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Extended music education enhances the quality of school life

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The claim of whether music education can create social benefits in the school environment was tested in 10 Finnish schools with an extended music curricular class and control classes. The quality of school life (QSL) was assessed by a representative sample ($N = 735$) of pupils at years 3 and 6 (9- and 12-years-olds). The results showed that extended music education enhances the QSL, particularly in areas related to general satisfaction about the school and a sense of achievement and opportunity for students. Differences related to the schools and gender did not account for the results. A follow-up study examined whether the increase in critical QSL variables was related to music. This analysis utilised data from other classes ($N = 98$) with an extended curriculum (sports and visual arts). These classes did not confer similar benefits. Overall, the results imply that extended music education has a positive effect on the social aspects of schooling.

Keywords: music education; quality of school life; social benefits; extended music education

Introduction

Music is not a school subject that is monitored in international school evaluations. For example, the Programme for International Student Assessment (PISA, OECD 2001) compares how students in different countries pass tests in reading, mathematics and science. The assessments also measure study effectiveness, how long the school day lasts, how much homework is required, the cost of test results for children, how enjoyable going to school is and how committed children are to their responsibilities as students (Willms 2003).

In Finland, despite excellent results in academic tests, Finnish school children have a reputation for scoring low in questions concerning general satisfaction related to school (Linnakylä and Malin 2008; Välijärvi 2007; Willms 2003). These results have in other studies also been operationalised as being related to school climate, positive attitude, commitment, engagement or relationships with the school (see Libbey 2004; Anderson 1982). As a remedy for poor engagement, there have been suggestions that the curriculum should make room for voluntary subjects, which would contain subjects like art, drama, music and sports – subjects that could create more participation and social cohesion (Pulkkinen and Launonen 2005). In the case of music, this makes sense, particularly within the context of recent notions suggesting the evolution of music in human cultures as a medium for creating a

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bond between mother and infant (Trehub 2001), or as a way of increasing cohesion in societies through transitional phases (weddings, funerals), where dancing and singing is done together in synchrony (Clayton 2009). This view is also supported by empirical studies of music as a way of fostering affiliation, prosocial behaviour and empathy (Hove and Risen 2009; Kirschner and Tomasello 2010; Rabinowitch, Cross, and Burnard 2013). However, there is no empirical evidence that music would lend itself to any positive social effects or atmosphere at school.

Previous findings concerning the transfer effect of music education have placed emphasis on cognitive and academic outcomes (e.g. Schellenberg 2011). In this study, we will examine the possibility that musical activities can confer social benefits in the school environment. By social benefits in the school environment, we mean increasing the quality of school life (QSL). Satisfaction towards school is built on relationships between students in a particular study group, the class and their teacher.

Social benefits of music

Is music education supposed to benefit students in areas and domains other than musical skills? Transfer studies of music education have tested numerous hypotheses, and have found abilities that develop in music education are transferrable to other domains (for summaries, see e.g. Hallam 2010; Schellenberg 2003; Special Edition of *Music Perception*, Schellenberg and Winner 2011). The evidence for music education *causing* short-term increases in IQ testing has been obtained from 6-year-old children (Schellenberg 2004), and the effect seems to last for 11-year-olds and even for 16- to 25-year-old adolescents (Schellenberg 2006a). Another investigated area of transfer is music and language. Practice in music has been found to speed-up literacy skills (Moreno et al. 2009) and the studying of foreign languages (Slevc and Miyake 2006; Milovanov et al. 2008). Some more general transfer effects have also been found; music education has been found to enhance selective attention (Degé et al. 2011) and sensitivity to emotions in speech (Thompson, Schellenberg, and Husain 2004).

In the social domain, Schellenberg (2004) did not find students enrolled in music classes showed any improvement in adaptive social behaviour compared to children enrolled in drama classes, who did exhibit such improvements. Moreover, attempts to prove that an out-of-school music education improves social adjustment (Schellenberg 2006a), or that music as a hobby would build longer-term emotional intelligence (Schellenberg 2011) were not successful, either. In the school environment, Rickard et al. (2012, 2013) conducted a series of experiments to study how music education, compared to courses in arts, drama, juggling or no special class, affected students' attitudes towards school, social competence, self-esteem, motivation and engagement with classes; their results showed no psychosocial effects whatsoever.

It is peculiar how transfer effect studies have not succeeded in finding a connection between social benefits and music education, since in qualitative and philosophical research – particularly in evolutionary psychology – music has put forward hypotheses that, as a hobby, it is able to bring people from different paths of life together (Campbell, Connell, and Beegle 2007), to create relations between self and other (Clayton 2009), having the capacity to increase willingness to cooperate

(Mithen 2005), show trust towards others (Freeman 2000) and increase emotional empathy (Rabinowitch, Cross, and Burnard 2013).

In experimental studies, it has been demonstrated how short-term exposure to music, or synchronisation in particular, is able to create social cohesion. Hove and Risen 2009 have found that tapping in synchrony – which is essential for making music together with someone – causes increased affiliation. Kirschner and Tomasello (2010) demonstrated how joint music-making increases cooperative and helpful behaviour among children. What would be the long-term benefit of these exercises?

The lack of positive outcome with respect to social effects in music education studies may be the result of the specific set of measurements used in these studies. The Social Skills Rating System (SSRS, Gresham and Elliott 1990) used by Rickard et al. (2012, 2013) and the Parent Rating Scale of the Behavioral Assessment System for Children (BASC, Reynolds and Kamphaus 1992) used by Schellenberg (2004, 2006a, 2011) tap into the social behaviour of an individual, and do not recognise how music education would affect the social climate of a group. For instance, the SSRS probes the issue with phrases such as 'controls temper' and 'fights others', and the BASC assesses the maladaptive (e.g. aggressiveness) and adaptive (e.g. leadership) behaviour that emphasises individual behaviour.

The connection between social benefits and music education – especially in the classroom – has not been studied thoroughly (see Rickard et al. 2012, 2013); nonetheless, scattered evidence seems to imply that social issues are influenced by music education. For instance, a study carried out in Switzerland from 1988 to 1991 compared classes that were given 5 weekly hours of music education to classes with a standard 1–2 weekly hours. The results suggested that the classes with the extended music education were more socially integrated than the normal classes (Spychiger et al. 1995).

Spychiger et al. (1995) describe the classroom climate as the first indicator of the social domain in schools. Using a simple sociometric questionnaire, they found that positive relationships increased in classes with extended music teaching when compared to their control classes. Since we, too, assume that music education affects the social climate of the classroom, we turned our attention to existing instruments of Quality of School Life (QSL), and adopted the often-used instrument by Linnakylä (QSL, Linnakylä 1996; Linnakylä and Malin 1997). We also added five items to the QSL to create a new classroom climate factor in order to capture the affiliation and group cohesion.

Extended music education

Long-term experimental research designs on extensive music education in the school environment are almost non-existing. To our knowledge, the only one is the Swiss experiment from 1988 to 1991, which was carried out in 51 classes around the country (Zulauf 1993; Spychiger et al. 1995). In Finland, there is a permanent scheme that fits the extended music education research design: the music classes (extended music education, EM), which have been in the Finnish school system since the 1960s (Kiiski and Törmälä 2009; Hyvönen, Hirvonen, and Hyry 2000).

In Finland, music is taught to everyone as part of general education (Years 1–9). The national minimum (Opetushallitus 2004, 304) is covered, for instance, if one weekly music lesson is given for Years 1–7 (7- to 13-years-olds). For Years 8–9 (14- to

15-year-olds), music is optional. Compared to other optional arts, crafts and sports subjects, however, music is the least chosen for Year 9 students (Kuusela 2009). Although not specified in the law, approximately 40 largest towns in Finland offer an opportunity to attend an extended music education class (EM) from Year 3 onwards (9-year-olds). It can modestly be estimated that at least 9000 Finnish pupils[1] are currently attending their obligatory schooling in an EM class.

Children need to take an entrance exam to enrol for an EM class. There are no standardised entrance examinations but children are usually tested in singing and for their ability to imitate short passages of rhythm or melody. In an EM class, music is taught up to 4 hours per week during the school day. It is worth pointing out that music lessons in EM classes are not an after-school hobby, neither do the pupils take individual instrument lessons during school hours, but music lessons for the class as a whole substitute for lessons in other school subjects, usually in visual arts and sports.

Conveniently for research, each EM class has a normal class for comparison at the same school. More importantly, the EM classes are not at an experimental phase, since they have been operational in schools for decades and are presented by specially trained and dedicated teachers. There are some national guidelines for the curriculum for EM classes, but each teacher is entitled to create his or her own style of teaching (KMO 2004). Multipart choir singing is favoured in most schools. The EM classes also perform music regularly to other pupils, parents and to a public audience.

The EM scheme offers a unique possibility and high ecological validity for studying the transfer effects of music without instigating an artificial setting or short-term intervention programme. Also, compared to the past experimental settings for studying the transfer effects of music education (e.g. Schellenberg 2004; Costa-Giomi 1999; Zulauf 1993; Spychiger et al. 1995), this provides an economically reasonable means for exploring these effects, as EM is a normal part of the education system and freely available to children. For this reason, the societal implications may also be more interesting, since EM can be implemented to larger groups of pupils at no extra cost, compared to instrumental music lessons. However, the downside of this quasi-experimental setting is that pupils are not randomly divided in the normal and EM classes, but rather according to their musical abilities and parental interest. This has, of course, also been the case in previous correlational studies (e.g. Degé et al. 2011; Schellenberg 2006a, 2011).

The main aim of this study is to seek evidence of whether music education in school has social benefits for pupils. More precisely, we test whether EM shows measurable increases in the QSL.

Design and method

In this study, no extra activities were added to children's normal school lives. In designing the study, the rationale was to include pairs of classes, which followed different curriculums in terms of music. A quasi-experimental design was adopted, since the pupils in the EM classes had already been selected according to their musical abilities. A cohort design was utilised, where the pupils in the EM class and the normal class (N) were tested at Years 3 and 6 (9- and 12-year-olds) simultaneously. We assume that there were no differences at Year 3 between the

normal (N) and the extended music (EM) classes, but that the hypothesised differences emerged only at Year 6.

Participants

Every year, nearly 70 classes of 9-year-olds (Year 3) all around Finland begin an extended music education class (EM). Pupils for these classes are selected on the basis of a test, which varies from school to school. In most schools, the minimum task is to sing a solo song a cappella and repeat rhythmic and melodic patterns after demonstration. Success in academic subjects is not a requisite.

In this study, the pupils in the EM class studied an average 3 extra music lessons per week (mean of 4.1 hours compared to 1.4 hours at the N class). The extra music lessons replaced most often lessons in Sports and Visual Arts.[2] According to the teachers, 62% of the children who had applied to the EM class were accepted. A need for special education did not inhibit a child from being accepted to an EM class. However, in the EM class, 6% of pupils were studying certain subjects with a special education teacher compared to the 12% in the N class. Furthermore, an immigration background was more common in the N classes. Out of the pupils who participated in this study, 21 did not speak Finnish as their mother tongue, and only 6 of them attended an EM class (1.4%; for the N class the percentage was 4.7%).

According to the teachers, the music curriculum in the EM class had similar contents than that of the N class. However, the extra music lessons and the selection of pupils allowed the class to sing in multipart harmony, and to play instruments in an ensemble already from the third year onwards; moreover, the quality of their music performances was of such a standard that they were able to perform outside the school.

Choice of the sample

From the possible 68 schools, a quarter was included for the study due to one main specification: the schools needed to have both Year 3 and Year 6 EM classes and Year 3 and 6 normal classes (N) for the purposes of comparison. Moreover, any school that announced it was working closely with a local conservatoire was discarded. For similar reasons, schools from major cities were not included in the sample. This resulted in 17 candidate schools, out of which seven refused to participate due to one of three reasons: (a) they had already participated in other research recently; (b) they were experiencing major construction projects in the school building and (c) they did not have a comparison group for EM classes (despite the information we had obtained about the school).

In the remaining 10 schools, 4 classes from each school participated in the study: Year 3 normal (N3) and music classes (EM3), and Year 6 normal (N6) and music classes (EM6). In one school, the comparison classes had a visual art emphasis; they were therefore excluded from the analysis. Thus, the sample was comprised of 735 pupils, of which 317 attended an N class and 418 attended an EM class. The gender division of the sample was 457 girls and 278 boys. It is worth noting that in the EM classes, the majority of pupils (72%) were girls ($X^2[f] = 44.8$, $p < 0.001$), an issue to which we will return later.

All parents were asked permission for their child to participate in the study. The measurements were done at the beginning of the spring term, January–February 2011, to ensure that pupils at the third-year level had already become familiar with their class, and for the EM3 classes to experience what EM was about.

For the purposes of comparison, a small sample of other extended education classes (OE) was added. This consisted of an extended arts education school and two extended sports education schools, making a total of 98 (38 Year 3 and 60 Year 6) pupils. Again, control classes were obtained from the same schools in order to control for school differences. This sample was used for exploring the differences related to enrolment for extended education versus the content of such education (music versus other topics of emphasis).

Measures

A standardised self-assessment measure of QSL by Linnakylä and Malin (1997; see also Williams and Roey 1996) was utilised. This had been used in International Education Assessment (IEA) reading tests (Schleicher and Sinisalco 1991) in 1991 and 1995 (Linnakylä 1996; Linnakylä and Malin 1997; Malin and Linnakylä 2001). This instrument contains 29 items spanning six factors: general satisfaction for school (G), teacher–student relations (T), status in class (S), identity in class (I), achievement and opportunity (A) and negative affect (N). In order to evaluate effects of affiliation and pro-social and collaborative action, five new items were added to form a new factor called the classroom climate (C): 'I am proud of our class'; 'We have fun in our class'; 'Our class is a quiet environment to work in'; 'In school I spend time with like-minded students' and finally one reversed item: 'There is bullying in our class'.

Since QSL has mainly been used for secondary school students (14-year-olds), the questions were customised to be suitable for 9-year-olds. The wording of the items was simplified and the scale was changed from expressing the degree of agreement to stating regularity: 'nearly always', 'often', 'seldom' and 'almost never'. These changes were piloted by asking a small group of third-year pupils (outside of the actual sample) to fill in and comment on the revised questionnaire.

For academic performance measures, the grades in Finnish Language and Literature, Mathematics and English were collected.[3] Additionally, information was gathered about the number of pupils in each class in need of special education, about the pupils' out-of-school activities, about the distance pupils lived from school and feelings towards music education at school.

Results

After screening for outliers (values over ± 2.5 SDs), all observations outside these values were truncated to the extremes defined by ± 2.5 SDs (Hoaglin, Mosteller, and Tukey 1983); this only concerned a minority (<6 values in each QSL construct) of responses. Two different orders of the questions were utilised, which did not result in differences in the QSL nor any other variables ($t[733] = 0.26$, $p = \text{ns}$). Since the instrument was applied to slightly younger pupils than it was originally designed for, the structure of the QSL factors was examined by means of factor analysis using identical parameters to those utilised by Linnakylä (1996). This analysis yielded a

highly similar structure of the QSL to previous studies, with six factors accounting for 58% of variance (X^2 [735] = 1391, $p < 0.001$), and all items loaded into their assumed theoretical constructs, with one exception.[4] The obtained factor structure is shown in Appendix 1.

The reliabilities of the constructs reached similar or even higher levels than in previous studies (Cronbach's α from 0.70 and 0.87; see Appendix 1 and cf. Malin and Linnakylä 2001). In sum, the main instrument functioned in the assumed fashion even though it had been customised for the purposes of this study. One additional construct was proposed, namely classroom climate (C), which tapped into the social climate of the classroom. When the five items representing this construct were entered into a new factor analysis with the previous parameters, four out of five classroom climate items loaded onto a new seventh factor, and the factor itself received a satisfactory reliability index ($\alpha = 0.60$). Moreover, this factor correlates only moderately with existing QSL factors ($G = 0.48$, $T = 0.43$, $S = 0.54$, $I = 0.47$, $A = 0.41$ and $N = 0.35$), suggesting that it will tap another facet of the QSL. We will use this new factor in the analysis in addition to five QSL factors, since this factor is well motivated by the background literature on the social benefits of music.

The results will be divided into four sections: QSL, academic achievement, effect of gender and the role of extended education.

Quality of school life

The first research hypothesis assumed that at the third year, N and EM would be similar in the measured variables (QSL and academic grades) across all schools. *T*-tests did not yield any significant differences for QSL factors (all $t < 1.76$, $p =$ ns), nor for English ($t = 1.62$, $p =$ ns), which the students had just begun learning. However, for Maths ($t = 2.52$, $p < 0.05$) and for Finnish Language and Literature ($t = 3.12$, $p < 0.01$), the EM class obtained higher scores (8.5 and 8.2) than the N classes (8.3 and 7.8, for Mathematics and Finnish, respectively), a point to which we will return later in the *Academic Achievement* section.

Having established that the point of comparison for N and EM classes was equal, the main hypothesis was addressed by means of ANOVA analyses. For each construct of the QSL, a separate analysis was conducted where the between-subjects factors were the Year (third vs. sixth), the Type (normal vs. extended music) and the School (10 schools). A summary of these analyses is shown in Figure 1, which displays the two main variables of interest, Type and Year, but omits School (10 levels) for the sake of clarity.

For the general satisfaction (QSL-G), significant differences between Type ($F = 11.1$, df = 1697, $p < 0.001$, $\eta^2 = 0.02$) and Year ($F = 28.5$, $p < 0.001$, $\eta^2 = 0.04$) and School ($F = 2.7$, $p < 0.01$, $\eta^2 = 0.04$) emerged. The factor interactions were significant for Type and School ($F = 2.70$, $p < 0.01$) and Year and School ($F = 4.3$, $p < 0.001$). As evident in Figure 1, the EM classes obtained higher means in years 3 and 6. The sixth-year pupils obtained lower scores than the third-year pupils in general satisfaction towards school, which is also observed in the previous studies of QSL (Samdal et al. 1998). However, this drop is fairly constant for both types of classes; additionally, the interaction between these two factors (Year and Type) is missing ($F = 0.31$, $p =$ ns).

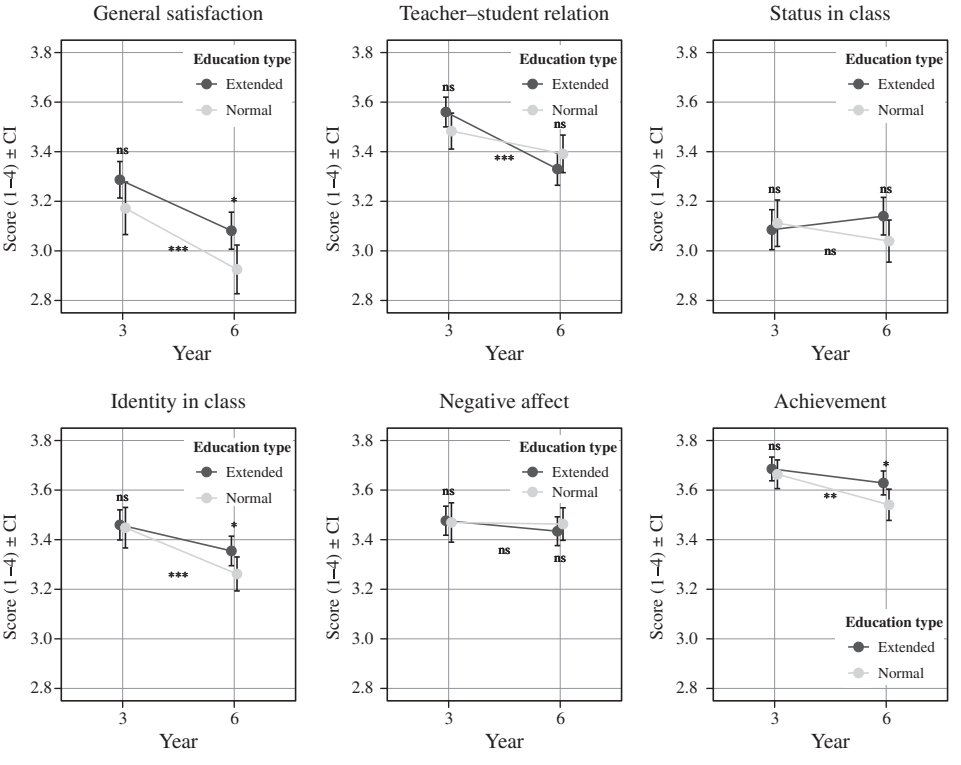

Figure 1. Means and confidence rates of the QSL factors across the year and type of class.

For the teacher–student relation (QSL-T), a significant effect of Year ($F=21.2$, $p<0.001$, $\eta^2=0.03$) and School ($F=3.2$, $p<0.001$, $\eta^2=0.05$) emerged, and two one-way interactions between Type and Year ($F=4.0$, $p<0.05$), Type and School ($F=2.6$, $p<0.01$) and one two-way interaction between Type, Year and School ($F=4.1$, $p<0.001$) was evident. Interestingly, and contrary to predictions, there seems to be a drop in this construct in the EM classes. If we look at the items of this construct separately, we see that the largest difference between EM and N is in the question related to equality ('Teachers are fair and just' $M=3.13$ and 3.40 for EM and N, respectively), possibly demonstrating how the teacher of the EM class assigns different responsibilities to chosen pupils in the musical performances – a major activity in the class, which can be felt unfair by other pupils.

The ANOVA analysis also revealed the main effects of Type ($F=4.9$, $p<0.05$, $\eta^2=0.01$) and Year ($F=7.24$, $p<0.01$, $\eta^2=0.01$) for achievement and opportunity (QSL-A), yet no interactions between the factors. Since the items in this factor refer to self-image as a learner, it seems that having to be exposed to criticism in music performance has an impact on the notion of achievement. Identity (QSL-I) showed the main effect of Year ($F=16.7$, $p<0.001$, $\eta^2=0.03$) and School ($F=1.92$, $p<0.05$, $\eta^2=0.02$) but no interactions whatsoever. The status in the class (QSL-S) revealed no significant main effects, nor interactions ($F<2.2$, $p=$ns), neither did negative effects (QSL-N).

The novel factor titled climate in the classroom (C) did exhibit a strong main effect of Type ($F=19.7$, $p<0.001$, $\eta^2=0.03$) and School ($F=4.16$, $p<0.001$, $\eta^2=0.06$) and interaction between Type and School ($F=2.53$, $p=0.01$) and Year and School ($F=4.9$, $p<0.001$). The EM classes ($M=3.35$ and $M=3.39$ for years 3 and 6, respectively) consistently had higher scores in this factor than the N classes ($M=3.26$ and 3.20, see Figure 2 for illustration). Since this factor was included to assess the classroom climate and team spirit, it is interesting that the EM classes consistently obtained higher scores in questions related to affiliation, being proud of their class and having fun in the classroom. For summary purposes, a visualisation of the main results is provided in Figure 1, which shows the means and confidence intervals for the main QSL variables across the year and class types.[5]

Academic achievement

All background variables related to academic achievement showed differences in ANOVA analyses; the Mathematics numbers differed across Type ($F=17.5$, $p<0.001$, $\eta^2=0.02$), Year ($F=13.4$, $p<0.001$, $\eta^2=0.02$), and School ($F=1.8$, $p<0.05$, $\eta^2=0.03$), and a similar pattern also held for Finnish Language and Literature. For English, the main effects were significant for Type ($F=12.1$, $p<0.001$, $\eta^2=0.02$) and School ($F=4.5$, $p<0.001$, $\eta^2=0.07$), but not for Year. The EM pupils were a step ahead of N classes in Finnish and Mathematics when they started music classes and kept the pace through the primary school; scores in English indicated a similar pattern, although this subject was started later. However, the EM pupils did not increase the gap through primary school, indicating that music education was not the cause of the better learning in these subjects; rather, the pupils appear to have had good learning skills from the start. Finally, we observed small but significant positive correlations between certain QSL variables and academic achievement (e.g. QSL-A and Finnish Language and Literature, $r=0.29$, Mathematics, $r=0.30$, and English $r=0.24$, all df $=733$, $p<0.001$).

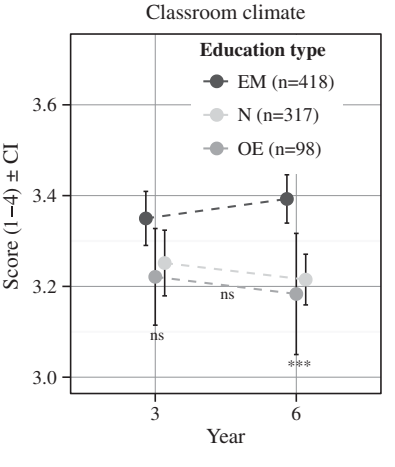

Figure 2. Means and confidence rates of the classroom climate factor across the year and type of class.

The effect of gender

Gender is known to affect QSL measurement in a way that suggests girls tend to like school more than boys (Samdal et al. 1998; Karatzias et al. 2001) and score higher on the QSL-G measure. Since boys comprise only 28% of the pupils in the EM class, it is assumed that their discontent does not appear in the results, since girls as the majority, would show greater satisfaction towards schoolwork. This higher proportion of girls in the EM class cannot explain the difference, since girls in the EM class obtain significantly higher scores on the generic QSL index ($t = 1.961$, df $= 261$, $p < 0.05$) than the girls in the N class. However, where the results are concerned, a full analysis of the role of gender is warranted. As boys were a minority in the EM class, the ANOVA analysis carried out in the previous section with the QSL-G was recalculated with gender as a new, separate factor. As predicted, this analysis did reveal the significant main effects of gender ($F = 55.23$, $p < 0.001$, $\eta^2 = 0.07$), but crucially, no interactions between gender and Type or Year ($F < 1.53$, $p =$ ns) were evident. In descriptive terms, boys reported a considerably lower QSL ($M = 2.91$) compared to girls ($M = 3.26$); this, however, is constant across class Type (N and EM) and Year (third and sixth). A similar pattern of results holds also for the rest of the factors. These results are in line with past observations (e.g. Samdal et al. 1998; Karatzias et al. 2001) and do not alter the interpretations of the main results concerning the effects of EM and its positive impact on QSL.

The role of extended education

The comparison between EM and N classes yielded a range of observations that supported the notion of music education creating positive social benefits for the school in terms of the QSL. However, we cannot rule out two separate alternative explanations to these positive results. The first one concerns extended education in general and the ensuing coherence and special status the class receives from such a nomination. The selection and the special status could very well contribute to the observed effects (Haney and Durlak 1998). For this reason, it is premature to conclude that it would be music in one form or another that now confers the positive effects to the QSL.

In order to explore this alternative explanation, the sample of other extended education classes (OE) was examined to see whether it was particularly the music that drove the results. OE sample consisted of one extended arts education school and two extended sports education schools ($N = 98$). A three-way ANOVA was carried out to establish the differences between the Type, Year and School. This revealed the same effects on QSL variables as previously (for G, $F = 7.55$, df $= 2844$, $p < 0.001$), and *post-hoc* analysis of the factor type (N, EM, OE) indicated that the only significant difference in the generic QSL resided between the N ($M = 3.03$, SD $=$ 0.66) and EM ($M = 3.19$, SD $= 0.55$) groups ($p < 0.001$), leaving comparisons between N and OE ($M = 3.11$, SD $= 0.55$), EM ($p = 0.47$) and OE non-significant ($p = 0.41$). Replicating this analysis with the other QSL variables produced results that were in line with the main analyses, that is, there were differences across the groups, but the QSL variables did not suggest that the OE group was different from the N group.

Differences between the three types of classes were more pronounced in the classroom climate factor, where the class Type yielded a large main effect ($F = 12.1$,

$p < 0.001$) but no effects on the Year or School ($F < 1$ in both cases). *Post-hoc* analysis indicated that the EM class scored statistically significantly ($p < 0.001$) higher mean scores (3.37) in classroom climate when compared with the OE and N, which received lower means (3.19 and 3.23, respectively), as illustrated in Figure 2, which portrays noteworthy differences at the year 6 level.

The second alternative explanation concerns the academic skills of the pupils. One of the academic variables showed differences between the three groups. In mathematics scores, the higher scores of the EM class ($N = 8.03$, OE $= 8.07$, EM $= 8.36$) were significantly higher ($p < 0.001$) from the two other groups. More importantly, the OE group scored marginally higher scores ($p = 0.05$) than those in the N classes. However, this observation was not evident in the English or Finnish Language and Literature scores. To assess the role of variable group sizes in this analysis, a bootstrapped analysis of 20,000 replications with 50 randomly chosen pupils from each type of the three classes was run to keep the group sizes identical, but this did not result to any new insights, since the results were practically identical to the ones obtained with unconstrained analysis of variance.

In sum, we can conclude from these additional analyses that the role of extended education may not be the source of increased QSL per se, since it was particularly the EM that displayed higher means in the critical QSL factors. This small-scale extension, however, needs to be interpreted with caution.

Conclusions

The results suggest that studying music does provide measurable social benefits. In the comprehensive school, pupils in the classes with extended music education were generally more satisfied with school life than pupils in the classes with a normal music education curriculum. Pupils in the EM classes also found that school provided them with achievement and opportunity more often than the pupils in the N classes. The most striking differences between these groups were found in the classroom climate, a novel factor designed for this study. Those receiving EM reported significantly more positive responses to items representing classroom climate compared to N and other extended (arts and sports) classes, a finding that corroborates the rather anecdotal evidence provided by Spychiger et al. (1995, 330).

The positive effects of music in primary schools could not be explained by the selection of a specialist class, or by an unbalanced gender distribution. Differences between family values and socio-economic backgrounds can potentially contribute to some of the observed differences, but the present study leaves this issue unresolved, since the pertinent background variables were not collected.

We could not conclude that QSL lead to better academic results because the pupils selected to the EM classes at third-year level were already ahead of the N classes in Mathematics and Finnish Language and Literature, and there was a similar gap at the sixth-year measurements. However, there were consistent positive, albeit small, correlations between the achievement and opportunity-factor and academic variables; however, this merely states that those individuals who felt confident in their schoolwork also generally scored better in Mathematics, Literature and English.

How could we have obtained results indicating that music education fosters social benefits when previous studies have failed? How was the present study different from previous attempts to show social benefits caused by music education (Schellenberg 2004, 2006a; Rickard et al. 2012, 2013)? Firstly, the evidence in the present study was gathered in an ecologically rich environment, in comprehensive schools, where music education is given to everybody. The experimental and control groups consisted of existing classes and were not created for this study. Extended music education was taught by a teacher of that very school, not an outsider whose mere presence might have made an impact on the experimental group. Secondly, the measurements were done following a relatively long period of time. The baseline measurement for third-year pupils was done in January–February, when the classes had already spent 5 months together. In previous studies (e.g. Rickard et al. 2012, 2013), the experimental phase had usually been over by this time. Thirdly, the social benefits were measured as attitudes of a *group* not as the behaviour of an *individual*. Both Schellenberg (2004, 2006a) and Rickard et al. (2012, 2013) measured mal-behaviour of an individual as perceived by a parent, teacher or the student her/himself. Furthermore, we gathered evidence of pro-social behaviour with a different instrument. In addition to QSL, which has similar factors as the Australian Attitudes to School Survey (AASS 2006) that Rickard et al. (2012) used, we devised a new factor called classroom climate that consisted of five items. However, compared to the items in AASS (2006), we used wording that emphasised collective experience in lieu of individual ones. For instance, 'I have been bullied recently at school' (AASS) was rephrased in this study to, 'There is bullying in our class'; 'The behaviour of some students in class makes it hard for me to do my work' (AASS) was rephrased as, 'Our class is a quiet environment to work in'. The final difference to past studies on the topic was the assumption that the social benefits of music education can only blossom if music is studied in a group, and if it involves joint music making. The social aspects of taking individual instrumental lessons are limited. String players may play in an orchestra after a couple of years of solitary training, but for accompaniment instruments (piano, guitar, accordion) chamber music only comes into the picture much later.

The design utilised in the present study (quasi-experimental) cannot establish a causal link between EM and QSL as group allocation is not random but instead may reflect family values, academic interests of parents or other possible factors contributing to differences (Schellenberg 2006b, 126). For instance, the EM may bring increased QSL to those who are interested in music but the design does not answer the question of what would happen if pupils not interested in music enrol in EM. This same caveat is raised by others (Schellenberg 2006b, 126) even concerning studies utilising true-experiment design (Schellenberg 2004; see also the modest results by Spychiger et al. 1995).

We may also surmise a number of other factors which could contribute to QSL due to the nature of EM. Pupils in EM class (a) enjoyed attending a class with like-minded peers with similar hobbies (e.g. Bakagiannis and Tarrant 2006), (b) felt good about school because they received appreciation from adults for their public performances, (c) obtained intense emotional and aesthetic experiences in school (Gabrielsson 2011, 32) and (d) may benefit from the pro-social effects (Kirschner and Tomasello 2010) and increased feelings of affiliation (Hove and Risen 2009) produced by joint musical activities. Despite being unable to pinpoint these exact

factors now, we can conclude that it was due to music education that the children were pooled together in the first place.

The ramifications of the findings are limited by two important accounts. First, merely increasing the number of hours dedicated to music education may not yield similar results since EM in this study hinged on interest in music. Second, EM as a long-term practice in schools is a rarity that currently occurs in only a few countries, which limits the wider impact of and follow-up research into these effects.

In the future, new concepts and ideas from the field of positive psychology (Seligman and Csíkszentmihályi 2000) may be worth applying if we want to explain the underlying mechanisms of the social benefits gained from music education. According to these ideas, one of the three things leading to happiness is engagement, a term often closely associated with the QSL (e.g. Willms 2003). Since the general satisfaction for school drops dramatically as pupils get older, the next step is to explore whether music has an impact on satisfaction at the secondary school level (years 7–9).

Student satisfaction with the school they attend is not a trivial issue since it is linked with teachers' work satisfaction and their number of absent days due to sickness (Ervasti et al. 2012). If financial losses and absences of teachers can be reduced with more music at school – or arts and sports, according to individual preferences – we would certainly hear about it afterwards.

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Notes

1. Primary school: 68 schools $\times$4 age groups $\times$20 students per class + Secondary school: 40 $\times$ 3 $\times$20.
2. In addition to visual arts and sports, music replaced occasionally lessons in all other subjects except foreign languages: Crafts, Finnish, Mathematics, Religion, Science, Biology, History, Geography and an extra-curricular lesson.
3. The Finnish Language and Literature curriculum contains communication, reading, writing, literature and language (Opetushallitus 2004). English is usually started at the third-year in Finnish schools.
4. G2 was more strongly linked with N constructs, similar to Linnakylä and Malin (1997) (see Appendix 1).
5. We conducted an alternative analysis with normalised QSL results within schools (across EM and N classes) in order to eliminate any school differences. This analysis yielded basically the same pattern of results without the school factor. As the material affords for keeping the school factor in the analyses, we do not feel that leaving out schools would be necessary to increase the effect sizes of the results.

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Appendix 1. The items measuring the quality of school life, the underlying constructs and the empirical factor structure

Items	Theoretical	G	T	S	I	A	N
I like to go to school	G	0.80					
I find that learning is fun	G	0.75					
I get enjoyment from being at school	G	0.71					
I enjoy my school work	G	0.75					
Teachers are fair and just	T		0.74				
Teachers help me to do my best	T		0.64				
Teachers treat me fairly in class	T		0.76				
I get the marks I deserve	T		0.64				
Adults at school listen to what I say	T		0.67				
I feel being important member of my class	S			0.67			
My class mates trust me	S			0.65			
My class mates come to me for help	S			0.60			
I know that my class mates think a lot of me	S			0.79			
My class mates respect me	S			0.73			
At school, I get along with other people	I				0.20		
Mixing with other people helps me understand myself	I				0.70		
At school, I learn a lot about myself	I				0.79		
At school, I get to know myself better	I				0.81		
I accept other people as they are	I				0.24		
I know how to cope with the work at school	A					0.58	
I reach a satisfactory standard in my work at school	A					0.71	
I know the sorts of things I can do well	A					0.69	
I know I can do well enough to be successful if I try	A					0.52	
I am doing fine at school	A					0.57	
I feel lonely at school	N						−0.65
I feel restless at school	N						−0.44
I feel depressed at school	N						−0.73
I sometimes get upset at school	N						−0.56
I feel happy at school	G						0.42
Reliability (Crobach's α)		0.87	0.81	0.82	0.72	0.76	0.70

G, general satisfaction; T, teacher–student relations; S, status in class; I, identity in formation; A, achievement and opportunity; N, negative effect.