Preventive Medicine Reports 31 (2023) 102052

Contents lists available at ScienceDirect

Preventive Medicine Reports

journal homepage: www.elsevier.com/locate/pmedr

A cross-sectional study of organized activity participation and emotional wellbeing among non-immigrant and immigrant-origin children in British Columbia, Canada

Carmela Melina Albanese [a,b,*], Eva Oberle [a], Jason M. Sutherland [c,d], Magdalena Janus [a,e], Kimberly A. Schonert-Reichl [f], Katholiki Georgiades [e], Martin Guhn [a], Monique Gagné Petteni [a,d], Anne Gadermann [a,d]

[a] Human Early Learning Partnership, School of Population and Public Health, University of British Columbia, Vancouver, British Columbia V6T 1Z3, Canada
[b] Dalla Lana School of Public Health, University of Toronto, Toronto, Ontario M5T 3M7, Canada
[c] Centre for Health Services and Policy Research, School of Population and Public Health, University of British Columbia, Vancouver, British Columbia V6T 1Z3, Canada
[d] Centre for Health Evaluation and Outcome Sciences, Providence Health Care Research Institute, Vancouver, British Columbia V6Z 1Y6, Canada
[e] Offord Centre for Child Studies, Department of Psychiatry and Behavioural Neurosciences, McMaster University, Hamilton, Ontario L8S 4K1, Canada
[f] Department of Psychology, University of Illinois at Chicago, Chicago, IL 60607-7137, USA

ARTICLE INFO

Keywords:
Organized activities
Middle childhood
Depressive symptoms
Satisfaction with life
Immigration
Middle Years Development Instrument

ABSTRACT

Organized activity participation has been linked to children's emotional wellbeing. However, a scarcity of literature considers the role of immigrant background. This study's primary objective was to measure the association between organized activity participation and emotional wellbeing among a population-based sample of Grade 7 children in British Columbia, Canada. We also examined whether this relationship depended on immigration background. Our sample included 14,406 children (47.8% female; mean age = 12.0 years). 9,393 (65.2%) children were of non-immigrant origin (48.9% female; mean age = 12.1 years). 5,013 children (34.8%) were of immigrant origin (45.8% female; mean age = 12.0 years; 40.8% first-generation). Participants completed the Middle Years Development Instrument, a self-report survey measuring children's wellbeing and assets. We used odds ratios and the χ^2 test to compare the organized activity participation of non-immigrant and immigrant-origin children. We used multiple linear regression to measure associations between participation and indicators of emotional wellbeing and assessed whether associations varied based on immigrant background, controlling for demographic factors and peer belonging. Participation in any activity was similar among non-immigrant and immigrant-origin children ($OR_{1st\text{-}gen}$=1.06, p=0.37; $OR_{2nd\text{-}gen}$=0.97, p=0.62). Immigrant generation status modified the relationship between participation and emotional wellbeing (χ^2_{SWL}=3.69, p=0.03; χ^2_{Dep}=12.31, p<0.01). Beneficial associations between participation and both life satisfaction and depressive symptoms were observed among non-immigrant children only, although associations were small. We conclude that immigrant background modestly modified the association between organized activity participation and emotional wellbeing.

1. Introduction

Organized activities, defined as structured, adult-supervised activities that occur regularly outside of school hours, are crucial for supporting children's healthy development (Lerner et al., 2010). Research has documented associations between participation in organized activities and important indicators of development, including academic achievement and emotional wellbeing, among children and adolescents (Badura et al., 2015; Bohnert et al., 2008; Darling, 2005; Oberle et al., 2019; Panza et al., 2020). Emotional wellbeing during childhood is associated with later wellbeing, including the absence of emotional problems (Richards & Huppert, 2011; Taylor et al., 2017); therefore,

Abbreviations: BC, British Columbia; ICC, Intraclass correlation coefficient; LRT, Likelihood ratio test; MDI, Middle Years Development Instrument; MLR, Multiple linear regression; MOH, Ministry of Health; MSP, Medical Services Plan; OR, Odds ratio; SES, Socioeconomic status; SWL, Satisfaction with life; US, United States.

* Corresponding author.
E-mail address: melinaalbanese@alumni.ubc.ca (C.M. Albanese).

https://doi.org/10.1016/j.pmedr.2022.102052
Received 1 April 2022; Received in revised form 7 November 2022; Accepted 13 November 2022
Available online 14 November 2022

understanding the role that organized activities play in supporting children's emotional wellbeing is important.

While most children in Canada participate in at least one organized activity, up to 14% of children aged 6–13 do not participate in any (Guèvremont et al., 2008). Numerous factors influence children's participation in organized activities. Low socioeconomic status (SES) is associated with nonparticipation because of affordability of activities and equipment, time constraints, and transportation constraints (Vandell et al., 2015). Peer belonging can impact selection into organized activities, with research showing that friends' participation influences children's participation in organized activities (Fredricks et al., 2002; Loder & Hirsch, 2003). Research from the United States (US) shows that 10% fewer immigrant-origin youth participate in organized activities than non-immigrant children (Jiang & Peguero, 2017; Jiang & Peterson, 2012). Approximately 37.5% of all children in Canada are foreign-born or have at least one foreign-born parent (Lara & Volante, 2019; Statistics Canada, 2017). Therefore, it is striking that comparisons of organized activity participation based on the immigration background of children in the Canadian context are lacking.

The association between organized activity participation and developmental outcomes is not universal for all children (Simpkins et al., 2017; Vandell et al., 2015). For example, US research reports that immigrant background modifies the association between participation in organized activities and youth's involvement in violence (Jiang & Peterson, 2012) and grade point average (GPA) (Camacho & Fuligni, 2015). Jiang and Peterson found that organized activity participation was associated with lower odds of self-reported involvement in violence among non-immigrant teenagers and higher odds of involvement among immigrant-origin teenagers (Jiang & Peterson, 2012). Participation in any organized activity has also been linked to higher GPA only among first-generation immigrant youth, controlling for demographic factors and previous GPA (Camacho & Fuligni, 2015). To the best of our knowledge, no prior research has explored the role of immigration background in the association between organized activity participation and emotional wellbeing.

To improve understanding of immigrant-origin children's involvement in organized activities and the role of immigration background in the association between organized activity participation and emotional wellbeing, this study had three objectives: first, to compare the proportion of immigrant- and non-immigrant origin children who participated in after-school organized activities; second, to measure the association between participation and emotional wellbeing, and; third, to examine whether immigrant background moderated this relationship among a population-level sample of Grade 7 students in British Columbia (BC), Canada.

2. Methods

2.1. Study design

This was a cross-sectional study based on a linkage between survey and administrative data. The study population included children who ever attended school in the ten largest urban or suburban school districts in BC, which represent over 80% of immigrant-origin children in the province.

2.2. Data source

Linked person-level data consisting of self-reported after-school organized activity participation, connectedness, and social-emotional outcomes measured with the Middle Years Development Instrument (MDI) (Human Early Learning Partnership, 2018; Schonert-Reichl et al., 2013), demographic variables from the BC Ministry of Health's (MOH) population-based registries (BC MOH, 2018a; BC MOH, 2018b), and immigration-related variables from Immigrant, Refugees and Citizenship Canada (IRCC) (IRCC, 2014) were used.

2.3. Procedure

The MDI was administered to Grade 7 students during the 2012/2013 school year through the 2016/2017 school year. In the 2012/2013 school year, the survey was administered by school staff in January or February; thereafter, implementation occurred in November or December due to administrative reasons. Students completed the MDI electronically or on paper over two forty-minute class periods. Item functioning and missingness did not differ between the two administration routes (Oberle et al., 2019). Student consent was obtained prior to administration. Ethics approval of this study was granted by the University of British Columbia's (UBC) Behavioural Research Ethics Board (H20-03669).

2.4. Measures

2.4.1. Administrative data

Demographic variables were obtained from administrative data sources. Records from BC's medical services plan (MSP), the province's universal health insurance program that covers medically required services of physicians and surgeons, were used to measure children's sex at birth and history of household MSP subsidy. Families with household income below a certain threshold (cut-off increased incrementally over time) were eligible to apply for MSP payment subsidies from the MOH. In this study, history of any (partial or full) MSP subsidy (yes/no) was used as a proxy for SES, following an approach that has been used in other studies (Guhn et al., 2020; Thomson et al., 2017). Immigration variables were derived from the IRCC records of children or their parents. The immigrant generation status variable indicated whether a child was of first-generation immigrant-origin (i.e., foreign-born), second-generation immigrant-origin (i.e., born in the host nation to at least one foreign-born parent), or non-immigrant origin. Other studies have used this definition in the Canadian context (Emerson et al., 2022; Gadermann et al., 2022).

2.4.2. The Middle Years Development Instrument

The MDI is a self-report tool that assesses children's social-emotional development and wellbeing (Schonert-Reichl et al., 2013; Thomson et al., 2018). Previous research has demonstrated strong psychometric evidence of the MDI, including evidence of factor structure, reliability, and convergent and discriminant validity (Schonert-Reichl et al., 2013; Thomson et al., 2018).

Satisfaction with Life. Life satisfaction was measured using the *Satisfaction With Life Scale adapted for Children* (SWLS-C) (Gadermann et al., 2010), a modified version of the *Satisfaction with Life Scale* (Diener et al., 1985). The subscale is comprised of five items, with responses ranging from "Disagree a lot" to "Agree a lot" (Gadermann et al., 2010). Sample item: "I am happy with my life." Life satisfaction scores ranged from 1 to 5 (mean = 3.96, SE = 0.08), with higher scores representing higher life satisfaction. The scale demonstrated good internal consistency (Cronbach's $\alpha = 0.86$).

Depressive symptoms. Depressive symptoms were measured using a three-item subscale adapted from the *Seattle Personality Questionnaire* (Kusche et al., 1988). Items have five responses ranging from "Disagree a lot" to "Agree a lot." Sample item: "I feel unhappy a lot of the time." Scores ranged from 1 to 5 (mean = 2.60, SE = 0.09), with higher scores denoting worse depressive symptoms. Internal consistency of this scale was adequate (Cronbach's $\alpha = 0.78$).

Participation in Organized Activities. Participation in organized activities was measured using items from the constructive use of after-school time domain of the MDI. These questions asked children, "During last week from after school to dinner time (about 3:00 pm to 6:00 pm), how many days did you participate in: a) Educational lessons b) Art or music lessons c) Youth organizations d) Individual sports with a coach or instructor, or e) Team sports with a coach or instructor." For each activity type, responses ranged from "Never" to "5 times a week (every

day).” This study considered participation in educational lessons, art or music lessons, individual sports, and team sports since they represent the most common organized activities in which children participated.

This study considered the presence or absence of participation using a dichotomous indicator (0 = response pattern of “never” across all four organized activity variables, 1 = participation in any activity on one or more days of the week). Previous research investigating associations between children’s organized activities and developmental outcomes has used this measure (Badura et al., 2015; Camacho & Fuligni, 2015; Gilman & Huebner, 2006; Jiang & Peterson, 2012; Oberle et al., 2019, 2020; Pedersen, 2005).

Peer belonging. Peer belonging was conceptualized to act as a confounder in the relationship between organized activity participation and wellbeing since previous research has identified friends’ participation as a reason children participate in organized activities (Arslan et al., 2020; Denault & Poulin, 2009; Fredricks et al., 2002). A modified 3-item version of the *Relational Provisional Loneliness Questionnaire* was used to measure peer belonging (Hayden-Thomson, 1989). The five-point response scale ranged from “disagree a lot” to “agree a lot,” with higher scores indicating higher peer belonging. Sample item: “I feel part of a group of friends that do things together.” Scores ranged from 1 to 5 (mean = 4.11, SE = 0.09). Internal consistency of the scale was good (Cronbach’s $\alpha = 0.81$).

2.5. Statistical analysis

Appendix A outlines the derivation of the final analytic sample. Missing data were limited to MDI survey items. 12,888 children (89.5%) had complete data on all variables used in the analyses. Among the remaining 1518 (10.5%) children with missing data we assumed items were missing at random and used multiple imputation by fully conditional specification to impute missing values (Little & Rubin, 2002; Sterne et al., 2009). All variables were used to impute missing values for the exposure and covariates (van Buuren & Groothuis-Oudshoorn, 2011) and 200 imputations were specified. The imputed data were used to assess the association between organized activity participation and emotional wellbeing to reduce possible bias associated with regression coefficients due to missing data (Little & Rubin, 2002).

To measure the association between immigrant background and organized activity participation, we calculated odds ratios (OR) for each immigrant generation, setting non-immigrant children as the reference group. The outcome variable was binary and indicated whether children reported participating in at least one organized activity on at least one day of the week prior to completing the survey. We also repeated this analysis separately for each type of organized activity.

To measure the association between organized activity participation and emotional wellbeing, we fit multiple linear regression (MLR) models. We calculated the intraclass correlation coefficient (ICC) to determine the variation in emotional wellbeing indicators between different classrooms, schools, and neighbourhoods. The independent variable of interest was any organized activity participation. Separate models were fit for life satisfaction and depressive symptoms, a selection of indicators reflective of children’s emotional wellbeing and thriving in childhood (Thomson et al., 2018), as the outcome. We adjusted for child’s sex, MSP subsidy history, and peer belonging. To test whether immigrant background moderated this relationship, an interaction term between organized activity participation and immigrant background was added to the model (full model). The likelihood ratio test (LRT) was performed to compare the fit of the full and reduced (no interaction term) models. When the LRT was significant, the full model was interpreted. PRATT indices (d) were calculated to measure the relative importance of each independent variable in the model. Using criteria previously established by Thomas et al. (1998), predictors were considered relatively unimportant if $d < 1/(2*p)$, where p is the number of predictors in the model. In this study, variables with a PRATT index<0.06, or $d < 1/(2*8)$, explain <6 % of the model’s R^2 and could be considered relatively unimportant in explaining the model variance.

Alpha was set *a priori* at 0.05 for all analyses. Analyses were conducted using R Statistical Software version 4.0.3 (R Core Team 2020) and SAS version 9.4 (SAS Institute Inc). Model assumptions of normality were satisfied by the central limit theorem, and multicollinearity was assessed using generalized variance inflation factors.

3. Results

3.1. Sample characteristics

The final sample consisted of 14,406 children attending a subset of public elementary and middle schools in BC; participants were from 1314 different classrooms, 276 schools, and 164 neighbourhoods. Their

Table 1
Sample characteristics.

Characteristic	
Total sample	N = 14,406
Age, mean (SE)	12.0 (0.00)
Peer belonging, mean (SE)[1]	4.11 (0.01)
Categorial variables, n (%)	
Immigrant generation status	
Non-immigrant	9393 (65.2)
1st generation	2047 (14.2)
2nd generation	2966 (20.6)
Sex	
Male	7515 (52.2)
Female	6891 (47.8)
MSP Subsidy	
No	9657 (67.0)
Yes	4749 (33.0)
Non-immigrant children	N = 9393
Age, mean (SE)	12.1 (0.01)
Peer belonging, mean (SE)	4.13 (0.01)
Categorical variables, n (%)	
Sex	
Male	4798 (51.1)
Female	4595 (48.9)
MSP Subsidy	
No	7074 (75.3)
Yes	2319 (24.7)
Immigrant-origin children	N = 5013
Age, mean (SE)	12.0 (0.01)
Peer belonging, mean (SE)	4.08 (0.01)
Years since arrival in Canada, mean (SE)[2]	7.57 (0.07)
Categorical variables, n (%)	
Sex	
Male	2717 (54.2)
Female	2296 (45.8)
MSP Subsidy	
No	2583 (51.5)
Yes	2430 (48.5)
Migration class	
Economic	2883 (57.5)
Family	1421 (28.4)
Refugee	667 (13.3)
Other[3]	42 (0.8)
Region of origin	
North America (US)	199 (4.0)
East Asia and Pacific	3048 (60.8)
Europe and Central Asia	674 (13.5)
Latin America and Caribbean	256 (5.1)
Middle East and North Africa	374 (7.5)
South Asia	344 (6.9)
Sub-Saharan Africa	116 (2.3)

SE: standard error.

[1] N = 254 children had missing responses to at least one item on the peer belonging scale and were not included in the calculation of the mean peer belonging score.

[2] Applies to first-generation only. Estimated as MDI completion year – year of arrival.

[3] Other indicates other miscellaneous forms of entry into Canada that do not fall into the economic, family, or refugee categories.

Table 2
Participation in organized activity types, stratified by immigrant background.

Immigrant generation status	*Missing*, N (%)	Participants, N (%)	Non-participants, N (%)	OR	95 % CI		*p*-value
					Lower	Upper	
Any activity							
Non-immigrant (ref.)	65 (0.7)	7874 (83.8)	1454 (15.5)	–	–	–	–
First generation	12 (0.6)	1734 (84.7)	301 (14.7)	1.06	0.93	1.22	0.37
Second generation	17 (0.6)	2478 (83.5)	471 (15.9)	0.97	0.87	1.09	0.62
Educational							
Non-immigrant (ref.)	112 (1.2)	2649 (28.2)	6632 (70.6)	–	–	–	–
First generation	25 (1.2)	980 (47.9)	1042 (50.9)	2.35	2.13	2.60	< 0.01
Second generation	32 (1.1)	1245 (42.0)	1689 (56.9)	1.85	1.69	2.01	< 0.01
Arts/music							
Non-immigrant (ref.)	141 (1.5)	3098 (33.0)	6154 (65.5)	–	–	–	–
First generation	33 (1.6)	962 (47.0)	1052 (51.4)	1.82	1.65	2.00	< 0.01
Second generation	35 (1.2)	1319 (44.5)	1612 (54.3)	1.63	1.49	1.77	< 0.01
Individual sports							
Non-immigrant (ref.)	191 (2.0)	3737 (39.8)	5465 (58.2)	–	–	–	–
First generation	35 (1.7)	930 (45.4)	1082 (52.9)	1.26	1.14	1.39	< 0.01
Second generation	43 (1.4)	1248 (42.1)	1675 (56.5)	1.09	1.00	1.19	0.05
Team sports							
Non-immigrant (ref.)	146 (1.6)	5394 (57.4)	3853 (41.0)	–	–	–	–
First generation	30 (1.5)	989 (48.3)	1028 (50.2)	0.69	0.62	0.76	< 0.01
Second generation	41 (1.4)	1364 (46.0)	1561 (52.6)	0.62	0.57	0.68	< 0.01

demographic characteristics are shown in Table 1. Approximately half the sample was female (47.8%) and one-third (33.0%) were from families with a history of receiving MSP subsidies. About one-third (34.8%) were of first- (14.2%) or second- (20.6%) generation immigrant-origin. Over half of immigrant-origin children belonged to the economic class (57.5%), 28.4% the family class, and 13.3% were refugees. Immigrant-origin children were primarily from East Asia and Pacific (60.8%), Europe and Central Asia (13.5%), Middle East and North Africa (7.5%), and South Asia (6.9%).

Exclusion from the analytic sample was associated with being male (χ^2=13.59, p<0.01), ever having received an MSP subsidy (χ^2=8.22, p < 0.01), and first-generation immigrant generation status (χ^2=4.41, p=0.04) (Appendix B).

3.2. Organized activity participation

The proportion of children who participated in organized activities stratified by immigrant background is shown in Table 2. 15.5% (n = 2226) of children in the sample did not participate in any organized activity, 83.9% (n = 12,086) participated in at least one activity, and 0.6% (n = 94) of the sample's organized activity participation status could not be discerned due to a combination of missing responses and "never." Participation was not associated with immigrant background (1st generation OR = 1.06, p = 0.37; 2nd generation: OR = 0.97, p = 0.62). Being of immigrant-origin was associated with participation in educational (1st generation: OR = 2.35, p < 0.01; 2nd generation: OR = 1.85, p < 0.01), arts and music (1st generation: OR = 1.82, p < 0.01; 2nd generation: OR = 1.63, p < 0.01), and individual sports (1st generation: OR = 1.26, p < 0.01; 2nd generation: OR = 1.09, p = 0.05) activity types. Being of immigrant-origin was associated with non-participation

Table 3
Multiple linear regression models for satisfaction with life and depressive symptoms.

	Reduced Model				**Full Model**			
	Coefficient (β)	SE	P-value	PRATT	Coefficient (β)	SE	P-value	PRATT
Satisfaction with life								
Intercept	2.18	0.03	< 0.01	–	2.15	0.04	< 0.01	–
OA Participation (yes)	0.11	0.02	< 0.01	0.020	0.14	0.02	< 0.01	0.020
1st generation	−0.13	0.02	< 0.01	0.015	−0.02	0.05	0.73	0.015
2nd generation	−0.09	0.02	< 0.01	0.008	−0.04	0.04	0.34	0.008
Female	−0.04	0.01	< 0.01	0.004	−0.04	0.01	< 0.01	0.004
MSP Subsidy (yes)	−0.14	0.01	< 0.01	0.043	−0.14	0.01	< 0.01	0.042
Peer Belonging	0.44	0.01	< 0.01	0.907	0.44	0.01	< 0.01	0.905
OA Participation * 1st generation	–	–	–		−0.13	0.05	0.01	<0.01
OA Participation * 2nd generation	–	–	–		−0.06	0.04	0.18	<0.01
R-squared	0.2301				0.2305			
Adjusted R-squared	0.2298				0.2301			
Depressive symptoms								
Intercept	4.28	0.04	< 0.01	–	4.34	0.04	< 0.01	–
OA Participation (yes)	−0.13	0.02	< 0.01	0.028	−0.20	0.03	< 0.01	0.028
1st generation	0.04	0.02	0.05	0.003	−0.15	0.06	0.01	0.003
2nd generation	0.02	0.02	0.22	0.001	−0.16	0.05	< 0.01	0.001
Female	0.13	0.02	< 0.01	0.037	0.13	0.02	< 0.01	0.034
MSP Subsidy (yes)	0.10	0.02	< 0.01	0.024	0.09	0.02	< 0.01	0.023
Peer Belonging	−0.41	0.01	< 0.01	0.905	−0.41	0.01	< 0.01	0.894
OA Participation * 1st generation	–	–		–	0.23	0.06	< 0.01	< 0.01
OA Participation * 2nd generation	–	–		–	0.22	0.05	< 0.01	< 0.01
R-squared	0.1477				0.1492			
Adjusted R-squared	0.1474				0.1487			

OA: organized activity

in team sports (1st generation: OR = 0.69, $p < 0.01$; 2nd generation: OR = 0.62, $p < 0.01$). Appendix C shows results for overall organized activity participation by immigration classes. Relative to non-immigrant children, only belonging to the economic class was associated with organized activity participation (1st generation: OR = 1.19, $p = 0.03$; 2nd generation: OR = 1.08, $p < 0.01$), while belonging to the refugee class was associated with nonparticipation (1st generation: OR = 0.62, $p < 0.01$; 2nd generation: OR = 0.65, $p < 0.01$).

3.3. Organized activity participation and emotional wellbeing

ICC values indicated that up to 4.1%, 3.1%, and 1.9% of the variance in emotional wellbeing scores was explained by between-classroom, between-school and between- neighbourhood variance, respectively (Appendix D). The full models fit the data better than the models without interaction terms for both life satisfaction and depressive symptoms ($\chi^2_{SWL} = 3.69$, $p = 0.03$; $\chi^2_{Dep} = 12.31$, $p < 0.01$). The adjusted change in variance explained (adjusted-R^2) by the models with interaction terms was small for both life satisfaction and depressive symptoms.

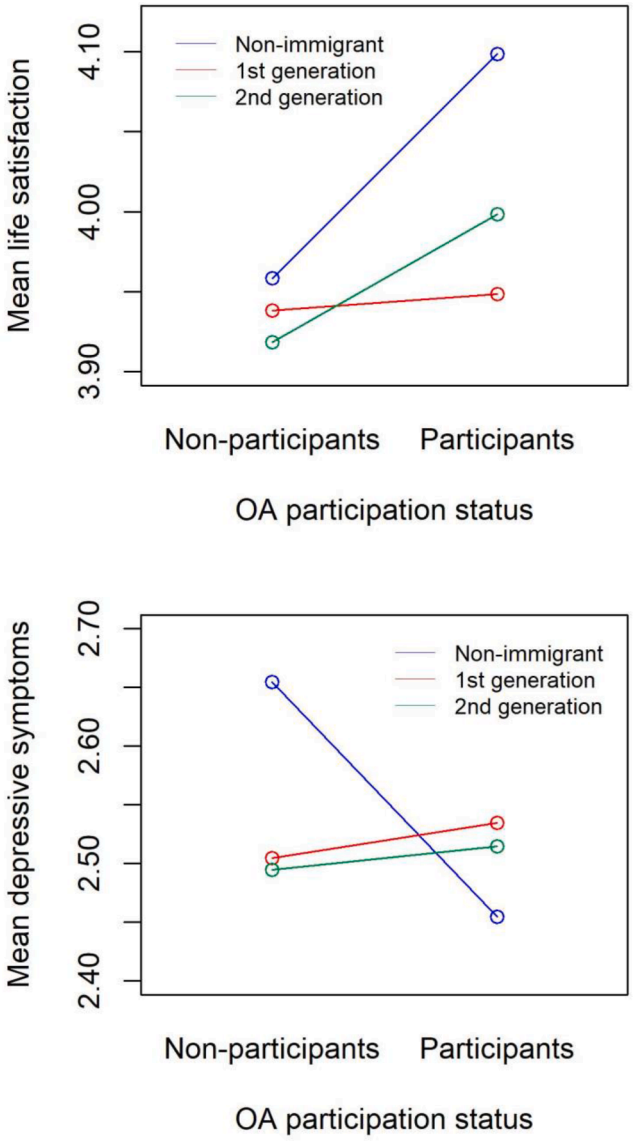

Fig. 1. Interaction plots showing life satisfaction (mean SWLS-C scores; scale range: 1–5) and depressive symptoms (scale range: 1–5) by OA participation status (any OA) and by immigrant generation status.

Table 3 shows the results of the multiple linear regression models, adjusted for sex, MSP subsidy, and peer belonging. The association between organized activity participation and life satisfaction scores diminished from non-immigrant, to first-generation, to second-generation immigrant background. Participation in organized activities was significantly associated with better life satisfaction ($\beta = 0.14$, $p < 0.01$) and lower depressive symptoms ($\beta = -0.20$, $p < 0.01$) among non-immigrant children. Interaction terms indicated that being of first-generation immigrant background decreased the effect of organized activity participation on life satisfaction scores by 0.13 points on average ($p = 0.01$) to no association, while being of second-generation immigrant origin decreased the effect on life satisfaction scores by 0.06 points ($p = 0.18$), on average. Organized activity participation was associated with lower depressive symptoms among non-immigrant children ($\beta = -0.20$, $p < 0.01$), and interaction terms indicated no association between participating in organized activities and depressive symptoms among children of first- ($\beta = 0.23$, $p < 0.01$) or second-generation ($\beta = 0.22$, $p < 0.01$) immigrant-origin. These interactions are shown visually in Fig. 1, and examples of predicted values for SWL and depressive symptoms are shown in Appendices E and F, respectively. A complete case analysis yielded similar results (Appendix G). As a sensitivity analysis, hierarchical linear models accounting for clustering by classroom and school were applied; the results were virtually identical (results available upon request).

PRATT indices indicated that peer belonging explained most (90%) of the model variance for both emotional wellbeing outcomes examined. Organized activity participation explained 1.5% and 2.8% of the model R^2 for satisfaction with life and depressive symptoms, respectively.

4. Discussion

This study examined organized activity participation among a population-based sample of Grade 7 schoolchildren in BC, Canada. We also considered the role of immigrant background as a potential effect measure modifier in the association between organized activity participation and emotional wellbeing.

We found that most (84%) children participated in at least one organized activity, which is consistent with estimates among 6 to 13-year-old children in Canada and 6 to 11-year-old children from the US (Guèvremont et al., 2008; Parasuraman et al., 2020). Participation in any organized activity was not associated with immigrant generation status. Comparisons by immigration class indicated that the similarity in participation in any organized activity among immigrant origin and non-immigrant subgroups was likely driven by the large proportion of economic class immigrants. Children who are economic class immigrants might face fewer material or time-related barriers to participating in organized activities than those belonging to the family or refugee classes because their parents were selected for their ability to contribute to Canada's economy.

We also found that participation in different activity types varied based on immigrant generation status. Relative to non-immigrant children, children of immigrant-origin were more likely to participate in art and music activities or individual sports activities, and less likely to participate in team sports. Different explanations can be considered to understand this finding. For example, because team sports take place in a social context and involve ongoing communication and interaction between peers, immigrants with a language background different from English may face language barriers that deter them from participating in team sports (Doherty & Taylor, 2007). Furthermore, children of immigrant origin with racial, cultural, or ethnic backgrounds representing a minority group in their community may perceive this difference in background as a barrier to joining team sports. Children of immigrant origin may also be less familiar with or have less interest in team sports that are popular in Canadian culture, such as ice hockey. In addition, over 60% of immigrant-origin children in the sample emigrated from countries in East Asia and the Pacific. We did not have the sample size

to account for region of origin in our model, which would have helped us to ascertain whether regional or cultural differences also play a role in the association between organized activity participation and immigrant background. Further research is needed to fully understand the underlying reasons why children of immigrant background are less likely to participate in team sports and more likely to participate in other organized activities than their non-immigrant peers in BC.

This study also found evidence that the association between organized activity participation and emotional wellbeing may be beneficial only among children of non-immigrant background. For example, participation was found to be associated with higher life satisfaction scores among non-immigrant children, but not first-generation immigrant-origin children. Organized activity participation was also associated with lower depressive symptoms only among non-immigrant children and was associated with worse depressive symptoms among children of immigrant-origin. As this was an exploratory study in examining the role of immigrant background in the association between organized activity participation and emotional wellbeing, these findings are novel. Social exclusion or feelings of discrimination are possible explanations for the higher depressive symptoms observed among children of immigrant-origin who participated in organized activities (Doherty & Taylor, 2007; Jiang & Peterson, 2012), although the data were not available to test this. Furthermore, while the models including an interaction term fit the data better than the models with no interaction, the change in R^2 was very small, suggesting that the added model complexity did not explain much additional variance in the outcome. Whether the association between organized activity participation and emotional wellbeing is meaningfully different between children of immigrant versus non-immigrant backgrounds is a direction for future research.

4.1. Strengths and limitations

This study used secondary data (previously collected survey and administrative data), which has the benefit of capturing a relatively large, population-based sample. However, the limitation to this design is that the survey does not focus specifically on children from immigrant backgrounds and may be missing some nuance that would be ideal to capture details about the unique experiences of children of immigrant origin. For example, we were unable to determine the extent to which variations in participation or the effect of organized activities on emotional wellbeing across different immigration backgrounds may have been due to feelings of discrimination, social connection, or familiarity with various activities. Because MDI stakeholders were interested in the critical "after-school" hours when parents are still at work, (Thomson et al., 2018) our study only captured organized activity participation that occurred between 3:00 to 6:00PM on weekdays; therefore, actual participation in organized activities may be underestimated in our sample, and our findings may only reflect participation that occurred during the after-school hours. Additionally, this study was cross-sectional in design, which prevented the identification of causal relationships between variables. Because of the small sample sizes of the family and refugee migrant classes, we were not able to include the immigration class variable in our regression analyses. The effect sizes reported in this study were small; however, in the context of child development, small effect sizes can be meaningful, as small changes can accumulate across contexts and over time (Simpkins, 2015).

4.2. Conclusions and future directions

This study showed that equal proportions of immigrant-origin and non-immigrant children participated in organized activities in a sample of BC schoolchildren. Future research efforts should focus on understanding reasons for non-participation using qualitative approaches such as semi-structured interviews. Our findings also demonstrated that associations between organized activity participation and emotional wellbeing are complex and that their dependence on immigrant background may vary based on the wellbeing indicators considered. While findings from this study point toward immigrant background as a potential modifier of the association between organized activity participation and emotional wellbeing, future research should examine whether this interaction is meaningful, whether immigrant-origin children accrue similar benefits from organized activity participation as non-immigrant children in longitudinal studies (to establish causality), and identify the pathways through which organized activity participation differentially influences wellbeing outcomes according to immigration background.

The current research suggests that children of non-immigrant origin may accrue small gains in life satisfaction and a moderate reduction in depressive symptoms from participating in organized activities, while children of first-generation immigrant origin do not appear to experience these benefits. These findings imply that efforts should be made by program leaders to ensure a positive, inclusive, and culturally sensitive environment for children of immigrant backgrounds to support the emotional wellbeing of immigrant-origin children.

Funding

The authors are grateful for funding from the Canadian Institutes of Health Research (CIHR) and the Social Sciences and Humanities Research Council (SSHRC) for this research. Dr. Janus also gratefully acknowledges support by the Ontario Children's Secretariat Chair in Early Childhood Development. Dr. Gadermann also gratefully acknowledges funding from the Canada Research Chairs Program and the Michael Smith Foundation for Health Research. Carmela Melina Albanese gratefully acknowledges funding from the Ontario Graduate Scholarship (OGS), Queen Elizabeth II/C.P. Shah Graduate Scholarship in Science and Technology (QEII-GSST), and Guiding interdisciplinary Research On cis- and trans-gender Women's and girls health and Wellbeing (GROWW) scholarship programs.

CRediT authorship contribution statement

Carmela Melina Albanese: Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Visualization. **Eva Oberle:** Conceptualization, Methodology, Writing – review & editing, Supervision. **Jason M. Sutherland:** Conceptualization, Methodology, Writing – review & editing, Supervision. **Magdalena Janus:** Writing – review & editing. **Kimberly A. Schonert-Reichl:** Writing – review & editing. **Katholiki Georgiades:** Writing – review & editing. **Martin Guhn:** Resources, Writing – review & editing. **Monique Gagné Petteni:** Data curation, Writing – review & editing. **Anne Gadermann:** Conceptualization, Methodology, Formal analysis, Writing – original draft, Writing – review & editing, Supervision, Funding acquisition.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Data availability

Access to data provided by the Data Steward(s) is subject to approval, but can be requested for research projects through the Data Steward(s) or their designated service providers. All inferences, opinions, and conclusions drawn in this publication are those of the author (s), and do not reflect the opinions or policies of the Data Steward(s).

Acknowledgements

Access to data provided by the Data Steward(s) is subject to approval, but can be requested for research projects through the Data Steward(s) or their designated service providers. All inferences, opinions, and conclusions drawn in this publication are those of the author (s), and do not reflect the opinions or policies of the Data Steward(s).

Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.pmedr.2022.102052.

References

Arslan, G., Allen, K.A., Ryan, T., 2020. Exploring the impacts of school belonging on youth wellbeing and mental health among Turkish adolescents. Child Indic Res. 13, 1619–1635. https://doi.org/10.1007/s12187-020-09721-z.

Badura, P., Geckova, A.M., Sigmundova, D., Van Dijk, J.P., Reijneveld, S.A., 2015. When children play, they feel better: Organized activity participation and health in adolescents. BMC Public Health. 15 https://doi.org/10.1186/s12889-015-2427-5.

BC MOH., 2018a. British Columbia Ministry of Health: Consolidation Files (MSP Registration & Premium Billing). Population Data BC[2018]. Data Extract. MOH (2018). http://www.popdata.bc.ca/data.

BC, MOH., 2018b. Medical Services Plan (MSP) Payment Information File. Population Data BC[2018]. Data Extract. British Columbia Ministry of Health. http://www.popdata.bc.ca/data.

Bohnert, A.M., Kane, P., Garber, J., 2008. Organized activity participation and internalizing and externalizing symptoms: Reciprocal relations during adolescence. J. Youth Adolesc. 37 (2), 239–250. https://doi.org/10.1007/s10964-007-9195-1.

Camacho, D.E., Fuligni, A.J., 2015. Extracurricular participation among adolescents from immigrant families. J. Youth Adolesc. 44 (6), 1251–1262. https://doi.org/10.1007/s10964-014-0105-z.

Darling, N., 2005. Participation in extracurricular activities and adolescent adjustment: Cross-sectional and longitudinal findings. J. Youth Adolesc. 34 (5), 493–505. https://doi.org/10.1007/s10964-005-7266-8.

Denault, A.S., Poulin, F., 2009. Predictors of adolescent participation in organized activities: A five-year longitudinal study. J. Res. Adolesc. 19 (2), 287–311. https://doi.org/10.1111/j.1532-7795.2009.00597.x.

Diener, E., Emmons, R.A., Larsen, R.J., Griffin, S., 1985. The Satisfaction With Life Scale. J. Pers. Assess. 49 (1), 71–75. https://doi.org/10.1207/s15327752jpa4901_13.

Doherty, A., Taylor, T., 2007. Sport and physical recreation in the settlement of immigrant youth. Leisure/Loisir. 31 (1), 27–55. https://doi.org/10.1080/14927713.2007.9651372.

Emerson, S.D., Petteni, M.G., Puyat, J.H., Guhn, M., Georgiades, K., Milbrath, C., Janus, M., Gadermann, A.M., 2022. Neighbourhood context and diagnosed mental health conditions among immigrant and non-immigrant youth: A population-based cohort study in British Columbia, Canada. Soc Psychiatry Psychiatr Epidemiol. https://doi.org/10.1007/s00127-022-02301-2.

Fredricks, J.A., Alfeld-Liro, C.J., Hruda, L.Z., Eccles, J.S., Patrick, H., Ryan, A.M., 2002. A qualitative exploration of adolescents' commitment to athletics and the arts. J. Adolesc. Res. 17 (1), 68–97. https://doi.org/10.1177/0743558402171004.

Gadermann, A.M., Schonert-Reichl, K.A., Zumbo, B.D., 2010. Investigating validity evidence of the Satisfaction with Life Scale adapted for children. Soc. Indic. Res. 96 (2), 229–247. https://doi.org/10.1007/s11205-009-9474-1.

Gadermann, A.M., Gagné Petteni, M., Janus, M., Puyat, J.H., Guhn, M., Georgiades, K., 2022. Prevalence of mental health disorders among immigrant, refugee, and nonimmigrant children and youth in British Columbia, Canada. JAMA Netw. Open. 5 (2), e2144934. https://doi.org/10.1001/jamanetworkopen.2021.44934.

Gilman, R., Huebner, E.S., 2006. Characteristics of adolescents who report very high life satisfaction. J. Youth Adolesc. 35 (3), 293–301. https://doi.org/10.1007/s10964-006-9036-7.

Guèvremont, A., Findlay, L., Kohen, D., 2008. Organized extracurricular activities of Canadian children and youth. Health Rep. 19 (3), 65–69.

Guhn, M., Emerson, S.D., Mahdaviani, D., Gadermann, A.M., 2020. Associations of birth factors and socio-economic status with indicators of early emotional development and mental health in childhood: A population-based linkage study. Child Psychiatry Hum Dev. 51 (1), 80–93. https://doi.org/10.1007/s10578-019-00912-6.

Hayden-Thomson, L.K., 1989. The development of the Relational Provisions Lonliness Questionnaire for Children. Unpublished doctoral dissertation, University of Waterloo, Waterloo, Ontario, Canada.

Human Early Learning Partnership. *The Middle Years Development Instrument: Measuring and Promoting Children's Social and Emotional Health, Well-Being, and Assets with the Middle Years Development Instrument, 2018 Research Brief*.; 2018. http://earlylearning.ubc.ca/media/publications/mdi-researchbrief-20180818-nobleed.pdf.

Jiang, X., Peguero, A.A., 2017. Immigration, extracurricular activity, and the role of family. Educ Urban Soc. 49 (3), 314–340. https://doi.org/10.1177/0013124516643759.

Jiang, X., Peterson, R.D., 2012. Beyond Participation: The association between school extracurricular activities and involvement in violence across generations of immigration. J Youth Adolesc. 41 (3), 362–378. https://doi.org/10.1007/s10964-011-9736-5.

IRCC., 2014. *Immigration, Refugees, and Citizenship Canada (IRCC): Permanent Resident Database*. Population Data BC[2014]. Data Extract. http://www.popdata.bc.ca/data.

Kusche, C.A., Greenberg, M.T., Beilke, R., 1988. Seattle Personality Questionnaire for young school aged children. Unpublished Manuscript. University of Washington, Department of Psychology, Seattle.

Lara, C.C., Volante, L., 2019. The education and integration of immigrant children in Ontario: A content analysis of policy documents guiding schools' response to the needs of immigrant students. CJEAP 191, 2–21.

Lerner, R.M., von Eye, A., Lerner, J.V., Lewin-Bizan, S., Bowers, E.P., 2010. Special issue introduction: The meaning and measurement of thriving: A view of the issues. J Youth Adolesc. 39, 707–719. https://doi.org/10.1007/s10964-010-9531-8.

Little RJA, Rubin DB. *Statistical Analysis with Missing Data*. 2nd ed. John Wiley & Sons, Inc.; 2002. 10.1002/9781119013563.

Loder, T.L., Hirsch, B.J., 2003. Inner-city youth development organizations: The salience of peer ties among early adolescent girls. Appl. Dev. Sci. 7 (1), 2–12. https://doi.org/10.1207/S1532480XADS0701_1.

Oberle, E., Ji, X.R., Guhn, M., Schonert-Reichl, K.A., Gadermann, A.M., 2019. Benefits of extracurricular participation in early adolescence: Associations with peer belonging and mental health. J Youth Adolesc. 48, 2255–2270. https://doi.org/10.1007/s10964-019-01110-2.

Oberle, E., Ji, X.R., Magee, C., Guhn, M., Schonert-Reichl, K.A., Gadermann, A.M., 2019. Extracurricular activity profiles and wellbeing in middle childhood: A population-level study. PLoS ONE 14 (7), 1–17. https://doi.org/10.1371/journal.pone.0218488.

Oberle, E., Ji, X.R., Kerai, S., Guhn, M., Schonert-Reichl, K.A., Gadermann, A.M., 2020. Screen time and extracurricular activities as risk and protective factors for mental health in adolescence: A population-level study. Prev Med 141, 106291. https://doi.org/10.1016/j.ypmed.2020.106291.

Panza, M.J., Graupensperger, S., Agans, J.P., Doré, I., Vella, S.A., Evans, M.B., 2020. Adolescent sport participation and symptoms of anxiety and depression: A systematic review and meta-analysis. J Sport Exerc Psychol. 42, 201–218. https://doi.org/10.1123/JSEP.2019-0235.

Parasuraman, S.R., Ghandour, R.M., Kogan, M.D., 2020. Epidemiological profile of health and behaviors in middle childhood. Pediatrics 145 (6). https://doi.org/10.1542/peds.2019-2244.

R Core Team (2020). R: A language and environment for statistical computing. R Foundation for Statistical Computing, Vienna, Austria. URL https://www.R-project.org/.

Pedersen, S., 2005. Urban adolescents' out-of-school activity profiles: Associations with youth, family, and school transition characteristics. Appl Dev Sci. 9 (2), 107–124. https://doi.org/10.1207/s1532480xads0902_5.

Richards, M., Huppert, F.A., 2011 Feb 10. Do positive children become positive adults? Evidence from a longitudinal birth cohort study. J Posit Psychol. 6 (1), 75–87. https://doi.org/10.1080/17439760.2011.536655.

Schonert-Reichl, K.A., Guhn, M., Gadermann, A.M., Hymel, S., Sweiss, L., Hertzman, C., 2013. Development and validation of the Middle Years Development Instrument (MDI): Assessing children's well-being and assets across multiple contexts. Soc. Indic. Res. 114, 345–369. https://doi.org/10.1007/s11205-012-0149-y.

Simpkins, S.D., 2015. When and how does participating in an organized after-school activity matter? Appl. Dev. Sci. 19 (3), 121–126. https://doi.org/10.1080/10888691.2015.1056344.

Simpkins, S.D., Riggs, N.R., Ngo, B., Vest Ettekal, A., Okamoto, D., 2017. Designing culturally responsive organized after-school activities. J. Adolesc. Res. 32 (1), 11–36. https://doi.org/10.1177/0743558416666169.

Sterne, J.A.C., White, I.R., Carlin, J.B., et al., 2009. Multiple imputation for missing data in epidemiological and clinical research: Potential and pitfalls. BMJ 338, b2393. https://doi.org/10.1136/bmj.b2393.

Taylor, R.D., Oberle, E., Durlak, J.A., Weissberg, R.P., 2017 Jul. Promoting positive youth development through school-based social and emotional learning interventions: A meta-analysis of follow-up effects. Child Dev. 88 (4), 1156–1171. https://doi.org/10.1111/cdev.12864.

Statistics Canada. (2017). Immigration and ethnocultural diversity: Key results from the 2016 Census. *The Daily*. (Catalogue number 11-001-X). https://www150.statcan.gc.ca/n1/daily-quotidien/171025/dq171025b-eng.htm?indid=14428-1&indgeo=0.

Thomas, D.R., Hughes, E., Zumbo, B.D., 1998. On variable importance in linear regression. Soc. Indic. Res. 45 (1–3), 253–275. https://doi.org/10.1023/a:1006954016433.

Thomson, K.C., Guhn, M., Richardson, C.G., Ark, T.K., Shoveller, J., 2017. Profiles of children's social-emotional health at school entry and associated income, gender and language inequalities: A cross-sectional population-based study in British Columbia, Canada. *BMJ Open*. 7, 1–10. https://doi.org/10.1136/bmjopen-2016-015353.

Thomson, K.C., Oberle, E., Gadermann, A.M., Guhn, M., Rowcliffe, P., Schonert-Reichl, K.A., 2018. Measuring social-emotional development in middle childhood: The Middle Years Development Instrument. J. Appl. Dev. Psychol. 55, 107–118. https://doi.org/10.1016/j.appdev.2017.03.005.

van Buuren S, Groothuis-Oudshoorn K. MICE: Multivariate imputation by chained equations in R. *J Stat Softw*. 2011;45(3). 10.18637/jss.v045.i03.

Vandell DL, Larson RW, Mahoney JL, Watts TW. Children's Organized Activities. In: Lerner RM, ed. *Handbook of Child Psychology and Developmental Science*. 7th ed. John Wiley & Sons, Inc.; 2015.