

# Choosing to study music in high school: Teacher support, psychological needs satisfaction, and elective music intentions

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## Abstract

High school students do not value music education highly, nor do they see it as a useful part of their academic pathways. When music becomes an elective subject, low enrolment in elective classes is seen as a challenge for music educators. This study aimed to further investigate this issue by examining the motivational climate of the music classroom, including the perceptions of the music teacher, in the development of student motivation for music. It also examined how these motivational factors influenced students' intentions to take music as an elective subject. A hypothesized model based on self-determination theory was tested using structural equation modeling (SEM), based on survey data from  $N = 395$  students from 11 schools. The hypothesized model fit the data well. Students' basic psychological needs fulfillment was predicted by the perceived needs-supportive practices of their teachers. These in turn were predictive of students' elective intentions. Using multi-group SEM analyses, findings were invariant across gender, school type, year at school, and socio-economic status, and the role of prior music learning was examined. The results indicate that an effective target for increasing students' motivation and value for music at school may be the motivational climate of the music classroom.

## Keywords

*self-determination theory, positive psychology, value, music education, psychological needs*

For adolescents in today's society, music is a culmination of interactions with community, culture, and technology (Wallerstedt & Lindgren, 2016). Music is strongly valued by people in this stage of life, who use it to build their personal and cultural identity (Evans & McPherson, 2017; Lamont, Hargreaves, Marshall, & Tarrant, 2003; Morinville, Miranda, & Gaudreau, 2013). In stark contrast to this, music in the practice of formal education settings (e.g., the high school music classroom) is generally not of value to adolescents and is consistently valued less than

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other school subjects (McPherson & Hendricks, 2010; McPherson & O'Neill, 2010; McPherson, Osborne, Barrett, Davidson, & Faulkner, 2015). Even though music may play a significant role in adolescents' social lives, these students are not always able to meaningfully justify the inclusion of music education in their academic pathways.

In most education systems, music is a subject that students are required to attend classes for, up to a certain year level. Beyond this, students are able to decide whether to continue with music as a school subject or otherwise end their music education at school. By looking at this transition from compulsory music classes to elective music classes, it is clear that the students' value of and attitudes toward different areas of study are vital to their subject selection. Low value for music in school and low uptake of elective music classes has been identified as an issue with a global scale (Lamont et al., 2003; Lamont & Maton, 2008; McPherson & Hendricks, 2010; McPherson et al., 2015; O'Neill, 2012). It is therefore worth inquiring as to where and how values for music education are formed.

Previous research suggests that there are many factors that impact on students' elective choices, including parents, peers, teachers, and the culture of the school (Adderley, Kennedy, & Berz, 2003; Evans, McPherson, & Davidson, 2012; McEwan, 2013; McPherson, 2009; Waters, McPherson, & Schubert, 2014). Most recently, Freer and Evans (2017) suggested that the motivational climate of the music classroom also plays a significant role in the formation of intentions to take music as an elective. The aim of the current study therefore was to further examine the effect of the motivational climate of the classroom on students' intentions to choose music as a school subject. The following sections review research within this context to date. We then outline a theoretical approach and an associated hypothesized model that is the central focus of the present study.

### *Value and music elective choice*

Previous research on the selection of music as an elective subject points to the idea that music is generally not considered favorably in this decision. Waters et al. (2014) compared the differences between the intended uptake of elective music and elective physical education (PE). Whereas 42.7% of the sample selected PE, only 4.8% selected music. There were no discernible differences in reasons facilitating the choice, but there were clear differences in reasons to reject the choice of music as a subject: music was rated lower in interest, importance, and competence beliefs, and because the students liked their music teacher less (Waters et al., 2014). The students in McEwan's (2013) study referenced the negative value of music held by their parents (who perceived it as not useful) and by the school culture more generally (where sport was much more highly regarded) as having significant influence over their elective choices (McEwan, 2013; McPherson, 2009). Perceived ability is also a significant issue in current research on music in high school (McPherson et al., 2015; McPherson & O'Neill, 2010). Lamont and Maton (2008) suggested that as school progresses, students increasingly perceived that elective music was for "elite" students and believed that they did not possess the skills required to study music at the elective level. Finally, students generally do not see music as a subject that will have much purpose in their future academic pathways (McPherson et al., 2015; McPherson & Hendricks, 2010; McPherson & O'Neill, 2010) and this has been shown as significant in selecting (or rather not selecting) music as an elective subject (Lamont et al., 2003; Waters et al., 2014).

These studies make it clear that music is undervalued as a school subject: students believe it is not interesting, enjoyable, or useful for their future academic pathways or lives, and they also lack belief that they could attain competence in the domain. Furthermore, this has been confirmed in an international consensus (McPherson & O'Neill, 2010). However, little is known

about how students adopt these values in the first place, besides that they are influenced by parental or school milieu. Most recently, Freer and Evans (2017) tested a model that examined psychological needs as part of the process involved in students' elective subject intentions. Value was shown to be an important predictor of intentions to choose music and the results also indicated that psychological needs satisfaction predicted this sense of value. This also confirmed the findings of previous studies on instrumental drop-out (e.g., Evans et al., 2012) and university-level music career intentions (e.g., Bonneville-Roussy, Evans, Verner-Filion, & Vallerand, 2017) that implicated psychological needs satisfaction in value-based choices.

The association between low valuing of music and low uptake of music as a school subject is therefore well-established. Although more recent research has begun to look closely at the means by which such values are formed (particularly in self-determination theory [SDT]; see Conceptual Framework), a common limitation is that they have been conducted in a single school context (e.g., Freer & Evans, 2017; McEwan, 2013; Waters et al., 2014).

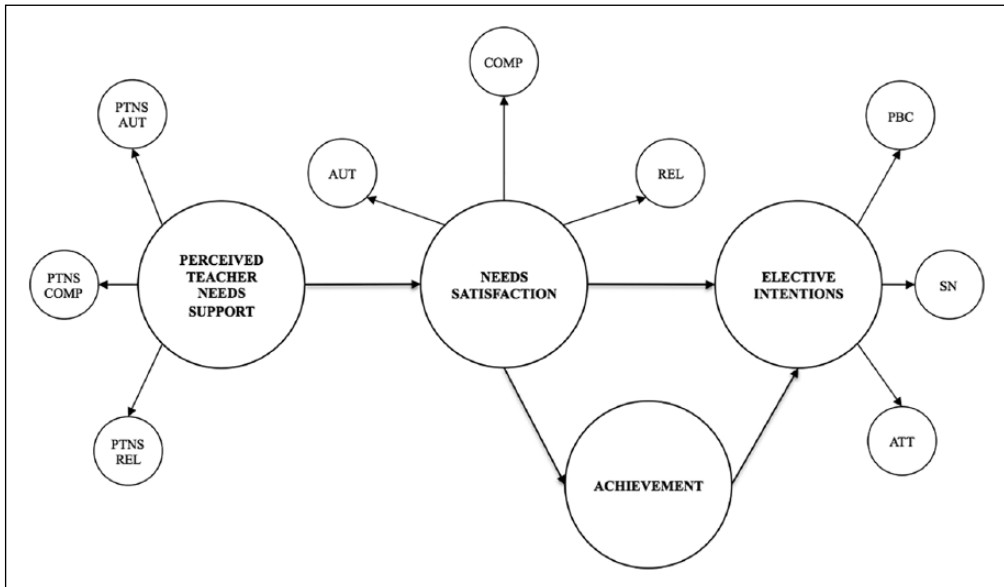
### *Conceptual framework*

The current study is grounded in SDT—a framework that is underpinned by understanding human development. The theory states that all people have three psychological needs that are essential to psychological growth and well-being, engagement, and the integration of social norms and values into an individual's sense of self (Deci & Ryan, 2000, 2008; Ryan & Deci, 2017). From the SDT perspective, it is the social environment that determines the extent to which psychological needs are satisfied or frustrated.

Satisfaction of psychological needs leads to the internalization of motivation and values from the social environment (Ryan & Deci, 2017). A person will thrive in an environment that provides needs satisfaction and will naturally align their personal values with those of the environment. Psychological needs satisfaction therefore develops a higher quality motivation (autonomous motivation), characterized by persistence, self-direction, and an internal drive for personally rewarding activities and opportunities for growth (Deci, Ryan, Schultz, & Niemiec, 2015; Ryan & Deci, 2017). In contrast, when an individual is placed in an environment where the frustration of psychological needs occurs, the quality of a person's motivation is diminished (controlled motivation). In such environments, psychological growth and well-being is limited because they are unable to successfully integrate the social norms of the environment and will therefore lack a personal drive to remain in such environments. They will often be motivated by external rewards and contingencies, rather than interest and enjoyment, because the environment does not align with their own personal values (Ryan & Deci, 2017). The social environment and consequent quality of motivation is therefore important for understanding a person's relative persistence in, or elimination of, certain activities.

The current study is well aligned with these tenets of SDT. It is an ideal framework through which to examine how the music classroom environment can satisfy students' psychological needs and the relative impact that this has on students' intentions to pursue further music learning as an elective in the following year. SDT is also advantageous because it is a broad theory of the mechanisms of human motivation. Although many previous studies in music education have examined individual motivational constructs (e.g., self-efficacy, expectations and values, attributions), using a broader conceptual framework like SDT makes the interpretation of the results easier to align with the underlying mechanisms of human motivation and with research on human motivation in other domains.

Another important aspect of this theory is that the experience of an environment is unique to each person based on their perception of certain cues and previously conceived beliefs



**Figure 1.** Hypothesized model.

surrounding that given context (Ryan & Deci, 2017). For the current study, this provides a secure basis for understanding how students perceive the psychological cues that are provided by their teachers and the potential impact of background factors that may also lead to differences in psychological needs satisfaction and elective intentions.

The SDT framework has been applied to research on music in high schools (Evans et al., 2012; Evans & Liu, 2019; Freer & Evans, 2017; Macintyre, Schnare, & Ross, 2018; Schatt, 2018) and university students (e.g., Bonneville-Roussy et al., 2017; Evans & Bonneville-Roussy, 2016) and seems appropriate for examining the problem of students' motivation to continue studying music when it becomes a choice (Evans, 2015).

### *Aims and hypotheses*

The principal aim of the current study was to test a hypothesized structural model (Figure 1) of psychological needs satisfaction and intentions to study music in high school. Alongside psychological needs satisfaction, elective intentions are predicted by achievement, as an alternative potential explanation for the internalization of the value of learning music. We also examined the role of teacher-provided psychological needs support. The central hypotheses are as follows:

1. Intentions to study music as an elective subject will be positively predicted by psychological needs satisfaction in the music classroom and by music achievement.
2. Psychological needs satisfaction will be positively predicted by how students perceive their teachers as actively supporting their psychological needs.

A number of socio-demographic factors (gender, year at school, socio-economic status [SES], school type, and prior music learning) have also been included as part of the analysis, with the

aim of understanding the strength of the above hypotheses when different groups in the population are taken into account.

## Method

### *Context of the study*

This study was conducted in the state of New South Wales (NSW), Australia. In Australian schools, the curriculum music subject provides general music learning, based on performing, composing, and listening strategies (ACARA, 2016). In contrast to other countries (e.g., the United States; McPherson & Hendricks, 2010), ensembles such as orchestra, band, or choir in NSW are generally considered extra-curricular activities. In NSW, music is a compulsory subject from Kindergarten to Year 6 (primary school) as well as Years 7 and 8 (first 2 years of high school). From Year 9 onward, students must choose music as one of their subjects to study or otherwise discontinue their music learning at school. It is this transition from compulsory to elective classes in high school which is under study here.

### *Participants and procedure*

Prior to any data collection or analysis, the procedure and survey instrument were approved by both the university ethics committee as well as the NSW education authority. Permission for the study to be carried out in each school was obtained from the school's principal, and parental/guardian consent was obtained for the individual students. Schools were recruited through purposive sampling to align with the aims and methods of the study. Criteria for school involvement in the study included the provision of mandatory music classes across Year 7 and Year 8 and provision of an elective music course in Years 9 and 10. A range of government and independent schools and a range of socio-economic distribution ensured representation of diversity and enabled analysis of the influence these factors had on student choices.

The total number of respondents for this study was 403 students. Eight cases were removed from the analysis due to large amounts of missing data or repeating item scores across all or most of the survey. Thus, the final number of participants was  $N = 395$ , gathered from 11 schools across the greater Sydney region of NSW. The sample was comprised of 61% female students, 38% male students, and 1% identified as other. The sample was inclusive of students in Year 7 ( $n = 247$ ; 62.5%) and Year 8 ( $n = 148$ , 37.5%), from both government ( $n = 217$ ; 54.9%) and independent ( $n = 178$ ; 45.1%) schools. On average, the students represented a fairly moderate SES background (62.82 out of 100; McMillan, Beavis, & Jones, 2009), as measured by the highest parent or guardian occupation.

Students completed a survey during Term 2 (approximately half way through the school year and prior to the time when students in Year 8 choose their elective subjects for Year 9). Music teachers were asked to supervise their students while they completed the survey during class time, providing assistance to students in understanding the questions if required. In addition, teachers were asked to provide a half-yearly music grade for each student who completed the survey.

### *Measures*

A confirmatory factor analysis (CFA) of each factor structure was performed prior to analysis. The results are described for each of the measures below and are summarized in Table 1.

**Table 1.** Confirmatory factor analysis results.

Scale	RMSEA [90% CI]	CFI	TLI	Factor loading onto the higher-order factor	Items	Item loadings on to the primary factors
Needs Satisfaction	.07 [.06, .09]	.91	.88			
Autonomy				0.83	4	.44–.69
Competence				0.90	4	.65–.76
Relatedness				0.71	4	.60–.78
Elective Intentions	.05 [.03, .07]	.98	.98			
Attitude				0.88	5	.56–.90
Subjective norm				0.90	3	.75–.90
PBC				0.98	2	.75–.83
PTNS—Full Scale	.07 [.06, .08]	.94	.93			
PTNS-A				1.03	6	.56–.97
PTNS-C				0.95	6	.71–.86
PTNS-R				0.98	5	.70–.88

Note. RMSEA: root mean square error of approximation; CI: confidence interval; CFI: comparative fit index; TLI: Tucker–Lewis index; PBC: perceived behavioral control; PTNS: perceived teacher needs support; PTNS-A: perceived autonomy support; PTNS-C: perceived competence; PTNS-R: relatedness.

**Needs satisfaction.** Students were assessed on their relative needs satisfaction in the music classroom, measured with the Basic Psychological Needs Satisfaction and Frustration Scale (BPNSFS; Chen et al., 2015). The 12-item subscale relating to the satisfaction of needs was used, answered under the stem “In my high school classroom . . .” Items were rated with agreement along a 7-point Likert-type scale from *disagree* to *agree*. Four items each were used to measure the three psychological needs: autonomy (e.g., “I feel a sense of freedom and choice”;  $\alpha = .67$ ), competence (e.g., “I feel confident that I can do things well”;  $\alpha = .80$ ), and relatedness (e.g., “I feel happy with the people I spend time with”;  $\alpha = .79$ ). The needs satisfaction subscale was reliable within the current data ( $\alpha = .76$ ). A higher-order CFA confirmed the structure, root mean square error approximation (RMSEA) = .07, 90% confidence interval (CI) [.06, .09], comparative fit index (CFI) = .91 and Tucker–Lewis index (TLI) = .88, including residual correlations of two autonomy items (“I feel that my decisions reflect what I really want” and “I feel my choices express who I really am”).

**Elective intentions.** Previous research has examined elective intentions in various ways. Quantitative research (e.g., Bonneville-Roussy et al., 2017; Freer & Evans, 2017) used a small number of items to assess whether students wanted to continue with studying music if given the choice. However, these measures were limited with respect to the multidimensionality and complexity of behavioral intentions. We therefore sought to address this issue by using the theory of planned behavior (Ajzen, 1991; Ajzen & Fishbein, 1980) to operationalize the measurement of elective intentions. This theory defines intentions as being measured by subjective norms, perceived behavioral control (PBC), and attitudes toward a given activity. Subjective norms were measured with three items (e.g., “Most people whose opinion I value would approve of me taking music as

an elective subject";  $\alpha = .85$ ), and three items were also used for PBC (e.g., "I am confident that if I wanted to, I could take music as an elective subject";  $\alpha = .77$ ), both under the stem "For Year 9 . . ." and rated on a Likert-type scale from *disagree* to *agree*. Attitude was assessed using five semantic differential responses under the stem "For me, taking music as one of my elective subjects in Year 9 would be . . ." (e.g., *bad* to *good*; *boring* to *interesting*; *difficult* to *easy*;  $\alpha = .93$ ). The elective intentions factor was indicated by subjective norms, PBC, and attitudes, and was found to be reliably measured for this study ( $\alpha = .89$ ). The higher-order structure was confirmed with a CFA (RMSEA = .05, 90% CI [.03, .07], CFI = .98 and TLI = .98). One PBC item was removed due to a very low factor loading (.14), and the residuals of two attitude items were correlated based on modification indices ("Boring—Interesting" and "Unenjoyable—Enjoyable").

**Perceived teacher needs support.** Three different subscales were used to measure students' perceived teacher needs support (PTNS). These were all answered using a 7-point Likert-type scale from *disagree* to *agree*, under the stem "In my high school music classes . . ." To assess perceived autonomy support (PTNS-A), the shortened version of the Learning Climate Questionnaire was used, consisting of six items (e.g., "My teacher provides me with choices and options";  $\alpha = .88$ ). Perceived competence (PTNS-C) and relatedness (PTNS-R) support items were developed in consideration of the specific strategies in current literature aimed at helping teachers increase and optimize their students' sense of competence and relatedness within a classroom environment (e.g., Evans, 2015; Evans et al., 2012; Jang, Reeve, & Deci, 2010; Niemiec & Ryan, 2009; Renwick & Reeve, 2012; Standage, Duda, & Ntoumanis, 2005). Both scales were subjected to an exploratory factor analysis (EFA). The PTNS-C subscale was reduced from eight items to six (e.g., "My teacher's answers are clear") with factor loadings ranging from .74 to .92, and the subscale achieved acceptable reliability ( $\alpha = .92$ ). The PTNS-R subscale retained all original five items (e.g., "I feel accepted by my teacher"). The factor loadings ranged from .71 to .83, and also achieved acceptable reliability ( $\alpha = .89$ ). The final list of items for PTNS-C and PTNS-R is shown in Appendix 1.

The CFA of PTNS confirmed the hypothesized higher-order structure (RMSEA = .07, 90% CI [.06, .08], CFI = .94, and TLI = .93.), including the residual correlations of two PTNS-R items ("My teacher likes me" and "I feel accepted by my teacher"), and two PTNS-C items ("My teacher gives me feedback about my work to help me learn" and "My teacher helps me to improve"), based on modification indices.

**Achievement.** Teachers were asked to provide a current grade for each student who completed the survey. To represent students' relative achievement in music, these were coded in five levels: A (5), B (4), C (3), D (2), and E (1).

**SES.** The Australian Socioeconomic Index (AUSEI06) was used to determine students' SES. This provides a score out of 100 to represent relative wealth, with higher scores relating to higher wealth (McMillan et al., 2009). Participants were asked to provide the occupation of both parents or guardians, which were then coded using the AUSEI06 at the unit-level. The highest score of the two occupations was used for analysis. For the purposes of invariance testing in the current study, participants were placed in either an "above average" or "below average" group based on this study's average student SES score (62.82).

**Prior music learning.** Participants reported if they had received, or were currently receiving, formal lessons for an instrument or voice, and how many years they had been receiving lessons. Based on their years of lessons, participants were placed into a "less experienced" group (1 year or less of lessons) or a "more experienced" group (more than 1 year of lessons).

## Analytical approach

The first step in analysis for the current study was to perform a CFA including all measures that were to be used in the structural model. The CFA was used to examine the internal structure of the measures and the correlations between factors in the hypothesized model. Following this, the full structural equation model (SEM) was examined. The criteria used to determine acceptable model fit of the CFA and SEM models included CFI and TLI above .95 (Byrne, 2012; Hu & Bentler, 1998); and the RMSEA and the standardized root mean square residual (SRMR) at below .05 (good fit), below .08 (reasonable fit), and at .10 (mediocre fit). The chi-square ( $\chi^2$ ) statistic of significance is also provided, though this was not used in the determination of model fit due to the influence of sample size and non-normality on the reliability of this value (Byrne, 2012; Schumacker & Lomax, 2010).

Multi-group invariance tests were then performed to determine the extent to which the structural model was similar across different groups in the data. The Jöreskog tradition (1971; as cited in Byrne, 2004, 2012) was followed, completing a configural model (testing item-factor relationships), followed by the restriction of factor loadings, factor covariances, residual variances, and structural paths in a successive fashion (Byrne, 2004, 2012; Chen, Sousa, & West, 2005). The invariance of each model was determined by comparing the RMSEA and CFI statistics to the configural model, with an acceptable difference in CFI deemed at less than or equal to .01, and for RMSEA, less than or equal to .015 (Bovaird & Koziol, 2012; Chen, 2007).

## Results

### Descriptive statistics

The mean, standard deviation, skewness, and kurtosis statistics for all continuous variables used in the current study are listed in Table 2. On average, students report needs satisfaction at the high end of the scale, moderate elective intentions, and PTNS in the high end of the scale. The mean number of years of learning an instrument was 1.9 years. The skewness and kurtosis values were mostly within an acceptable range of  $\pm 2$ . However, the relatedness satisfaction exceeded this cut-off point, indicating that the data may not be normally distributed for this variable. Therefore, the maximum likelihood with robustness (MLR) command in Mplus was included in all subsequent analyses to account for any potential bias that stemmed from non-normally distributed variables (Byrne, 2012; Muthén & Muthén, 2017). In addition, the Mahalanobis Distance was calculated at this stage and indicated that 22 cases be removed from the data due to multivariate non-normality.

### CFA

A CFA of all scales, as well as the achievement variable (single-item factor), was performed and returned an excellent model fit indicating that the data and factor structures are conducive to SEM: RMSEA = .051, 90% CI [.047, .055], CFI = .92, TLI = .92. Both the PTNS-A and PTNS-R were identified as Heywood cases, with higher-order factor loadings greater than 1.00 and negative residual variances. Table 3 shows the correlations for all factors used in the model, including higher-order and lower-order factors. Correlations between needs satisfaction, elective intentions, and PTNS factors were substantial, significant ( $p < .001$ ), and in the expected direction. Correlations with achievement were smaller and indicated that although achievement is related to needs satisfaction,  $r = .16$ ,  $p = .039$ , and elective intentions,  $r = .27$ ,  $p < .001$ ,



**Table 2.** Descriptive statistics.

Scale	<i>M</i>	<i>SD</i>	Skewness	Kurtosis	$\alpha$
Needs Satisfaction	5.37	0.93	-0.81	0.73	.76
Autonomy	4.76	1.17	-0.36	-0.07	.67
Competence	5.37	1.17	-0.82	0.41	.80
Relatedness	5.98	1.03	-1.50	2.72	.79
Elective Intentions	3.55	1.67	0.32	-0.87	.89
Attitude	3.75	1.75	0.17	-0.98	.93
Subjective norm	3.09	1.85	0.61	-0.77	.85
PBC	3.80	1.94	0.09	-1.16	.77
PTNS	5.02	1.27	-0.47	-0.56	.94
PTNS-A	4.76	1.32	-0.33	-0.63	.88
PTNS-C	5.29	1.38	-0.71	-0.24	.92
PTNS-R	5.03	1.34	-0.44	-0.67	.89
SES	62.82	24.43	-0.64	-0.65	-
Years prior music learning	1.90	2.60	1.35	1.05	-

Note. PBC: perceived behavioral control; PTNS: perceived teacher needs support; PTNS-A: perceived autonomy support; PTNS-C: perceived competence; PTNS-R: relatedness; SES: socio-economic status.

**Table 3.** Correlations.

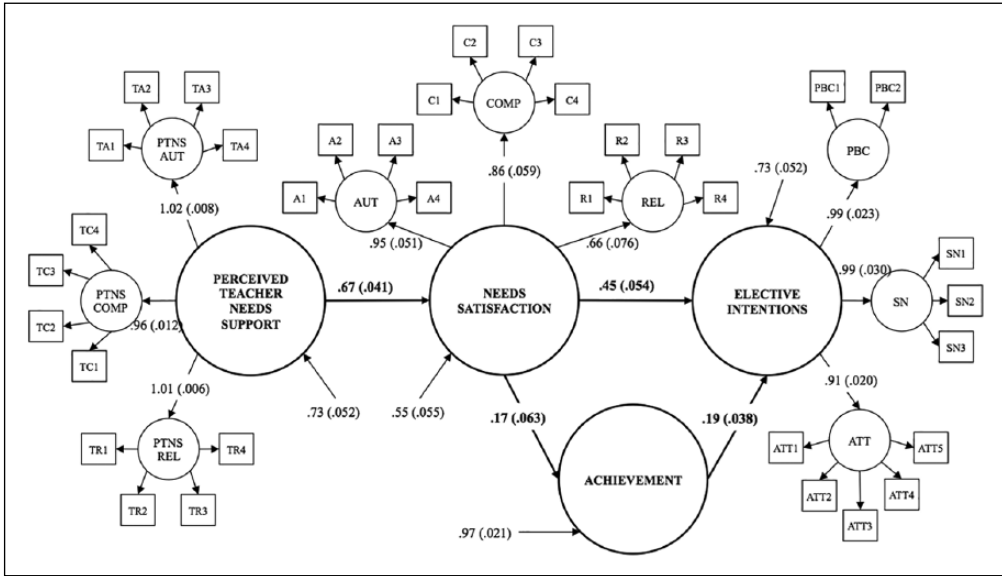
	1	2	3	4	5	6	7	8	9	10	11	12
1. Needs												
2. Autonomy	.94**											
3. Competence	.88**	.82**										
4. Relatedness	.70**	.64**	.60**									
5. Intention	.44**	.41**	.39**	.30**								
6. Attitude	.40**	.38**	.35**	.27**	.91**							
7. Subjective norm	.40**	.38**	.35**	.28**	.92**	.83**						
8. Perceived behavioral control	.44**	.41**	.38**	.30**	.99**	.90**	.91**					
9. Perceived teacher needs support	.65**	.61**	.57**	.44**	.41**	.37**	.37**	.40**				
10. PTNS-A	.66**	.62**	.58**	.45**	.42**	.38**	.38**	.41**	1.02**			
11. PTNS-C	.62**	.58**	.55**	.43**	.39**	.36**	.36**	.39**	.96**	.99**		
12. PTNS-R	.65**	.61**	.57**	.44**	.41**	.37**	.38**	.41**	1.00**	1.03**	.97**	
14. Grade	.16*	.15*	.14	.11*	.27**	.24**	.25**	.27**	.13**	.14**	.13**	.13**

PTNS-A: perceived autonomy support; PTNS-C: perceived competence; PTNS-R: relatedness.

\*Significant at  $p < .05$

\*\*Significant at  $p < .001$

the structural paths may not be as strong as others in the model. It also appears that multicollinearity may exist between some of the lower-order factors within the PTNS and elective intentions scales with correlations greater than .90. However, this is contained within their higher-order structures and is assumed not to substantively affect the structural model which is the subject of subsequent analysis.



**Figure 2.** Structural equation model. Note. Labels show standardized factor loadings and regression coefficients; figures in parentheses indicate standard errors.

**Structural equation model**

A SEM was performed based on the hypothesized model and showed a good model fit: RMSEA = .051, 90% CI [.047, .055], a CFI = .92, and a TLI = .92. Intention was positively and significantly predicted by needs satisfaction ( $\beta = .45, p < .001$ ) and also by achievement ( $\beta = .19, p < .001$ ). A total of 27% of variance in elective intentions was explained by needs satisfaction and achievement. The structural relationship from needs satisfaction to achievement was small, though still significant ( $\beta = .17, p = .007$ ). The largest path in this model was found from PTNS to needs satisfaction ( $\beta = .67, p < .001$ ). The extent to which students perceived active psychological needs support from their teacher explained 45% of general needs satisfaction in the music classroom. In addition, an indirect effect was tested from PTNS to elective intentions through the needs satisfaction construct. This path was found to be positive and significant ( $\beta = .50, p < .001$ ). The hypothesized model was confirmed (Figure 2).

**Multi-group analysis**

To ensure that the findings generalized across various groupings (gender, school type, year at school, SES, and prior music experience), multiple group testing was carried out. Due to the smaller sample sizes in each of the subgroups, a reduced model was to ensure that any potential strain on the model due to smaller group sizes was minimized. The reduced model was the same as the hypothesized model that was tested above, except that each lower-order factor was modeled as the mean score of all the items in that factor (i.e., using item parcels). This reduced version of the model was subjected to a single-group CFA and SEM to confirm that the goodness-of-fit and hypothesized relationships were held. This included one residual correlation between the competence and relatedness constructs, as suggested by the modification indices

(SDT's psychological needs are postulated as highly related constructs; Ryan & Deci, 2017). The fit statistics for the SEM of this final model were RMSEA = .08, 90% CI [.06, .10], CFI = .97, and TLI = .96.

The summaries of each invariance test can be seen in Table 4. Gender, school type, year at school, and SES all achieved invariance of the structural model. One exception to establishing invariance was observed when comparing less experienced students (1 year of prior music learning or less,  $n = 228$ ) with more experienced students (more than 1 year of prior music learning,  $n = 141$ ). The configural model produced an acceptable fit to the data— $\chi^2(63) = 155.670$ , RMSEA = .089, 90% CI [.072, .107]; CFI = .951—and the metric model was within the prescribed limits of change. However, the scalar model did not present an invariant model. The modification indices suggested that the source of invariance could be the elective intentions factor—participants in the less experienced group had stronger elective intentions than participants in the more experienced group—so this intercept was freed in the subsequent analysis. This still showed undesirable model fit and modification indices further suggested that the intercept of needs satisfaction be freed—the more experienced group reported higher levels of needs satisfaction than the less experienced group. This final scalar model with the intercepts of both elective intentions and needs satisfaction being freely estimated produced a model fit that was within acceptable limits of change from the configural model statistics. The next two models—full measurement and structural—were both confirmed. That is, the measures and structure of relationships was found to be invariant across the two groups once the differences in elective intentions and needs satisfaction was accounted for.

## Discussion

Previous research in the area of music education suggests that school students generally perceive music as low in value and relate this to a lack of enjoyment, interest, competence, and usefulness to their future (McPherson & O'Neill, 2010; McPherson et al., 2015). Yet where understanding is lacking is in how these values are formed, and the studies that have attempted to shed light on this have done so only in a limited capacity. Based on the conceptual framework of psychological needs and its implications for the internalization of social values (Ryan & Deci, 2017), the current study successfully found psychological needs satisfaction in the music classroom to be strong and significant in the formation of intentions to continue with music as a subject in high school. The results extend the findings in music, particularly in the area of SDT (Evans & Liu, 2017; Freer & Evans, 2017; Schatt, 2018) as well as SDT research in other subject areas (e.g., Cheon, Reeve, & Moon, 2012; Gucciardi & Jackson, 2015). The influence of psychological needs appeared to be generalizable across several important covariate factors: gender (males vs. females), school type (government vs. independent), year at school (Year 7 vs. Year 8), and SES (below average vs. above average). The findings here also carry important implications for music teachers as a crucial influence on students' elective choices and the way in which students with prior music learning interact with the music classroom.

### *Needs satisfaction and elective intentions*

The relationship from needs satisfaction to elective intentions was positive and strong. This indicates that students who experience higher levels of needs satisfaction in the music classroom are more likely to develop stronger intentions to take music as an elective subject. That is, when students feel that they engage in their music class with volition and choice, when they have opportunities to develop and exercise their musical competence, and when they

**Table 4.** Multi-group invariance test results.

Model	$\chi^2$	<i>df</i>	RMSEA [90% CI]	CFI	TLI	SRMR
Gender						
Configural	138.208	63	.081 [.062, .099]	.962	.945	.060
Metric (factor loadings)	143.562	69	.077 [.059, .094]	.962	.950	.062
Scalar (intercepts)	165.979	78	.078 [.062, .095]	.955	.948	.066
Full measurement (residuals)	179.070	87	.076 [.060, .092]	.953	.951	.092
Structural (correlations)	185.294	91	.075 [.060, .091]	.952	.952	.101
School type						
Configural	124.811	63	.073 [.054, .091]	.968	.955	.058
Metric (factor loadings)	136.406	69	.073 [.055, .090]	.966	.955	.066
Scalar (intercepts)	150.538	78	.071 [.054, .088]	.963	.957	.071
Full measurement (residuals)	155.616	87	.065 [.048, .082]	.965	.964	.093
Structural (correlations)	160.696	91	.064 [.048, .080]	.964	.965	.106
Year at school						
Configural	126.977	63	.074 [.055, .093]	.967	.952	.065
Metric (factor loadings)	133.809	69	.071 [.053, .089]	.966	.956	.073
Scalar (intercepts)	151.076	78	.071 [.054, .088]	.962	.956	.085
Full measurement (residuals)	156.186	87	.065 [.049, .082]	.964	.963	.088
Structural (correlations)	157.204	91	.063 [.046, .079]	.965	.966	.093
SES						
Configural	139.490	63	.084 [.065, .103]	.958	.939	.065
Metric (factor loadings)	143.640	69	.080 [.061, .098]	.959	.946	.067
Scalar (intercepts)	156.523	78	.077 [.059, .094]	.956	.950	.071
Full measurement (residuals)	167.530	87	.074 [.057, .090]	.955	.954	.085
Structural (correlations)	170.879	91	.072 [.055, .088]	.956	.956	.094
Years of prior music learning						
Configural	155.670	63	.089 [.072, .107]	.951	.930	.067
Metric (factor loadings)	163.667	69	.086 [.069, .103]	.950	.935	.071
Scalar (intercepts) <sup>a</sup>	173.575	76	.083 [.067, .100]	.948	.939	.069
Full measurement (residuals)	191.257	85	.082 [.067, .098]	.944	.941	.084
Structural (correlations)	196.612	89	.081 [.066, .096]	.943	.942	.092

Note. RMSEA: root mean square error of approximation; CI: confidence interval; CFI: comparative fit index; TLI: Tucker–Lewis index; SRMR: standardized root mean square residual; SES: socio-economic status.

<sup>a</sup>Invariance not established at this step. Results are for scalar model with intercepts freed for needs satisfaction and elective intentions.

feel connected with the teacher and their peers in the music classroom, they are more able to internalize their value of learning music in the school classroom, and thus to place importance on the music subject in their selection of elective choices for Year 9.

Compared with needs satisfaction, the prediction of elective intentions by achievement was relatively small. Although previous research implicated ability in subject selection (Bryan, Glynn, & Kittleson, 2011; Patrick, Care, & Ainley, 2011), the current study found this to be a small relationship when taking needs satisfaction into account. Given that needs satisfaction yielded a stronger effect on elective intentions than achievement did, this may indicate that when students are receiving optimal autonomy, competence, and relatedness support from their classroom environment, it has a stronger influence on their elective intentions than their achievement level.

Previous research suggested that psychological needs satisfaction would relate to higher achievement (Cheon & Reeve, 2013; Cheon et al., 2012; Taylor et al., 2014). The current study found a small relationship between needs satisfaction and achievement. Prior research had indicated that other student-level factors have a greater impact on achievement in the music classroom, such as prior music learning (McPherson & O'Neill, 2010; McPherson et al., 2015), upholding/avoiding parental (McPherson, 2009) and peer pressures (Evans et al., 2012; McEwan, 2013), many of which could be mediated by psychological needs satisfaction—an implication for further research on these issues.

### *Needs satisfaction and PTNS*

As well as examining the potential outcomes of psychological needs satisfaction, this study examined the role of the teacher as one of the potential sources of needs satisfaction. The results indicated that the students' perceptions of the way in which their teacher supported their psychological needs during classroom instruction and interaction predicted the students' needs satisfaction in the music classroom. Furthermore, the indirect relationship from PTNS to elective intentions, through needs satisfaction, indicates the significant role that teachers play in students' elective choices. Both these findings are well supported by SDT (Ryan & Deci, 2017) and have been strongly implied through many previous studies on high school PE classes (Barkoukis, Hagger, Lambropoulos, & Tsorbatzoudis, 2010; Cheon et al., 2012; Cheon & Reeve, 2015; Cheon, Reeve, & Song, 2016). Important implications for music educators are discussed in the following sections.

### *Socio-demographic factors*

All measurement and structural elements of the current study's model were found to be invariant across genders, year at school, school types, and SES backgrounds. This therefore points to the reliability of the model in being able to support students' motivation in the music classroom and increase the likelihood of elective music enrolments.

For gender, this particularly highlights that the music classroom may offer an environment that is capable of facilitating the well-being and motivation of all students, and is an area in which gender difference may be smaller compared with other subjects (e.g., PE classes that favor male students (Cheon & Reeve, 2015; Cheon et al., 2012; Haerens, Aelterman, Vansteenkiste, Soenens, & Van Petegem, 2015). The invariance of across students' year at school indicates that all students need to experience autonomy, competence, and relatedness as part of their learning, and this is having an effect on their elective intentions even in Year 7 when their actual decision is more than 12 months away. Finally, while it is acknowledged that school type and SES may result in differential treatment of music education (time, resource, availability), the findings here suggest that these factors do not necessarily impact on the students' ability to develop positive elective intentions when their psychological needs are optimally supported.

### *Prior music learning*

Elective intentions and needs satisfaction were found to significantly differ between students who had more or less than 2 years of experience. Despite evidence to suggest that prior experience would lead to higher value for music and would therefore be more likely to pursue music learning opportunities (McPherson et al., 2015; McPherson & Hendricks, 2010; McPherson &

O'Neill, 2010), the findings of the current study suggest that those with more experience were less likely to take music as an elective subject. While music may be important to these students, they are also likely to be high achievers in other academic areas (McPherson et al., 2015; McPherson & O'Neill, 2010) and may feel a pressure to select subjects that have more perceived utility value. That is, their low intentions for music may reflect a generally limited view of music in their academic future, rather than their high ability. An additional consideration here is that these students may feel the pressure from their peer group, or general school culture, where music is not compatible with the social image and identity development that is vitally important to adolescents (Evans & McPherson, 2017; McEwan, 2013; Waters et al., 2014). In SDT, the fulfillment of psychological needs is posited to help individuals to integrate social values with their sense of self. So, students who have prior experience in music learning, who have identified its importance, may develop integrated regulation for music learning as a reflection of their identity to the extent that they experience psychological needs fulfillment in music at school (see also Evans & McPherson, 2017).

Students with more prior music experience were found to have higher levels of needs satisfaction in the music classroom. This confirms the findings of Freer and Evans (2017) as it stands to reason that students with more years of learning an instrument would have developed a more autonomous motivation orientation toward music learning in general, allowing them to then derive greater needs satisfaction in the music classroom (Evans, 2016).

Nonetheless, once the group differences in needs satisfaction and elective intentions were accounted for, the structural paths in the model were found to be invariant. Thus, experienced students benefited no more or less than less experienced students from the teacher's provision of support and from their own psychological needs satisfaction.

## **Limitations and implications for future research**

The current study presents some limitations. First, the sampling method offered a reduced representation of the population with the implication that the results may not be generalizable. In addition, while a wide range of student SES backgrounds was desirable, the distribution in the current study was fairly moderate and represented mostly a middle range. Thus, although a range of SES and other demographics was observed in the study, future research may find it beneficial to explore the findings of the current study with a more representative sample.

Second, newly developed scales were included in the current study (PTNS-C and PTNS-R). While these scales achieved acceptable internal consistency and reliability, it is always desirable to complete further testing on items and scales that have not been previously validated. Issues of multicollinearity are also noted, as is the use of modification indices in the CFA process. For these reasons, confirmation of this study's findings is recommended.

Third, the study was cross-sectional. This means that the dimension of time is largely unaccounted for in the results. This is particularly important to note given the dynamic nature of the phenomena under investigation—the dynamic influence of needs satisfaction over time and its impact on students' internalization of values. Using a longitudinal method can enable the study of these processes over time, as well as establish stronger evidence for causality.

The current study's results also provide direction for future educational research. The importance of teacher support in the development of student motivation and elective choice has been firmly established here. A potential next step could be to test the effectiveness of autonomy-supportive intervention programs in this context and develop music-specific strategies for supporting students in the music classroom. Furthermore, the study theoretically adopted SDT as the conceptual approach. As a broad theory of human behavior, SDT

theorizes the fundamental processes that explain why people do what they do. There is a full range of any number of potential influences on students choosing to study music as an elective (e.g., peer relationships, achieving highly in music, and experiencing parental pressure) which are theorized to be mediated by SDT constructs (e.g., relatedness, competence, and autonomy-thwarting, respectively).

## Implications for teachers

This study has provided strong support for the relationship between needs satisfaction and elective intentions, regardless of gender, year at school, SES, and prior music learning. The reliance on stereotypes, particularly with regard to SES (e.g., that the socio-economics of children's households are a major determinant of their motivation for music) and school type (e.g., that independent schools are better equipped to motivate music students), does not seem to be implicated as a useful perspective on student motivation for music learning. It is also not uncommon for teachers to embark on campaigns for student engagement around the time they choose their elective subjects—including “fun” activities and highlighting the dimension of enjoyment in the music class in the hope that more students will then choose to continue (Evans et al., 2012). Such campaigns are likely to be ineffective (especially when students can see through the strategy). Rather, teachers are encouraged to focus on supporting students' psychological needs in all classroom interactions (Ryan & Deci, 2017). Indeed, activities that are more fundamentally fulfilling to students may assist students to more fully integrate music into their sense of identity (Evans & McPherson, 2017).

The support of autonomy lies in nurturing students' inner motivational resources. It takes into account the needs, preferences, and interests of the students in all classroom activities (Jang et al., 2010; Reeve & Halusic, 2009). As such, teacher strategies including non-controlling language, providing explanatory rationales, acknowledging students' feelings, and allowing an aspect of choice would help the student value the activities they are given and encourage a sense of autonomy (Evans, 2015; Niemiec & Ryan, 2009; Reeve & Halusic, 2009; Ryan & Deci, 2017).

Competence support relates to having ample opportunity to exercise and extend one's capabilities (Deci & Ryan, 2008). A students' sense of competence can be increased when lessons and activities are differentiated to ability levels, when students are provided with scaffolding and strategies for learning, and when teachers focus on progress and effort rather than the evaluation of ability (Evans, 2015; Evans et al., 2012; Jang et al., 2010; Niemiec & Ryan, 2009).

Satisfaction of relatedness comes through feeling a sense of belonging and this occurs in the classroom when students feel that they are respected, liked, and supported by both their teacher and their peers (Evans, 2015; Evans et al., 2012; Niemiec & Ryan, 2009). Many strategies for relatedness support will come through a general autonomy-supportive teaching style (Ryan & Deci, 2017)—when teachers bring students' feelings and perspectives into classroom activities and interactions, the student is more likely to feel that they belong in the classroom.

Teachers are also encouraged to discuss the elective choice with their students—understand their perspective and any pressures they may feel, and demystify any fears or misconceptions that the students may hold about pursuing music in the high school context (McPherson & O'Neill, 2010). In the design and delivery of music programs, the best practice may be a consistent emphasis on how learning activities support psychological needs. The current study has shown that the fulfillment of students' psychological needs leads to strong intentions to take music as an elective, regardless of background, age, or experience.

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## Appendix I

Items for Perceived Teacher Needs Support scale (described in Measures).

*Perceived Autonomy Support* (Learning Climate Questionnaire (LCQ); Williams & Deci, 1996)

My teacher provides me with choices and options

My teacher understands me

My teacher thinks I can do well

My teacher encourages me to ask questions

My teacher tries to understand my opinion before suggesting a new way

My teacher listens to how I like to do things

*Perceived Competence Support*

My teacher gives me activities that are challenging, but not too hard

My teacher helps me learn new skills

My teacher encourages me for putting in effort

With this teacher, I can do well

My teacher's instructions are clear

My teacher gives me feedback about my work to help me learn

*Perceived Relatedness Support*

My teacher likes me

I feel accepted by my teacher

My teacher respects me

My teacher supports me

I feel close to my teacher