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Musical extracurricular activities and adjustment among children from immigrant families: A 2-year quasi-experimental study

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This quasi-experimental study examines the impact on emotional/behavioral functioning (hyperactivity-inattention and internalizing symptoms) and school experiences (school engagement, positive experience in school) of *La classe enchantée*, a high-quality, non-selective extracurricular music program. Based on the program's objectives and on the positive youth development model, it was anticipated that elementary school students participating in *La classe enchantée* would evolve more favorably in terms of these outcomes over the 2-year duration of the program spanning Grades 4 and 5, compared to non-participating schoolmates. The sample includes 72 children (25% in the intervention group, 47% girls, 93% first/second generation immigrants) from one low-income school, followed over 2 years starting in grade four ($M_{age} = 9.30$, $SD = 0.49$). Latent Growth Curve models show that, compared to classmates not in the program, children in *La classe enchantée* progressed more favorably over time on self-reported measures of internalizing symptoms and positive experiences in school. For teacher-rated hyperactivity-inattention and school engagement, the slopes indicated stability over time in both groups, although hyperactivity-inattention tended to improve among those with relatively high initial levels in the intervention group. These results suggest that engagement in quality musical extracurricular activities might boost emotional and school well-being and potentially reduce hyperactivity-inattention among a specific subgroup of children from immigrant families.

KEYWORDS

extracurricular activities, music, psychosocial outcomes, immigration, program evaluation

Introduction

Learning to play a music instrument is valuable in and of itself. Yet, besides its intrinsic value, it has long been argued that musical skill development among children might generate developmental benefits in other domains, through “transfer” processes (Hallam, 2015; Sala and Gobet, 2017; Swaminathan and Schellenberg, 2021). Learning music requires complex executive functions like attention and memory, as well as an understanding of mathematical concepts like fractions to grasp beats and musical notation. Thus, music instruction could support cognitive functioning and academic learning (Swaminathan and Schellenberg, 2021). This intuition has generated much empirical research, including experimental and quasi-experimental evaluations of music instruction programs. According to recent meta-analyses, it appears, however, that music education in school may not significantly improve cognitive outcomes like academic grades, working memory, or IQ scores in the general population of children (Sala and Gobet, 2017; Cooper, 2020), although the question is not settled and continues to be examined from new angles (e.g., Frischen et al., 2021).

The general focus on cognitive outcomes and neurological processes may have obscured some of the potential benefits of music instruction for children and youth. Learning music involves much more than learning to play an instrument, perhaps especially when learning occurs in an after-school, extracurricular setting involving group activities like orchestra and choral singing. According to the positive youth development perspective, learning music in such a context, through extracurricular activities (ECAs), offers opportunities to enjoy positive experiences and to develop personal strengths, like a sense of competence and connection to larger communities and institutions (notably to school), which in turn supports emotional and behavioral functioning (Lerner et al., 2015; Vandell et al., 2015). However, these psychosocial outcomes have received scant research attention in the specialized music literature. To illustrate, in a recent review of research linking music education and children and youth outcomes (Dumont et al., 2017), only 8 of the 46 reviewed studies measured impacts on social, emotional, or psychosocial functioning (Kirschner and Tomasello, 2010; Pelham et al., 2011; Rickard et al., 2012, 2013; Schellenberg and Mankarious, 2012; Ritblatt et al., 2013; Degé et al., 2014; Schellenberg et al., 2015). These studies yielded mixed results, which is not surprising given wide differences in terms of developmental periods (toddlerhood to adolescence), types of music interventions (e.g., listening to music while doing other tasks, individual instrument instruction, choral singing), settings (in-school compulsory classes, extracurricular), duration (from a few sessions to a year), outcomes (e.g., depression, self-esteem, in-class behavior, attitudes toward school, pro-social skills), sample sizes (ranging between 52

and 195), and study design (correlational, quasi-experimental, experimental).

These studies were consistent in one respect, however: their lack of attention to children from diverse backgrounds in general, and from immigrant backgrounds in particular (for a similar argument, see Holochwost et al., 2017; Christensen, 2022). Yet, insights from qualitative studies suggest that music programs might foster inclusion and a sense of belonging among children from immigrant families, whether first (born outside the host country) or second generation (born in the host country), who may particularly benefit from opportunities to communicate and express themselves non-verbally through music. This may be especially so for those whose mother tongue differs from the majority language (Marsh, 2012, 2017). Correlational findings from the literature on extracurricular activities in general (i.e., not focusing specifically on music) also suggest that children from immigrant families might particularly benefit from ECA involvement, although this potential is left significantly unfulfilled, as children from immigrant families participate comparatively less than their non-immigrant peers (Simpkins et al., 2013; Camacho and Fuligni, 2015; Lerner et al., 2017; Meier et al., 2018). Non-participation is further compounded for children from low-SES backgrounds or for those who are less well-adjusted in school in general (McCabe et al., 2020).

To address the noted gaps in the literature, the present study proposes a quasi-experimental evaluation of the impact of a high-quality, non-selective music ECA program offered over 2 years on the school experiences and emotional and behavioral outcomes of children attending a school almost exclusively serving first- and second-generation immigrant children. The evaluation focuses on outcomes similar to those used in previous studies, and includes indicators of positive functioning (i.e., positive school experiences, school engagement) and of difficulties or challenges (i.e., internalizing problems, hyperactivity-inattention) that might be promoted or improved through participation in the program.

School engagement is a construct generally understood to refer to students’ active investment and involvement in school, which usually includes behavioral, affective, and cognitive components (Archambault I. et al., 2019). In this study, only the behavioral component was considered, namely children’s engagement in classroom work. Concerning positive school experiences, they mostly refer to the children’s feelings of excitement and motivation about school. Internalizing problems and hyperactivity-inattention capture two major poles of student socio-emotional functioning and refer to difficulties that are relatively common among school-age children, including in non-clinical samples (Caspi et al., 2014; Achenbach et al., 2016). Internalizing problems refer mainly to symptoms of depression and anxiety, such as worry, sadness, and a negative mood (Garber and Rao, 2014; Vasey et al., 2014). Hyperactivity-inattention encompasses problematic behaviors

such as impulsivity, restlessness, and difficulties concentrating on a task (Campbell et al., 2014).

These outcomes were assessed *via* either self-reports for emotional aspects usually best captured from children's own points of view (i.e., internalizing problems, positive school experiences) or teacher-rated measures for behavioral aspects easily observed in the classroom (i.e., hyperactivity-inattention and behavioral engagement in academic work; De Los Reyes et al., 2015).

Music activities and psychosocial outcomes: Insights from a positive youth development lens

Besides pointing to the need to consider outcomes beyond cognitive functioning, the general literature on ECA underscores multiple factors shaping the potential benefits of music instruction (Eccles and Gootman, 2002; Vandell et al., 2015; Deutsch et al., 2017). In this literature, largely conducted within Lerner's positive youth development perspective (Lerner et al., 2015), ECAs are defined as non-compulsory organized activities that occur regularly, take place outside of regular school hours, are adult led, involve peers, and focus on a single endeavor, like a sport or performing art. According to the positive youth development model, the psychosocial benefits of ECA, musical or otherwise, are not guaranteed, and are thought to depend on factors like the ECAs' quality, setting, and dosage (Simpkins, 2015). Providing optimal experiences along those lines might be particularly crucial for programs serving children and youth for whom access to excellent ECA programming is limited, such as those from immigrant backgrounds (Camacho and Fuligni, 2015; Park et al., 2015; Smith et al., 2017; Heath et al., 2018).

Extracurricular activities quality

Many authors emphasize that offering quality ECA capable of fostering positive development is complex and requires many ingredients (Eccles and Templeton, 2002; Hirsch et al., 2011; Larson et al., 2015; Roth and Brooks-Gunn, 2016; Fredricks et al., 2017). For ECA to be considered high-quality, it is crucial that participants experience healthy, supportive relationships with activity leaders and peers. In addition, quality ECAs offer individuals opportunities to develop their skills *via* intentional learning experiences and provide the group experiences supporting teamwork and the development of a shared sense of belonging. Quality ECAs also balance structure and autonomy. Adequately structured ECAs offer carefully planned, engaging, challenging activities scaffolded according to developmental needs, while also providing participants space to exert autonomy and make choices. Quality ECAs also offer youth occasion to build their leadership in the group and outside of it, through contributions to the broader community,

for instance through public performances (Smith et al., 2010; Deutsch et al., 2017). This "real-life contribution in authentic settings" feature might be especially important in bringing children from immigrant families to positively engage in ECA (Heath et al., 2018), as these settings provide a unique opportunity for them to learn about the norms and expectations of their host society.

Extracurricular activities setting

Extracurricular activities are typically either community-based or school-based. Activities offered by community-based organizations can still be planned in close collaboration with schools (Hirsch et al., 2011). For instance, school staff can directly promote certain activities or invite community-organization staff to promote specific activities on the school premises. Schools can also provide venues and equipment for activities, whether or not they are directly in charge of managing them. Coordination with school staff appears particularly important for recruiting children and youth from immigrant backgrounds in ECA, as well as youth with learning, behavioral, or emotional difficulties, who also tend to participate less in ECA (Heath et al., 2018; McCabe et al., 2020). Such coordination may also facilitate the generalization of eventual positive impacts of ECA on outcomes observable in the classroom, like behavioral engagement in class.

Extracurricular activities dosage

Even ECA of the highest quality and offered in ideal settings may not yield benefits if children are insufficiently exposed. Dosage usually refers to both intensity and duration, which are often captured in the form of hours per week and years of continuous practice, respectively (Simpkins, 2015; Vandell et al., 2015). There are no clear guidelines regarding optimal dosage, but some findings suggest that significant impacts might require a minimum total exposure of around 45 h, and that programs lasting at least 2 years are associated with effect sizes many times larger than programs lasting a year or less (Reisner et al., 2004; Lauer et al., 2006; Roth et al., 2010; synthesized in Vandell et al., 2015). Similar dose-response patterns have been reported in studies specifically focused on music education (e.g., Holochwost et al., 2017; Knaus, 2021).

La classe enchantée: A high-quality music extracurricular activities program

La classe enchantée embodies many of the quality, setting, and dosage features recommended for ECA programs just discussed. The program results from a partnership between the youth community outreach branch of the Faculty of Music of the Université de Montréal (*L'École des jeunes de la Faculté de musique de l'Université de Montréal*) and the Montreal

school board (*Centre de service scolaire de Montréal*). The explicit goal of the program is to improve access to high-quality classical music instruction by offering non-selective music ECA to children attending primary public schools located in neighborhoods with high concentrations of low-income immigrant families. To achieve this goal and reach children who do not typically participate in classical music ECA (e.g., children with less advantaged academic or psychosocial profiles; [Vandell et al., 2015](#)), recruitment efforts unfold in close collaboration with local schools and include special in-person exchanges to present the program and encourage children to participate regardless of their past music experiences, academic grades, or psychosocial profiles. The program is also offered at low (and sometimes no) cost, with fees adjusted according to families' financial means. Also, the instruments are loaned for free to the participating children, who assume responsibility for taking good care of their instrument for the duration of the program.

In terms of dosage, the program offers weekly three-hour sessions offered during the weekend over multiple school years. The sessions include many "ingredients" of high-quality programming. They include instrument instruction in small subgroups as well as larger orchestral and choral activities, all involving students attending the same school. In a typical weekly session, students start with instrument instruction (e.g., harp instruction) in small groups of about five students playing the same instrument. Then, all subgroups (usually three) from the same grade (e.g., 4th grade students) participate in a session of auditory training together. Then, the weekly session ends with choral singing and orchestra practice, in which all the students involved in *La classe enchantée* participate, regardless of their grade level (typically, about 35 to 45 students; for more details, see [Milette, 2021](#)).

Even though the program activities are highly structured, participants also have opportunities to make significant choices. Notably, they can experiment with diverse instruments before choosing the one they want to learn. The program also provides meaningful opportunities to perform in public events at the participants' school and in the larger community. To foster supportive, healthy relationships within the program, the activity leaders in charge of implementation (undergraduate music students) are carefully selected, trained, and supported by professional music educators from the community outreach branch of the Faculty of Music of the Université de Montréal. The program staff are also in regular contact with school personnel (e.g., teachers, psychosocial practitioners) and parents, to adapt their approach to students' individual profiles and needs. A qualitative evaluation of the program confirmed that all the stakeholders involved, including the children and their families, experienced the program positively and considered that it fostered positive and supportive relationships both with peers and with the program staff (Authors, submitted).

Objectives and hypotheses

The goal of this study is to assess the efficacy of *La classe enchantée* in increasing positive adjustment in school and decreasing adjustment problems among children from immigrant backgrounds. More specifically, it aims to assess changes in two indicators of positive adjustment (positive school experiences and engagement) and two indicators of psychosocial adjustment problems (internalizing behaviors and hyperactivity-inattention) among children participating in *La classe enchantée*, while comparing these changes to those reported by classmates in the control group. To do so, this study followed students from one primary school across two consecutive school years (grades 4 and 5), including those who did (intervention group) and did not (control group) choose to participate in the program.

Based on the positive youth development model, we anticipated that students participating in *La classe enchantée* and their teachers would either report improved or stable school experiences, whereas those from the control group would report a slight decline, based on well-documented general declining trends for these outcomes over the primary school years (see [Archambault I. et al., 2019](#)). We also anticipated that children participating in *La classe enchantée* would experience a slight decrease in their internalizing behaviors and hyperactivity-inattention, whereas those levels would remain stable in the control group, as usually found in this age group ([Campbell et al., 2014](#); [Vasey et al., 2014](#)). Besides levels of changes, we expected that the initial levels of these indicators should be similar across groups, since the general tendency for children with more advantaged academic and psychosocial profiles to participate more in ECA ([Vandell et al., 2015](#)) should be offset by the explicit commitment embedded in *La classe enchantée* to recruit atypical participants in the program.

Materials and methods

Participants

Participants include 72 students from one school, followed from the beginning of their fourth grade to the end of their fifth grade. Among those, 18 (25.0%) participated in *La classe enchantée*, and 54 (75.0%) composed the control group. At the beginning of the study, students were between 8 and 10 years old ($M = 9.30$, $SD = 0.49$; 46.5% girls). Almost all (93%) were of immigrant background (47.9% first generation born outside Canada, 45.1% second generation born in Canada from parents born outside the country, and 7.0% of parents also born in Canada). A majority (74.6%) lived with both parents, whereas 25.4% lived in other family configurations (e.g., joint custody, mother only, father only, mother and her partner, father and his partner, other).

Procedures

The pilot version of *La classe enchantée* evaluated in the present study was implemented in one public primary school adjacent to the Université de Montréal's campus. At the time of data collection, the school's catchment area was considered low-income according to the official provincial Ministry of Education classification system (the school was ranked at the last decile position, indicating a concentration of low-income family in the school's catchment at or above the 90th percentile; Ministry of Education, 2017).

Recruitment for the program took place in the fall of 2017, on the primary school premises. The program staff presented *La classe enchantée* to fourth-grade students and their parents while underscoring its non-selective nature and the possibility for students to participate regardless of past music experience or profiles in terms of grades, behavior, etc. Recruitment for the research project was launched a few weeks later, after obtaining independent approval from both the Université de Montréal's IRB and the school board ethics committee (approval number: #CERAS-2017-18-073-D). All fourth-grade students (from three classrooms) were invited to participate in the research project, regardless of whether they participated in the program. To ensure renewed, ongoing consent, consent procedures were repeated a year later at the beginning of fifth grade. Consent to participate in the research project was obtained for all the students involved in *La classe enchantée*. In the control group, 18% of the families refused to participate in fourth grade. It turned out that some families initially refused to participate because they mistakenly thought that consent was required only for those involved in the program. Thus, some who had initially refused consented to participate the next year in fifth grade, and thus provided at least partial data (see section "Missing data").

The musical activities started in January 2018 and continued until the end of that school year (June 2019), and then resumed the following school year (September 2019–June 2020). Data collection waves took place twice a year, and involved all participating students (i.e., *La classe enchantée* and Control group) and their homeroom teachers. Specifically, data collection waves took place in November 2017 (pretest T1), May 2018 (T2), December 2018 (T3), and June 2019 (T4).

Missing data

Missing data was due either to attrition (i.e., participants lost during the study, often because of residential mobility) or students or their teachers not answering a particular questionnaire (i.e., a student absent on the day of data collection or a teacher not returning a questionnaire to the research team). In terms of attrition, one participant from

the control group was lost after T1, and 19 participants were lost after T2 (17 from the control group and 2 from *La classe enchantée*). Overall, missing data (due to attrition or not answering the questionnaire) was as follows: 19.4% at T1, 20.8% at T2, 29.2% at T3, and 29.2% at T4. Comparing students without and with missing data across time points revealed more missing data among those from the control group ($\chi^2 = 10.667$, $df = 1$, $p = 0.001$) and students not born in Canada ($\chi^2 = 6.199$, $df = 1$, $p = 0.013$). However, missing data was not related to gender, age, or family structure. Having missing data was associated with neither student-reported nor teacher-reported measures, except for a positive association found between having missing data and teacher-reported behavioral engagement at T1 ($r = 0.381$, $p = 0.003$) and T2 ($r = 0.285$, $df = 1$, $p = 0.032$). Missing data was handled using Mplus (Muthén and Muthén, 2017) Full Information Maximum Likelihood (Enders, 2010).

Measures

Sociodemographic characteristics

Students reported their gender (0 = girl; 1 = boy), their age in years (8 to 10 years old), their immigration status (0 = born in Canada [almost always from parents born outside the country]; 1 = born elsewhere), and their family structure (0 = living with both parents; 1 = else).

Student-rated internalizing behaviors

Students rated their internalizing behaviors on anxiety and depression items from the French adaptation (Tremblay et al., 1987) of the *Preschool Behavior Questionnaire* (Hoge et al., 1985). This questionnaire was initially developed for kindergarten students, but has been shown to be valid across the primary school years (Tremblay et al., 1987); as such, it has often been used with older school-age children, including during the later elementary school years (e.g., Olivier et al., 2020). Students responded to this 6-item scale (e.g., "You worry a lot" and "You are unhappy or sad"; $\alpha_{T1} = 0.694$, $\alpha_{T2} = 0.825$, $\alpha_{T3} = 0.859$, $\alpha_{T4} = 0.895$) on a response scale ranging from 1 (*not true*) to 3 (*certainly true*).

Student-rated positive experiences at school

Students rated four items from the "zest" subscale of the *Positive Experiences at School Scale* (Furlong et al., 2013). This scale captures positive attitudes toward school, like excitement, enthusiasm, and energy, through items like "I wake up in the morning excited to go to school," "I get really excited about my school projects," rated on a response scale ranging from 1 (*almost never*) to 3 (*very often*). As a French validation of this scale has not yet been published, the research team conducted preliminary analyses to verify the quality of its psychometric properties. The translated version showed good

internal consistency (e.g., $\alpha_{T1} = 0.762$, $\alpha_{T2} = 0.829$, $\alpha_{T3} = 0.823$, $\alpha_{T4} = 0.815$).

Teacher-reported hyperactivity-inattention

Teachers reported each of their students' hyperactivity-inattention levels using one subscale from the *Strengths and Difficulties Questionnaire* (Goodman, 2001) adapted in French (Capron et al., 2007). They responded to this 9-item scale (e.g., "This student is restless, overactive, cannot stay still for long" and "This student is inattentive"; $\alpha_{T1} = 0.943$, $\alpha_{T2} = 0.944$, $\alpha_{T3} = 0.951$, $\alpha_{T4} = 0.918$) on a response scale ranging from 1 (*not true*) to 3 (*certainly true*).

Teacher-reported behavioral engagement

Teachers reported each of their students' behavioral engagement levels in the classroom using a scale developed in French for the Quebec Longitudinal Study of Child Development (Pagani et al., 2010). Teachers responded to this 9-item scale (e.g., "This student puts a lot of effort in assignments" and "This student participates in class"; $\alpha_{T1} = 0.811$, $\alpha_{T2} = 0.851$, $\alpha_{T3} = 0.858$, $\alpha_{T4} = 0.849$) on a response scale ranging from 1 (*never*) to 3 (*often*).

Data analysis

Preliminary analyses included assessing whether students enlisted in *La classe enchantée* differed from the control group in terms of sociodemographic characteristics, as well as assessing correlations between all study variables. Using Mplus 8.4 (Muthén and Muthén, 2017), we then conducted Latent Growth Curve analysis (LGC, including intercept and linear slope) to assess changes in school experiences (positive school experiences and behavioral engagement) and behavior problems (internalizing behaviors and hyperactivity-inattention) across the two school years (T1 to T4) in both the *La classe enchantée* and control groups. LGC analysis is useful for examining group differences in program evaluations involving long-term follow-ups and multiple measures (e.g., Beauchaine et al., 2005; Liddle et al., 2009; Eddy et al., 2021).

To determine whether students from the two groups followed distinct developmental trajectories, we first assessed a model in which all parameters varied between groups and then progressively constrained them to equality across groups using the following sequence: (1) model freely estimated, (2) fixed intercept mean, (3) fixed intercept variance, (4) fixed slope mean, (5) fixed slope variance, and (6) fixed intercept-slope covariance. These models were compared using a chi-square difference test calculated using the Satorra-Bentler correction (Satorra and Bentler, 2010). When significant, this test indicates the presence of a difference on the constrained parameter between groups, as a result of which we retained the previous

model (i.e., kept the parameter freely estimated between groups in the following models).

Model fit was assessed using the chi-square statistic (χ^2), the Comparative Fit Index (CFI), the Tucker-Lewis Index (TLI), and the Root Mean Square Error of Approximation (RMSEA) (Marsh et al., 2005). For the CFI and TLI, values above .90 and .95 respectively indicate an acceptable and excellent model fit. For the RMSEA, values smaller than .08 and .06 respectively suggest an acceptable and excellent fit (Browne and Cudeck, 1992; Schumacker and Lomax, 1996; Hu and Bentler, 1999).

Results

Preliminary analyses

Initial differences between groups

Comparing students who participated in *La classe enchantée* to those from the control group revealed no sociodemographic differences in proportions of boys and girls ($\chi^2 = 3.641$, $df = 1$, $p = 0.056$), of students born in Canada or elsewhere ($\chi^2 = 0.019$, $df = 1$, $p = 0.982$), of family structure ($\chi^2 = 0.024$, $df = 1$, $p = 0.877$), or of differences in mean age ($t = 0.531$, $df = 1$, $p = 0.597$). Similarly, according to descriptive statistics (mean and standard deviations) reported in Table 1, no differences between groups were found for self-reported internalizing problems or positive school experiences at T1. However, participating in *La classe enchantée* was associated with higher levels of teacher-reported hyperactivity-inattention and lower levels of behavioral engagement at T1. Thus, the few differences between the two groups were limited to teacher-reported measures, and indicated worse initial functioning in the intervention group as compared to the control group.

Other correlations

In Table 1, all significant associations were in the expected direction and indicated relative stability of the adjustment indicators across time points. Also, teachers' perceptions of their students' hyperactivity-inattention and behavioral engagement levels shared moderate to high correlations ($r = -0.510$ to -0.860), indicating that teachers tend to perceive the behavioral engagement of their students as closely tied to their hyperactivity-inattention levels.

Latent curve models

Model fit indices from the alternative Latent Curve Models are reported in Table 2 and detailed parameter estimates are reported in Supplementary Table 1 of the online Supplementary material. All models that were retained (those not in bold in Table 1) had an acceptable to an excellent level of fit.

TABLE 1 Correlations between study variables.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)	(20)	(21)
(1) Program (0 = no)																					
(2) Sex (0 = girl)	0.225																				
(3) Age	0.063	0.079																			
(4) Immigration (0 = no)	0.016	-0.082	-0.149																		
(5) Family (0 = intact)	0.018	0.061	-0.204	-0.015																	
(6) Internalizing T1	0.166	-0.050	0.104	-0.008	-0.027																
(7) Internalizing T2	0.147	0.016	-0.156	0.155	-0.009	0.454*															
(8) Internalizing T3	-0.039	-0.014	-0.288*	0.232	-0.040	0.294	0.595*														
(9) Internalizing T4	-0.041	-0.022	-0.148	0.047	0.053	0.245	0.417*	0.556*													
(10) Positive Exp. T1	0.003	0.120	0.186	-0.120	-0.129	-0.135	-0.074	0.090	-0.091												
(11) Positive Exp. T2	-0.065	0.021	-0.121	-0.004	-0.039	0.116	-0.161	0.088	-0.012	0.445*											
(12) Positive Exp. T3	0.236	-0.079	0.032	0.018	-0.133	-0.057	0.078	-0.218	-0.258	0.433*	0.557*										
(13) Positive Exp. T4	0.278	-0.071	-0.022	0.226	-0.238	-0.024	0.119	0.121	-0.143	0.153	0.218	0.468*									
(14) Hyper-Inatten. T1	0.384*	0.318*	0.046	-0.238	0.068	0.425*	0.180	0.028	-0.147	-0.167	0.087	0.181	0.199								
(15) Hyper-Inatten. T2	0.314*	0.268*	-0.003	-0.084	0.054	0.454*	0.345*	0.113	-0.056	-0.143	0.094	-0.034	0.222	0.832*							
(16) Hyper-Inatten. T3	0.379*	0.378*	0.102	-0.106	-0.069	0.407*	0.152	0.102	-0.022	-0.133	0.027	0.154	0.091	0.809*	0.785*						
(17) Hyper-Inatten. T4	0.198	0.338*	0.189	-0.163	-0.017	0.331	0.038	0.147	0.052	0.042	0.164	0.076	-0.036	0.723*	0.599*	0.729*					
(18) Engagement T1	-0.389*	-0.272*	-0.036	0.358*	-0.206	-0.263	-0.102	0.183	0.140	0.034	-0.076	-0.208	-0.200	-0.774*	-0.585*	-0.533*	-0.572*				
(19) Engagement T2	-0.288*	-0.359*	0.030	0.166	-0.051	-0.485*	-0.322*	-0.052	0.119	0.215	0.039	0.202	-0.057	-0.671*	-0.819*	-0.725*	-0.584*	0.603*			
(20) Engagement T3	-0.314*	-0.401*	-0.098	-0.017	0.198	-0.377*	-0.177	-0.161	0.000	0.266	0.095	-0.018	-0.109	-0.645*	-0.637*	-0.860*	-0.559*	0.448*	0.751*		
(21) Engagement T4	-0.149	-0.239	-0.217	0.143	0.184	-0.323	-0.067	-0.089	-0.031	0.241	-0.017	-0.023	0.075	-0.572*	-0.510*	-0.741*	-0.767*	0.414*	0.581*	0.743*	
Mean						1.539	1.522	1.493	1.479	3.255	3.097	2.957	2.839	1.394	1.378	1.402	1.404	2.592	2.621	2.547	2.573
Standard Deviation						0.401	0.483	0.466	0.551	0.632	0.761	0.760	0.778	0.545	0.555	0.529	0.445	0.364	0.381	0.419	0.407
Minimum-Maximum						1-3	1-3	1-3	1-3	1-4	1-4	1-4	1-4	1-3	1-3	1-3	1-3	1-3	1-3	1-3	1-3

* $p < 0.05$.

TABLE 2 Results from the alternative latent growth curve models.

Model	χ^2	df	SCF	CFI	TLI	RMSEA	Satorra-Bentler diff. test	
							$\Delta \chi^2$	p-Value
Student-Reported Internalizing Behaviors								
(1) Free	5.234	10	0.857	1.000	1.000	0.000		
(2) Fixed intercept mean	8.525	11	0.805	1.000	1.000	0.000	8.484	0.004
(3) Fixed intercept variance	5.744	11	0.821	1.000	1.000	0.000	0.500	0.480
(4) Fixed slope mean	9.278	12	0.793	1.000	1.000	0.000	5.435	0.020
(5) Fixed slope variance	6.140	12	0.821	1.000	1.000	0.000	0.395	0.530
(6) Fixed intercept-slope covariance	7.266	13	0.800	1.000	1.000	0.000	1.399	0.237
Student-Reported Positive School Experiences								
(1) Free	6.744	10	0.937	1.000	1.000	0.000		
(2) Fixed intercept mean	7.032	11	0.935	1.000	1.000	0.000	0.277	0.598
(3) Fixed intercept variance	8.815	12	0.915	1.000	1.000	0.000	2.150	0.143
(4) Fixed slope mean	16.708	13	0.871	0.876	0.886	0.089	18.929	0.000
(5) Fixed slope variance	8.914	13	0.909	1.000	1.000	0.000	0.050	0.823
(6) Fixed intercept-slope covariance	11.936	14	0.939	1.000	1.000	0.000	2.333	0.127
Teacher-Reported Hyperactivity-Inattention								
(1) Free	19.770*	10	1.008	0.933	0.919	0.157		
(2) Fixed intercept mean	24.733*	11	0.958	0.895	0.885	0.188	8.236	0.004
(3) Fixed intercept variance	28.651*	11	1.018	0.864	0.852	0.213	8.303	0.004
(4) Fixed slope mean	21.829*	11	0.983	0.917	0.909	0.167	2.088	0.149
(5) Fixed slope variance	28.059*	12	0.870	0.877	0.877	0.194	8.044	0.005
(6) Fixed intercept-slope covariance	33.916*	12	0.818	0.832	0.832	0.227	6.323	0.012
Teacher-Reported Behavioral Engagement								
(1) Free	10.134	10	0.918	0.999	0.998	0.019		
(2) Fixed intercept mean	15.063	11	0.901	0.958	0.954	0.102	5.806	0.016
(3) Fixed intercept variance	28.801*	11	0.752	0.814	0.797	0.214	13.580	0.000
(4) Fixed slope mean	10.338	11	0.927	1.000	1.000	0.000	0.276	0.599
(5) Fixed slope variance	13.265	12	0.899	0.987	0.987	0.054	3.975	0.046
(6) Fixed intercept-slope covariance	16.860	12	0.866	0.949	0.949	0.107	25.454	0.000

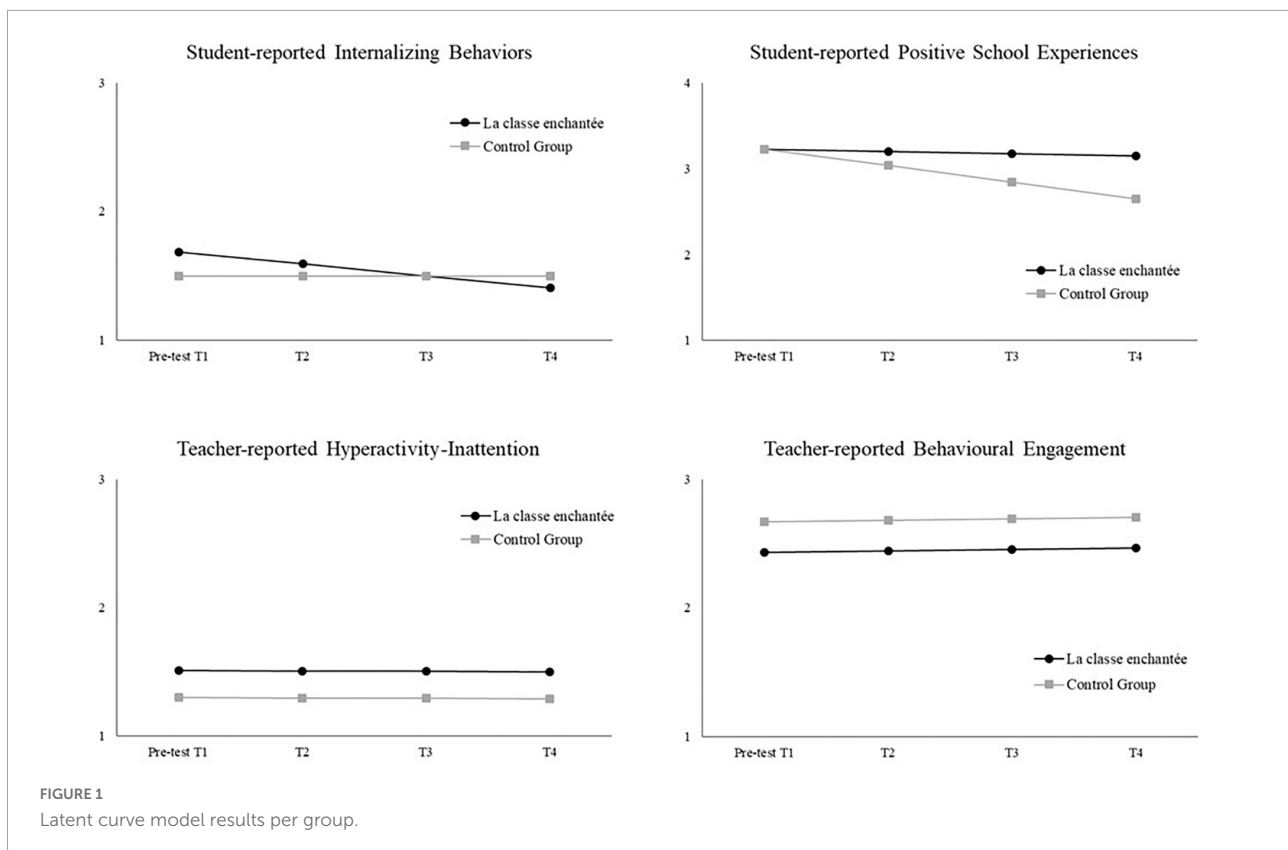
* $p < 0.05$. Models displayed in bold were not retained, meaning that the parameter was freely estimated between groups in the following models. χ^2 , chi-square statistic; df, degrees of freedom; SCF, scaling correction factor; CFI, Comparative Fit Index; TLI, Tucker-Lewis Index; RMSEA, Root Mean Square Error of Approximation.

Looking first at the model with student-rated internalizing behaviors revealed that all parameters were equivalent between *La classe enchantée* and control groups, except for the means of the intercept and slope. As displayed in **Figure 1**, students in *La classe enchantée* had an initially (i.e., intercept) higher level of internalizing behaviors at pretest ($M = 1.687$, $p < 0.001$), which decreased (i.e., slope) over time ($M = -0.094$, $p = 0.034$), compared to the initially lower level found in students from the control group at pretest ($M = 1.498$, $p < 0.001$), which remained stable over time ($M = 0.000$, $p = 0.986$).

Second, the model with student-rated positive school experiences revealed that all parameters were equivalent between groups, except for the slope means. As displayed in **Figure 1**, students from both groups reported the same initial level at pretest ($M = 3.228$, $p < 0.000$), which remained stable in the *La classe enchantée* group ($M = -0.025$,

$p = 0.641$), but decreased in the control group ($M = -0.192$, $p < 0.000$).

Third, looking at the model with teacher-reported hyperactivity-inattention indicates that all parameters differed between groups, except for the slope means, which showed a stable level of hyperactivity-inattention in the two groups ($M = -0.003$, $p = 0.867$). The initial level of hyperactivity-inattention at pretest was higher in *La classe enchantée* group ($M = 1.510$, $p < 0.000$) compared to the control group ($M = 1.300$, $p < 0.000$). There was also greater variability (i.e., intercept and slope variance) in the *La classe enchantée* group than in the control group (see **Supplementary Table 1** for detailed parameters). Finally, we found a negative association between intercept and slope in the *La classe enchantée* group ($r = -0.099$, $p = 0.033$), but not in the control group ($r = -0.011$, $p = 0.387$). In other words, students in *La classe enchantée* who had an initially



higher level of hyperactivity-inattention tended to experience a greater decrease in these behaviors than those who had an initially lower level of such behaviors, whereas this association was not found in the control group. Results from this model should be interpreted with caution as the RMSEA indicated a poor level of fit, whereas the CFI and TLI suggested an acceptable level of fit.

Fourth, similarly to hyperactivity-inattention, the model with teacher-reported behavioral engagement indicates that all parameters differed between groups, except for the slope means, which showed a stable level of engagement in the two groups ($M = 0.011$, $p = 0.532$). The initial level of engagement at pretest was lower in the *La classe enchantée* group ($M = 2.434$, $p < 0.000$) compared to the control group ($M = 2.668$, $p < 0.000$). There was also greater variability (i.e., intercept and slope variance) in the *La classe enchantée* group than in the control group (see [Supplementary Table 1](#) for detailed parameters). Finally, we found a positive association between the intercept and slope in the control group ($r = 0.016$, $p = 0.045$), but not in the *La classe enchantée* group ($r = -0.033$, $p = 0.097$). This indicates that, among students from the control group, having an initially higher level of engagement was associated with a greater increase in engagement over time than for those who had an initially lower level of engagement. This association was not found in students in the *La classe enchantée* group.

Discussion

The goal of this study was to evaluate, using a quasi-experimental design, the impact on various dimensions of psychosocial adjustment of *La classe enchantée*, a high-quality music ECA program offered to first- and second-generation immigrant children over two school years (fourth and fifth grade). Program impacts were examined from the point of view of children for internalizing symptoms and positive experiences in school, which are typically best captured *via* self-reported measures, and from their homeroom teacher's perspective for externally visible behaviors, namely, hyperactivity-inattention and behavioral engagement in classroom work. The results were partially consistent with initial expectations of favorable program outcomes.

Initial similarities and differences between the intervention and control groups

The results first indicated that, contrary to trends reported both in the general ECA literature and in the more specialized literature focusing on music programs ([Vandell et al., 2015](#);

Alegro and Winsler, 2020), children who participated in *La classe enchantée* were not more advantaged than their peers who did not volunteer to participate in the program. Sociodemographic variables were similar across groups, including for individual (gender, age) and family background (family structure, immigration status) characteristics. However, the groups differed in some aspects of initial adjustment (i.e., internalizing problems, hyperactivity-inattention, and behavioral engagement according to preliminary bivariate associations and/or estimated growth curve intercepts), but always in a direction pointing to better adjustment in the control group as compared to the intervention group.

These results suggest that with an intentional approach specifically designed to foster inclusivity, it is possible to support ECA enrollment among children who usually participate less (McCabe et al., 2020). Despite its appeal from an equity point of view, it should be kept in mind that the initial differences in favor of the control group complicate the interpretation of the results (discussed next), showing comparatively favorable evolution in the intervention group compared to the control group for some outcomes, as apparent differences could reflect differential regression-to-the mean processes rather than real program effects.

Apparent program effects

Even though caution is warranted in the context of a quasi-experimental study with initial differences between intervention and control groups, the results are generally consistent with the premise that high-quality music ECA might support positive adjustment among first- and second-generation immigrant children, at least for the two self-reported outcomes considered. For these outcomes – that is, positive school experiences and internalizing problems – children involved in *La classe enchantée* evolved more positively over time compared to their non-involved classmates. More specifically, students who participated in *La classe enchantée* reported, over the two-year observation window, decreasing levels of internalizing behaviors, whereas these behaviors remained stable for the control group. For positive school experiences, consistent with studies showing a slight decline in these positive experiences over time, students in the control group reported such a decline from fourth to fifth grade; however, this decline was not observed in students who participated in *La classe enchantée*.

The results thus suggest that the program helped children from immigrant families feel less distress and more positive emotions and excitement toward school. Given that these children are more likely to encounter challenges due to their family's migration and resettlement trajectory (Motti-Stefanidi, 2019), the promotion of musical

ECA appears an interesting, positive avenue to support their resilience. These results correspond to the positive youth development premises suggesting that high-quality ECAs in general support children's well-being and positive attitudes toward larger institutions, most notably their school (Lerner et al., 2015), and that music ECA in particular can foster emotional regulation (Van Goethem and Sloboda, 2011; Archambault K. et al., 2019). They are also consistent with the idea that these benefits appear gradually, as exposure to high-quality ECA builds up over time (Simpkins, 2015; Vandell et al., 2015). Features of *La classe enchantée* corresponding to characteristics considered core for high-quality programming might have supported these positive outcomes, like the fact that the program involved schoolmates and promoted positive relationships with peers in the program, which continued to be experienced at school. Beyond relationships with peers and adults directly involved in the program, participation in the program also provided occasions to “shine” at school-wide concerts in front of the whole student body, teachers, and parents, as well as in other community venues. Qualitative interviews with participants suggested that these occasions contributed to the building of a general sense of excitement or “zest,” including toward school (Authors, submitted).

In contrast, results for teacher-reported outcomes showed no comparatively favorable trends on average over time in the intervention group as compared to the control group. In both groups, the average level of hyperactivity-inattention and behavioral engagement in classroom work remained stable over time, meaning that the initial discrepancy found between groups (in favor of the control group) lasted throughout the study. These results are consistent with Ciocanel et al.'s (2017) meta-analysis of positive youth development interventions, which found positive impacts for psychological adjustment (i.e., emotional distress, self-perceptions), but not for problem behavior. They are also consistent with the generally held consensus that hyperactivity and inattention problems (and associated difficulties in terms of behavioral engagement) result in substantial part from neurological functioning impairments, which are not likely to change through exposure to low-intensity ECA programs not specifically designed to impact such outcomes, as compared to targeted intensive interventions or medication (Thapar et al., 2013). It is also possible that gains made in an ECA taking place outside of regular school hours do not necessarily translate into the classroom context. Finally, measurement issues might also contribute to explain the different results for self-reported and teacher-reported outcomes. Participants in *La classe enchantée* might have consciously or unconsciously provided inflated scores, knowing that the research project's goal was to evaluate the program. However, the fact that differences between groups

tented to emerge slowly over time suggests against this interpretation.

Even though children in *La classe enchantée* did not improve on average in terms of teacher-rated hyperactivity-inattention, results showed that among this group only, the initial level of hyperactivity-inattention (i.e., intercept) was associated with evolution over time (i.e., slope), suggesting that the program might have yielded benefits among those who had initially higher hyperactivity-inattention levels. This result is consistent with other findings suggesting that participation in ECA might be especially beneficial for youth presenting an at-risk or less favorable initial profile (Simpkins, 2015; Vandell et al., 2015; Deutsch et al., 2017). However, given the small sample size, firm conclusions will require replication.

Limitations and future directions

The results should be interpreted with caution. As already stated, this study is based on a non-equivalent quasi-experimental group design, meaning that the results might overestimate or underestimate the real impacts of the program. The small sample size also yields low power to detect program impacts and to conduct subgroup analyses (e.g., by gender). In addition, the control group did not receive any alternative form of ECA; thus, the findings could reflect non-specific effects that other form of ECA programming might have achieved. The cognitive outcomes that have been the main focus of past research evaluating music education programs, such as memory, IQ, and executive functioning, were not part of this evaluation, which limits our capacity to compare the findings to those of previous studies. Finally, the high quality of the ECA experiences offered in *La classe enchantée* spanning 2 years is probably not representative of typical community-based offerings, thus limiting potential generalization. These limitations underscore the oft-repeated need for large randomized control trials to better understand ECA impacts and processes, and how they might depend on the characteristics of both participants and activities (Vandell et al., 2015; Roth and Brooks-Gunn, 2016).

Conclusion

This study adds to an emerging experimental and quasi-experimental research base emphasizing the potential of music ECA for supporting positive psychosocial outcomes among children and youth from diverse ethnic, migratory, and socioeconomic backgrounds (Holochwost et al., 2017, 2021). The findings suggest that targeted efforts specifically

dedicated to that end can successfully encourage long-term ECA participation in diverse populations of children, including among subgroups with socioeconomic and behavioral profiles traditionally associated with non-participation. They also show that among first- and second-generation immigrants attending public low-income schools, sustained participation in quality music ECA has the potential to support some dimension of psychosocial adjustment. Although limited in several ways, these encouraging findings should provide support for the provision of high-quality ECA to improve access among underserved population, as well as the launch of larger, better control studies in the future.

Data availability statement

The datasets presented in this article are not readily available because of ethical reasons related to confidentiality issues. Requests to access the datasets should be directed to VD, veronique.dupere@umontreal.ca.

Ethics statement

The studies involving human participants were reviewed and approved by the Université de Montréal's IRB (approval number: #CERAS-2017-18-073-D). Written informed consent to participate in this study was provided by the participants' legal guardian/next of kin.

Author contributions

EO performed the statistical analysis and drafted sections of the manuscript. VD conceived the study, participated in its design and coordination, and drafted sections of the manuscript. IA participated in the design of the study and interpretation of the data, and helped to draft the manuscript. MM and ÉT coordinated the study, performed the measurements, and revised the manuscript. A-SD participated in the design of the study, the literature review, and the interpretation of the data and helped to draft the manuscript. All authors read and approved the final manuscript.

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Conflict of interest

The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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Supplementary material

The Supplementary Material for this article can be found online at: <https://www.frontiersin.org/articles/10.3389/feduc.2022.937983/full#supplementary-material>

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