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Changes in the well-being of children starting to learn to play musical instruments

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Background

Learning a musical instrument can be considered a 'superskill' associated with meta-plasticity in the brain (Stewart, 2008). Evidence shows neural structural adaptation after 15 months of musical training (Hyde et al., 2009), and behavioural benefits from 15 weeks of musical training (Overy, 2003). A goal-directed pleasurable reward system appears to support the acquisition of musical skills over time, promoting motivation to continue practicing as the emerging musician learns the *autotelic* value (a meaning unto itself) of playing their instrument (Elliott, 1993). Peripatetic music teachers note a range of benefits from the development of team work and social skills to self-discipline, with pupils themselves noting the enhancement of 'life skills', such as improved ability to both concentrate and relax during stressful periods (Kokotsaki & Hallam, 2007). Clift and Handcox (2001) report members of a choral society benefitting socially (87%) and emotionally (75%). Physically, playing piano has been shown to exercise the heart as much as a brisk walk (Parr, 1985) and singing supports the immune system by increasing salivary immunoglobulin production (Clift et al., 2008). Overall, we appear to perceive musical instrument learning (MIL) as providing benefits such as good health, improved quality of life and mental well-being (Hallam, 2010).

The hypothesis of the current study is that the group spending more time learning musical instruments will benefit more in measures of emotional and behavioural well-being than those who spend less time on this activity.

Methodology and measurement

This study took place over one academic year with Time 1 occurring in September 2013 and Time 2 observations in June 2014 (N=38). The mean age at T1 was 93 months (SD 5.54) with 21 female and 17 males, 22 attending state schools and 16 attending independent schools. The mean IQ was 106 (SD 13.77; Range 74-133). Twenty participants were classed as having more than one hour of musical learning (a mixture of instruments) per week (the 'More' group), whilst 18 received less than this (the 'Less' group).

Parents and teachers completed the Behavioural Assessment System for Children (BASC-II; Reynolds & Kamphaus, 2004). Additionally, parents completed a *proforma* providing information with regard to the number of hours their child spent doing activities classified as musical, physical and leisure, both in and out of school. The BASC-II contains descriptors of behaviour that the respondent rates on a four-point scale of frequency (Never, Sometimes, Often and Almost Always) and takes 10 to 20 minutes to complete. The clinical scales include aggression, anxiety, attention problems, atypicality, conduct problems, depression, hyperactivity, learning problems, somatisation and withdrawal. The adaptive scales include activities of daily living, adaptability, functional communication, leadership, social skills and study skills.

Results

For the teacher ratings, Figure 1 shows that time spent learning a musical instrument seems to have a positive impact on well-being, with the More MIL group showing a higher level of resilience on these measures, in comparison to the Less MIL group, with overall lower scores on externalising problems, internalising problems, school problems, overall behavioural problems, anxiety and somatisation and a higher score on adaptive skills. However, these group differences are not statistically significant.

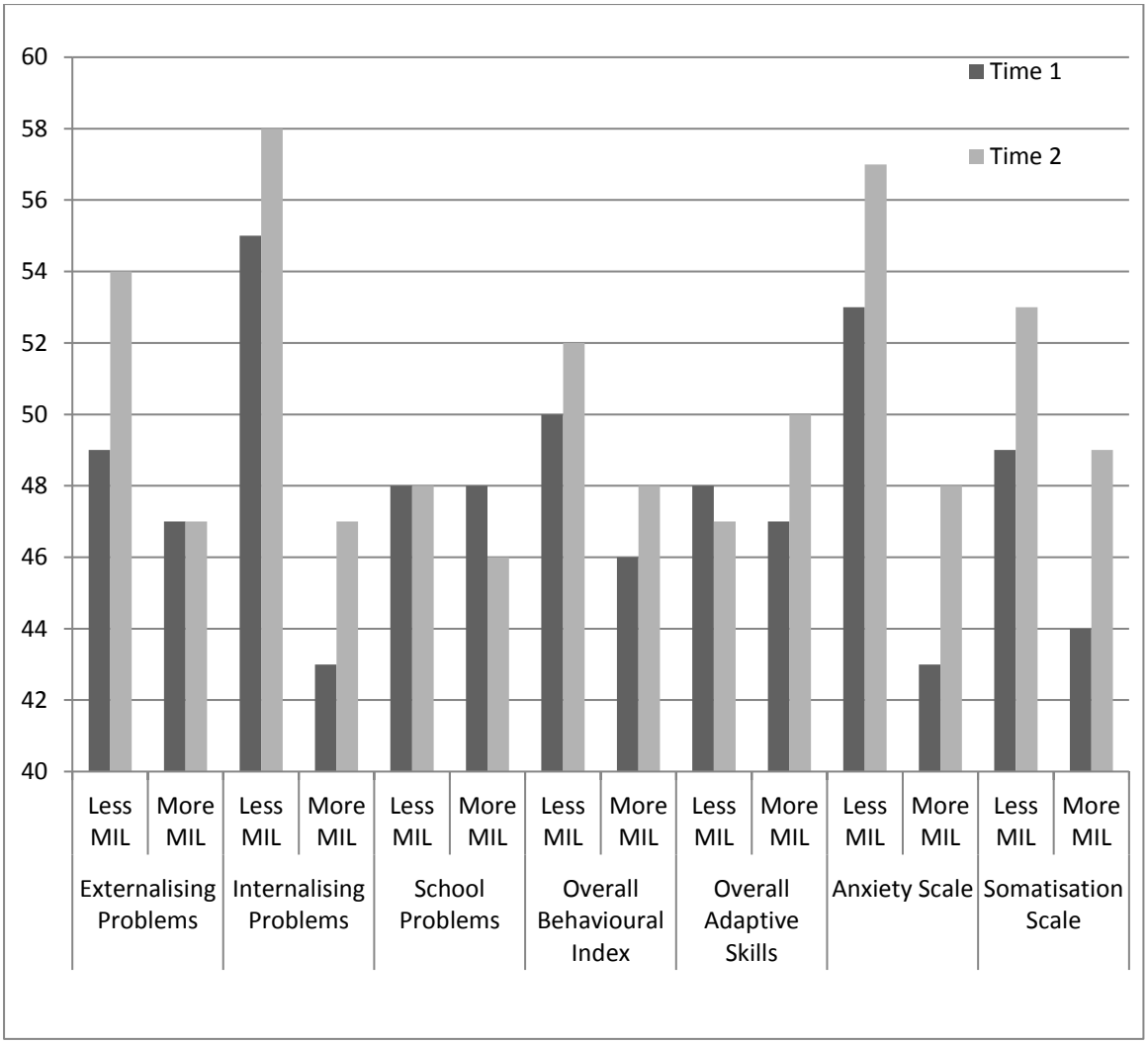

Figure 1. Teacher ratings for BASC composites

Nevertheless, there are some interesting significant findings when looking at the effect of hours per week involved in musical activity, physical activity and leisure activity on teacher-reported changes in well-being over time. There is a significant disordinal interaction between time and MHpW Musical Activity on the Overall Behavioural Symptoms Index (BSI), $F(4,4)=21.037$, $p=.006$: those who were musically active for 2 or 3 hours reduced their overall BSI score; those who were described as either doing no musical activities or 4 hours worth increased their scores; whilst those reported as doing either 1, 5 or 6 hours showed no change. There is a significant disordinal interaction between time and MHpW Musical Activity on teacher-reported Externalising Problems (EP), $F(4,4)=51.685$, $p=.001$: those doing 0,1 or 4 hours of musical activity showed an increase in EP scores; those doing 2 or 6 hours showed a reduction in EP scores; and those doing 3 or 5 hours showed no change. There is also a significant disordinal interaction between time and MHpW Leisure Activity on teacher-reported EP scores, $F(4,4)=21.630$, $p=.006$: those doing 0 or 3 hours of leisure activity showed no change; those doing 5 hours showed a decrease; and those doing 1, 2, 4 or 6 hours showed an increase. There is no correlation between the number of hours spent doing musical and leisure activities. There was a significant disordinal interaction between time and MHpW Physical Activity on teacher-reported Internalising Problems (IP), $F(3,4)=16.354$, $p=.010$: those doing 2, 3 or 8 hours of physical activity increased their IP scores; those doing 4 or 5 hours remained stable; and those doing 6 or 11 hours reduced their IP scores. There is also a significant disordinal interaction between time and MHpW Musical Activity on teacher-reported IP scores, $F(4,4)=12.963$,

p=.015: those doing 0, 1, 4, 5 or 6 hours of musical activity per week increased their IP scores; whilst those doing 2 or 3 hours per week reduced their IP scores.

Parent ratings (see Figure 2), reflected the findings from teacher reports that time spent learning a musical instrument appears to have a positive impact on well-being, with the More MIL group showing overall lower scores on externalising problems, conduct problems, hyperactivity, aggression, and attention problems.

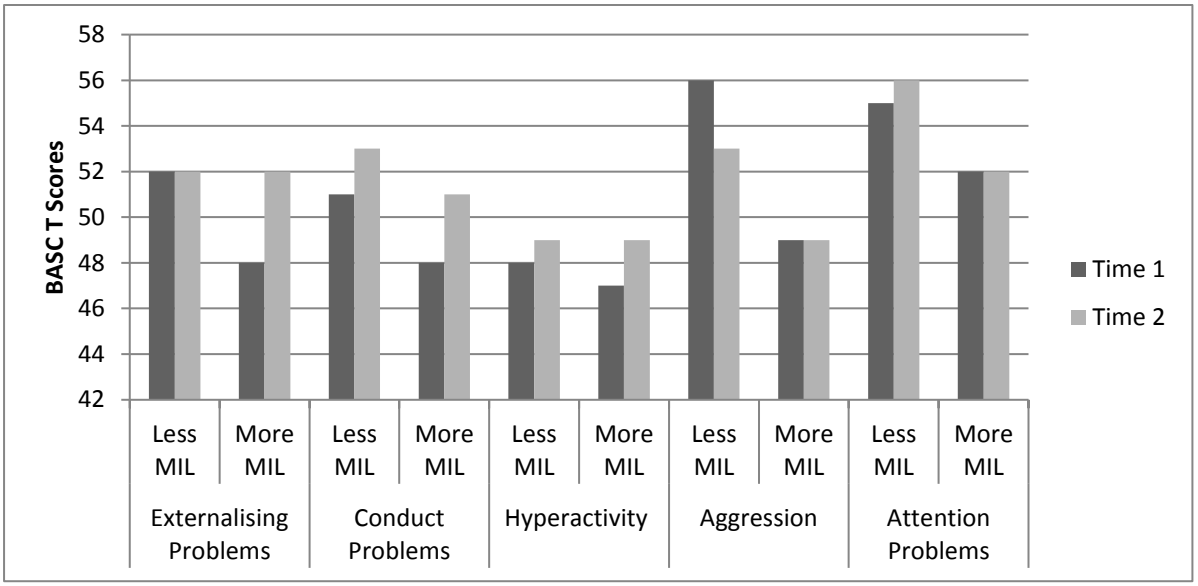

Figure 2. Parent ratings for BASC composites and scales

Again, there are some interesting significant findings when looking at the effect of hours per week involved in musical activity, physical activity and leisure activity on parent-reported changes in well-being over time. A significant disordinal interaction was found between time and MHpW Physical Activity on parent-reported Externalising Problems score, $F(3,4)=30.775$, $p=.009$: those doing 2, 3 or 11 hours of physical activity increased their EP scores; those doing 6 hours showed no change; and those doing 4, 5 or 8 hours reduced their EP scores. A significant disordinal interaction was also found between time and MHpW Musical Activity on parent-reported EP scores, $F(4,4)=24.772$, $p=.012$: those doing 1 or 5 hours of musical activity reduced their EP score; those doing 3 or 4 hours showed no change; and those doing 0, 2 or 6 hours showed an increase in EP scores. There is no correlation between the number of hours spent doing musical and physical activities. The only other scale affected by musical or physical activity was Hyperactivity. There is a significant disordinal interaction between time and MHpW Physical Activity on parent-reported Hyperactivity, $F(3,3)=39.339$, $p=.007$: those doing 2,3, 6 or 11 hours of physical activity increased their Hyperactivity scores; those doing 5 hours showed no change; and those doing 4 or 8 hours showed a reduction. There is also a significant disordinal interaction between time and MHpW Musical Activity on Hyperactivity, $F(4,3)=27.325$, $p=.011$: those doing 3 or 5 hours per week of musical activity show no change; and those doing 0, 1, 2, 4 or 6 hours increase in Hyperactivity.

Conclusions

This pilot exploration of the BASC-II as a measure of well-being of children learning musical instruments used innovative analytical techniques which compared the number of hours attributed to musical, physical and leisure activities in an attempt to present a picture which reflects the way in which children spend their time and how this

impacts on well-being. Our evidence provides a heuristic approach, questioning presumptions of dichotomous variables and presents coded controls as comparable conditions in order to investigate the nature of interactions. The evidence presented here suggests that time spent learning musical instruments has as much impact on some aspects of well-being as physical activity, and far more than other aspects of leisure activities. However, the results also suggest that we cannot afford presumptions of a linear effect on affect, as the number of hours which appear to reduce or increase emotional and behavioural resilience varies at an individual level. Further portrait profile analyses will be required in order to identify the nature of these relationships.

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