participation, and sports identity are valued and often prioritized for children and youths (Weinberg et al. 2000; Lau et al. 2007).

The group of non-participants remained fairly large between grades 4 and 7 in the present study. As researchers have shown, extracurricular activities are associated with costs and therefore not accessible for everyone (Snellman et al. 2014; Townsend and Murphy 2001). Typical costs include fees and parents' time required to support their children's participation (e.g., driving them to activities). Even though no information was available for why children did not participate in extracurricular activities, it is possible that some of the non-participations were facing barriers that prevented them from participating in activities which need to be addressed by communities. In BC, extracurricular activities during the elementary school years are often offered through the community and private clubs rather than through schools. One way to support the accessibility and affordability of extracurricular activities is to offer activities at the school location, subsequent to school hours, and subsidizing those activities is (Darling et al. 2005).

Stability in Extracurricular Activities Over Time

The main finding regarding stability in extracurricular participation from grade 4 to 7 was that across all extracurricular clusters in grade 4, children were (by far) most likely to stay within the same cluster over time. The only exception was the group of children who participated in all activities in grade 4; for children in this cluster, the likelihood to move from all activities to sports only by grade 7 (i.e., probability of 0.47), was comparable to the one for staying involved in all activities (i.e., probability of 0.45). It is possible that due to the typically increasing demands of school work between grades 4 and 7 (Ryan et al. 2013), some children who were involved in a broad range of extracurricular activities reduced their participation to fewer activities between grades 4 and 7. Alternatively, children involved in all activities in grade 4 may have been at a stage of exploring a wide range of interests, but by grade 7, it is possible that they had decided on which activities they wanted to focus (and, in this context, sports were the most common focus they took).

The overall stability in cluster membership is an important finding. On the one hand, it is possible that interest in or commitment to extracurricular activities is already formed in middle childhood. This is plausible since the transition to early adolescence marks a developmental period where young people form a sense of identity, become increasingly self-aware of their own ideas and wishes, and embark on a trajectory in their development (Cincotta 2008). On the other hand, it is also possible that they tend to stick with the activities they start with, which is also influenced by the programming available. Given the popularity of sports in Canadian and North American culture, access to sports-related extracurricular activities tends to be good. In

contrast, less funding is typically available for music and arts programs and such programs might be harder to access therefore. From a practical perspective, the present finding suggests that if communities want to get children and adolescents involved in extracurricular activities, they need to start early. Further, lack of access and barriers to participation at an earlier stage may result in "closing doors" for extracurricular involvement later on.

Mental Health in Previous Non-Participants

As expected, a subgroup was classified as non-participants in grade 4 and had moved to extracurricular participation by grade 7 (i.e., ~10% of the entire sample). For early adolescents in this subgroup, moving out of non-participation and into sports only or all activities by grade 7 significantly and indirectly predicted higher levels of positive mental health and lower levels of negative mental health in grade 7; peer belonging fully mediated this relationship. This is a key finding in the present study because it supports the theoretical assumption that extracurricular activities can play both a promotive and a protective role for mental health in childhood and adolescence (Smith 2007). In accordance with previous theory (Fredricks and Simpkins 2013) and emerging research (Dimech and Seiler 2011; Dworkin et al. 2003; Fredricks and Eccles 2005), it suggests that the within-person shift from non-participation to sports or all types of extracurricular activities provided early adolescents with an opportunity for connecting with peers and forming friendships; this may have enhanced their sense of peer belonging which, in turn, played a positive role for their mental health (Bond et al. 2007). Although causality cannot be implied, this directional explanation is supported through the present analytical design, in which within-child changes in extracurricular participation were measured over time, using children who remained non-participants at both time points as a comparison group and controlling for earlier mental health and peer belonging. Previous research (Fredricks and Eccles 2005) is in line with the finding that peer belonging plays a mediating role between extracurricular participation and positive outcomes.

The question arises why only the shifts to sports and to all activities predicted more positive and less negative mental health over time, but not the shift to the extracurricular activities cluster that included educational programs, music/arts, and individual sports. In fact, children who shifted from non-participation to this cluster did not significantly differ in their mental health over time from children who stayed non-participants at both time points. It is important to discuss this finding based on what type of learning and experiences the different activities enable.

Educational programs tend to provide opportunities for individuals to learn new cognitive skills and provide academic enrichment for individuals (Vandell et al. 2015). Through participation in the arts, young people practice precision in focus and detail, express their creativity, and often create a final product to be showcased (Heath 2001). Music programs provide opportunities for cognitive learning (e.g., understanding and producing the structure and patterns in music) and improving music-specific skills (e.g., learning to play an instrument) (O'Neill 2005). For example, extended music participation has been found to be associated with higher executive functioning (Slevc et al. 2016), academic achievement (Guhn et al. 2019), and academic self concept (Degé and Schwarzer 2017). Participation in team sports, has an obvious and dominant social component. It affords building and managing social relationships with teammates, including practicing social skills, cooperating, and communicating with team members to jointly work towards a common goal (Hansen et al. 2010).

Team sports were a "key ingredient" in the present study. Specifically, early adolescents in the two clusters that were linked to better mental health through peer belonging (i.e., "all activities" and "sports only") shared "team sports" as a type of activity they had shifted to since grade 4. Emphasizing the important role of team sports in mental health is also in alignment with findings from a recent study based on a nationally representative sample of 9668 individuals in the US (Easterlin et al. 2019). Specifically, the authors found that among those who had adverse childhood experiences, team sports participation during adolescence was associated with better mental health (i.e., lower odds of receiving a diagnosis of depression) during early adulthood.

The finding that peer belonging mediated the relation between shifting to sports or all activities, and later mental health offers an important clue to interpreting the finding. It is possible that compared to team sports, the activities in the education, music/arts, individual sports cluster in this study tended to have more of an individual focus (e.g., tutoring programs and learning to play an instrument) which may have provided fewer opportunities for building peer relationships. Alternatively, even though children's motivation for engaging in an extracurricular activities was not measured, it can also be speculated that some activities in individual activities cluster (e.g., educational programs) were not preferred or chosen activities by children but instead requested by parents or a recommended by a teacher. Whether or not children participate in extracurricular activities by choice, in turn, could further influence whether or not they benefit their overall wellbeing.

Limitations and Future Research

Several limitations need to be considered. The present study was based on large-scale data available from a population-based project that monitors child wellbeing across multiple domains in school districts in BC. Given the broad focus of

the MDI survey, detailed information about extracurricular participation, such as how long children had participated in the activities, how often and regular they participated, why they participated in particular activities, and the location of the activities was not available. There was also no information available on families' socioeconomic backgrounds —a factor that likely played a role in non-participation. Future research needs to incorporate these aspects—especially when investigating barriers to extracurricular involvement. The present study was based on data from two time points – grades 4 and 7. Given that most children stayed in the same extracurricular activities cluster at both grade levels, future research needs to include children at younger ages to understand from what time point on this stability emerges. A transition analysis with more frequent (e.g., annual) time points can also shed light on possible fluctuations in extracurricular involvement between grades 4 and 7 that may have occurred but could not be tracked in the present study. Finally, research that jointly examines participation in both structured and unstructured activities can provide important insight into what non-participants are doing during out-of-school time.

Conclusion

Previous research has shown that participation in extracurricular activities supports positive development in childhood and adolescence. To date, the majority of studies have investigated extracurricular participation with older adolescents, through a variable-centered lens, and at one point in time. Studies that examine extracurricular participation from a person-centered and longitudinal perspective (i.e., capturing the combinations of activities in which young people participate, and how these patterns change over time) are limited. Furthermore, there is a shortage of research on underlying processes (e.g., peer belonging) through which extracurricular participation is linked to positive developmental outcomes. The present study addressed these limitations. Several important conclusions emerged. First, during middle childhood and early adolescence, young people tend to participate in the same combinations of activities (i.e., sports only, individual activities, no activities, or all activities). Moreover, patterns of extracurricular participation (including non-participation) are fairly stable over time. Given this stability, it is important to support involvement in extracurricular activities before the onset of early adolescence. Third, supporting non-participants to become involved in extracurricular activities including team sports can have benefits for their mental health and these benefits are in part due to an increased sense of peer belonging. This emphasizes the social context of extracurricular participation and highlights the importance of supporting peer belonging when promoting positive youth development through extracurricular activities.

Authors' Contributions EO conceived of the study, designed research questions, interpreted findings, and coordinated and drafted the manuscript; XRJ participated in the design of data analyses, performed statistical analyses, and contributed to drafting the manuscript; AMG participated in the interpretation of data analyses and provided critical review and editing of the manuscript; MG and KAS-R provided critical review and editing of the manuscript. All authors read and approved the final manuscript.

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Compliance with Ethical Standards

Conflict of Interest The authors declare that they have no conflict of interest.

Ethical Approval All procedures performed in studies involving human participants were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki declaration and its later amendments or comparable ethical standards. This research was approved by the Behavioural Research Ethics Board at the University of British Columbia, Vancouver, Canada. Ethical approval #: H17-01723.

Informed Consent A passive consent protocol was implemented in this study. All students were included in the research, unless their primary guardians withdrew them from the study. Participants' assent was obtained for participation in the study.

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