

Article

Mastery Motivation, Mastery Pleasure, and Self-Concept in Singing of Students in Specialized and Non-Specialized Music Classes

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Abstract: This study aimed to investigate differences in mastery motivation (MM), mastery pleasure (MP), and self-concept (SC) in singing based on class type (specialized non-specialized music classes) and gender across four grades: 1, 3, 5, and 7. It also explored the relationships between students' demographic variables and the fundamental motivational factors in music education such as MM, MP, and SC. A survey questionnaire was administered to 586 elementary students in grades 1, 3, 5, and 7 in Hungary. The findings showed that the students from specialized music classes had higher MM, MP, and SC compared to those from non-specialized classes. Female students demonstrated higher MM, MP, and SC in signing across all grades, 1, 3, 5, and 7. Moreover, a negative correlation between grade and these factors showed that the younger students had higher MM, MP, and SC in singing than the older students. Demographic factors such as gender, grade, and class type, except for parental education, significantly influenced students' development in MM, MP, and SC in singing. This study highlights the importance of specialized music education and early engagement in developing MM, MP, and SC in singing, suggesting that appropriate approaches based on age and gender could enhance students' musical development.

Keywords: mastery motivation; mastery pleasure; self-concept; singing; music education



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1. Introduction

One of the most natural ways of making music is singing, which is both a creative and self-expressive activity. As an opportunity to experience the joy inherent in playing music, as well as a method of learning other important musical skills, vocal music activities are one of the most used forms of primary school singing and music education worldwide. This is why significant attention is generally paid to its possibilities for development and the exploration of factors that support its development. In the development of abilities, including singing (e.g., Berkowska & Dalla Bella, 2009; Hutchins et al., 2014), educational and environmental factors (e.g., Gudmundsdottir & Cohen, 2015; Rutkowski, 1996; Welch, 2006) as well as individual characteristics play a significant role. Additionally, many affective factors, such as mastery motivation (Janurik et al., 2023) and self-concept (e.g., Demorest et al., 2017; Pfordresher & Demorest, 2021), also contribute.

Our understanding of the relationship between mastery motivation (MM), mastery pleasure (MP), and self-concept (SC) is limited. Two previous studies emphasize the positive relationship between MM and SC in school performance among school-aged children with learning difficulties (Szenczi et al., 2018). Further research on music learning also revealed a strong relationship between MM and SC in singing in music education (Janurik et al., 2023). According to this, students' MM was most supported if they wanted their musical skills to improve and if they had previous positive experiences with singing.

A study focusing on MM, MP, and SC in singing is important in terms of gaining a more precise understanding of the factors influencing the development of school singing and the exploration of their connections. In this research, we therefore aimed to examine the grade- or age-related changes in MM, MP, and SC in singing as well as their correlations among students in the first, third, fifth, and seventh grades. The geographical context of this study is the elementary schools (especially their specialized and non-specialized music classes) in Hungary. We planned to employ a survey questionnaire to collect data from targeted participants to assess their MM, MP, and SC in singing.

2. Literature Review

2.1. Mastery Motivation and Mastery Pleasure

The starting point of the theory of mastery motivation (MM) is the concept of “intrinsic motivation”, which White (1959) describes as the basic driving force of effective interactions with the environment and curious, playful exploration. Later, Yarrow and his colleagues created the MM approach based on this concept (Yarrow et al., 1975). According to Barrett and Morgan's definition, it is a self-rewarding psychological force that prompts an individual to persevere in learning skills and solving tasks and problems that are at least moderately challenging (Barrett & Morgan, 2018; Morgan et al., 2017). The challenge thus plays an important role in the operation of learning motivation, which also distinguishes it from other motivational approaches; it works as long as the challenge exists until mastering takes place or we give up trying (Morgan et al., 1990). Therefore, the task represents an optimal challenge that the individual cannot solve in a short time, but at the same time, it is not so difficult that he can fail, nor is it so easy that they are no longer motivated (Barrett & Morgan, 2018). One of the key elements of the concept of mastery motivation is that the reward comes from within, from the success of learning. At the same time, the emotions experienced during and after solving the task, such as the joy, sadness, or anger accompanying the mastery, also play an important role in persistence or giving up (Barrett & Morgan, 1995). Along these lines, Morgan et al. (2017) separated the two main elements of MM, its instrumental and expressive components. According to the instrumental component, we can talk about cognitive, motor, and social mastery motives, depending on what activity and behavior the persistent attempt, as an observable feature, is related to. By the expressive component, we mean the emotional reactions that can be observed during learning and solving tasks and after completing or giving up the task.

MM is described in many areas of the literature as a key factor in personality development (e.g., Shonkoff & Phillips, 2000; Józsa & Morgan, 2014; Wang et al., 2011; Wang et al., 2017), as it determines cognitive (Hashmi et al., 2017; Józsa & Molnár, 2013), linguistic (Mokrova et al., 2013), social (Józsa & Barrett, 2018; Razza et al., 2015), and psychomotor (Wang, 2016) development, and is thus the basis of effective learning (Busch-Rossnagel & Morgan, 2013). Several studies support that MM is the best predictor of the development of cognitive abilities and that it plays at least as much a role in school success as intelligence (Busch-Rossnagel & Morgan, 2013; Józsa & Barrett, 2018; Mercader et al., 2017). In the research of Józsa and Molnár (2013), for example, MM was a better predictor of school grades than IQ or performance in tests assessing basic skills.

Mastery pleasure (MP) is driven by intrinsic goals, where students engage in musical activities for the inherent enjoyment and satisfaction they provide, rather than for external rewards or recognition (Ng, 2017). MP is associated with positive emotional experiences, such as enjoyment, enthusiasm, and creativity. These emotions enhance students' overall engagement and participation in musical activities (Green & Hale, 2011). Students' MP, as indicated by their MM and self-concept, is crucial for effective musical learning. Moreover, there is a strong positive correlation between students' MM and SC in the context of music education, with significant differences observed across school levels and genders (Janurik et al., 2023). The existing literature suggests that there are gender-based differences in students' MM and MP in musical education. Girls have been found to show higher scores than boys in total music reward sensitivity and several subdomains (Lippolis et al., 2023). Students in specialized music programs often exhibit higher MM and MP. These students are more likely to continue their learning in music programs, driven by mastery-focused and multiple-goal orientations, which include both mastery and performance-approach goals (Ng, 2017). However, students in non-specialized classes may not exhibit the same level of intrinsic motivation as those in specialized programs, often being extrinsically motivated instead (Ribeiro & da Silva, 2022).

Based on Barrett and Morgan's (2018) definition of MM, Józsa (2014) developed a measuring tool for examining subject-learning motives, and Józsa et al. (2017) identified subject-specific mastery motivation related to school learning. His research on a sample of 1359 Hungarian and 623 Taiwanese students in grades 4, 6, 8, and 10 also showed its effects on the learning of singing and music. According to his results, the correlations between individual subject-specific mastery motivation gradually weaken in higher grades, and the degree of motivation decreases. In this international comparative study, the Hungarian students showed lower motivation than the Taiwanese students. Among the Hungarian students, between the fourth and eighth grades, the greatest decrease in MM was related to learning singing and music, while the Taiwanese students did not show a significant decrease. In another study (Janurik et al., 2021), MM in music was broken down into additional learning dimensions that reflected school musical activities, in which the learning of singing appeared as a separate dimension. Based on its results, the motivation of seventh-grade Hungarian students for learning rhythm, sheet music, musical knowledge, and singing did not reach the average level; however, compared to other areas of musical learning, they were significantly more motivated to learn singing. Based on the examination by gender, the mean values of girls were significantly higher in all dimensions of musical learning.

2.2. Musical Self-Concept and Singing

Self-concept (SC) can be defined most generally as "how one describes oneself" (Harter, 2003, p. 612). Self-perception, self-appraisal, self-representation, self-evaluation, and self-description play a role in its formation. Its most comprehensive model was developed by Shavelson and his colleagues (Shavelson et al., 1976), and further, extensive research confirmed the existence of some specific self-concept areas described as part of global self-concept (Hattie, 1992; Marsh, 1984, 1990; Vispoel, 2021). Musical SC, as a specific area, is part of one's global self-concept, a psychological structure that translates an individual's personal musical experiences into a musical identity. It is the area that answers the questions of "who I am" and "what I can do" in music (Spychiger, 2017, p. 268). Musical SC is related to general self-concept through the mediation of one's commitment and interest in music and the importance attached to performing well in music (Vispoel, 2021). Vispoel's (1995, 2003) well-known musical SC model, in line with previous SC research, also names general and specific areas. In the Music Self Perception Inventory (MUSPI) questionnaire, including

84 items (Vispoel, 1993), one subscale assesses perceptions of general musical ability, and six additional ones assess perceptions of skill in the music subdomains of singing, instrument playing, reading, composing, listening, and dancing. Based on the research, musical SC is part of a SC hierarchy involving a hierarchically superordinate artistic domain and hierarchically subordinate components (music composition, instrument playing, music reading, singing, listening, and dancing). The components (facets) of musical SC show a connection with each other; however, the singing and dancing SCs are more distinct from the other facets of musical SC (Morin et al., 2015; Vispoel, 2021).

The majority of musical SC research is primarily concerned with examining music students and those involved in music. Based on the fact that we all have a musical SC, Spsychiger et al. (2009) created a more general, broadly interpreted, multidimensional model of musical SC, in which, however, singing is included with less emphasis. They separated the non-academic components—the emotional, social, physical, cognitive, and spiritual representations related to music—the ideal musical self, and the academic component, which refers to musical abilities. The questionnaire contains only one statement related to self-perception in singing (Spsychiger et al., 2009).

The self-concept affects how confident we are in a given area and how we think about our options for action. In connection with singing, Krause and his colleagues formulated this as follows: “Singing SC to moderate how people behave, and how they describe, feel, and think about singing, particularly in regard to their own ability, level of confidence, and motivation to participate” (Krause et al., 2022, p. 3). The focus of their research on singing SC was on the role of social comparison in the formation of singing SC, and its effect on musical and singing participation. It was proven that singing SC is context-dependent and that social comparison affects not only the development of SC but also participation. In their experiment, watching and listening to reality television-style singing had a negative effect on the participants of the experimental group. Compared to their peers who were not exposed to these influences (listening to amateur singers), they had a worse opinion of their own singing, and at the same time, they were less motivated to participate in singing and musical activities.

Self-perception in singing also plays a role in the formation of the SC of one’s musical abilities. In Janurik et al.’s (2021) research with seventh graders, they used an expanded version of the MUSCI-youth questionnaire (Spsychiger et al., 2009) according to the dimension of musical abilities. Based on their results, one’s opinion about their development of singing had the most significant explanatory power for the self-perception of their musical abilities. Several studies also support the connection between musical SC and the current level of singing (e.g., Demorest et al., 2017; Pfordresher & Demorest, 2021). However, self-perception in singing is often not realistic. Several studies have shown that those who develop the image of themselves as “poor singers” are reluctant to participate in musical activities (Whidden, 2010); when examined, many of them had average musical abilities (Demorest et al., 2017; Mizener, 1993; Sloboda et al., 2005). Previous research also shows that musical SC among primary school-age children is relatively stable, but competition, which is considered an external motivator, and the evaluative educational environment can also have a positive effect on SC (Austin, 1988).

2.3. Mastery Motivation, Mastery Pleasure, and Self-Concept

Mastery motivation is a self-rewarding motive that can have a positive effect on experiencing music learning as a joyful, optimally challenging activity. However, musical SC can also play a role in the degree to which self-rewarding motives are present during music learning. Schmidt (2005) and Marsh et al. (2003) confirm that musical SC is related to intrinsic motivation. Marsh et al. (2003), in their study with high-achieving students

in grades 3–6, identified two higher-order factors of learning motivation as a task factor or intrinsic motivation factor (orientation and learning goals) and a performance factor or extrinsic factor (extrinsic motivation and performance goals). Schmidt (2005) studied music students in grades 7–12, and this research identified three motivational factors. In relation to musical activities, he also showed learning/task orientation as the first, strongest factor, in which intrinsic orientation was featured with the greatest factor weight. The second factor could be identified as the performance/ego orientation factor. The third factor was individual orientation. Based on his results, musical SC had a moderate correlation with both intrinsic orientation and individual orientation. Further research also confirms that musical SC is significantly correlated with both intrinsic motivation and internal attributions (Austin & Vispoel, 1998; Sandene, 1997).

A study involving first-, second-, and third-grade students showed significant differences in MP when playing Orff instruments and conducting musical creativity activities according to their age (Svalina & Zelić, 2020). Additionally, a study involving 139 Hungarian grade 7 students revealed significant differences in musical MM; higher MM was observed among female students (Janurik et al., 2023). In Svalina and Zelić's (2020) study, it was found that younger students (first and third grades) showed a preference for musical games and singing activities, while older students had different preferences in different musical activities. Comparing class types, students from music-specialized classes exhibited higher levels of MP than those from non-specialized music classes (Sepúlveda-Durán et al., 2024).

We are aware of two previous studies that examined the relationship between MM and SC, and only one study that focused on the relationship between musical SC and MM to learn music. Szenczi et al. (2018) showed among 6th-, 8th-, and 10th-grade students with learning disabilities that MM and SC are related. According to their results, the intellectual acquisition motive was demonstrably related to mathematical SC, general school SC, the general self, physical abilities, and the verbal and social components of the SC. General SC is also related to MM regarding intellectual, motor, and adult relationships. Szenczi et al. (2018) found moderate to strong correlations between mastery motivation and components of SC among 2110 Hungarian students in grades 2, 4, 6, 8, and 10. It was also shown that age plays a role in the development of the relationship, and the correlations between MM and SC showed a different picture at different ages.

Janurik et al.'s (2023) study showed a strong correlation between musical MM and musical SC in a sample of seventh-grade students in connection with school singing and music lessons. The authors used the MUSCI-youth questionnaire (Fiedler & Spychiger, 2017) to examine the non-academic components of musical SC—the emotional, social, physical, cognitive, and spiritual representations related to music—as well as the academic component related to musical abilities as separate dimensions of musical SC. Of the eight scales of musical motivation in the musical MM questionnaire, five were used to examine the instrumental (endurance) component of motivation to learn music (learning to sing, learning rhythm, reading sheet music, and learning music), and two were related to its expressive components. A strong relationship was shown between the composite index of musical MM and the composite index of musical SC. The instrumental (endurance) component was also shown to have a strong relationship with the combined indicator of musical SC, while its correlation with the expressive component was of medium strength.

2.4. Singing in Hungarian Music Education

Singing plays a central role in Hungarian music pedagogic practice according to Kodály's concept. An essential element of this concept is that singing leads most directly to the experience and understanding of music. He emphasizes that the human voice is an

instrument accessible to everyone (Mattingly, 2024). Kodály's method heavily incorporates Hungarian folk songs, which he collected and used as the foundation for music education. This approach not only preserves cultural heritage but also makes music education more relatable and engaging for students (Dallos, 2024; Song, 2019). In the Hungarian National Core Curriculum (Educational Research and Development Institute, 2020; Orsovcics, 2015), the main goal of teaching singing and music to the lower grades (grades 1–4) is to make students fall in love with singing through active musical activities and singing together. Children must have joyful experiences through singing. In the upper grades (grades 5–8), the focus is still on musical activity, primarily singing. Singing, as a method, helps the development of musical abilities, is a means of relative solmization, and forms the basis for learning musical literacy. The aim of the development of singing is for the students to sing in groups or independently at a pitch appropriate to their age and vocal characteristics. They should strive for clear intonation and the right tempo of the songs. In the seventh and eighth grades, the development goal formulated by the Framework Curriculum for singing is already the advanced pronunciation of the character of a given song (dynamics, tempo, musical structure, phrasing, and style). The teaching material related to singing in the lower grades consists of children's songs and children's play songs. In the upper grades, students experience group musical activities through folk songs and art songs. The final goal is well-intended, expressive singing.

At the time of our research, the recommended number of hours is two music lessons per week in the lower grades and one music lesson per week in the upper grades in non-specialized music classes. In specialized music classes, both in the lower and upper grades, the time frame for vocal and musical education is four hours per week, plus one or two choir sessions. In these classes, the curriculum of the extra hours consists of additional theoretical and song material.

2.5. Rationale of This Study

In the above review of different studies, it was found that several papers explored the relationship between MM and SC (e.g., Fiedler & Spychiger, 2017; Janurik et al., 2023; Szenczi et al., 2018) and MM and SC in music education (e.g., Józsa et al., 2017; Ng, 2017). Although there are studies about the gendered and school differences in MM for music education, there is still a lack of studies about the differences in class types and grades concerning MP and SC in singing. Moreover, there is still a research gap regarding the relationships among all three variables of MM, MP, and SC in singing. Moreover, most of the studies did not describe in detail the role of demographic variables as significant predictors. Therefore, this study aims to investigate differences in students' MM, MP, and SC in singing across class types (specialized music and non-specialized music) and genders in grades 1, 3, 5, and 7, subsequently exploring the impacts of these demographic variables on MM, MP, and SC in singing. The current study addresses the following research questions.

RQ1: What are the differences among class types and genders for students' MM, MP, and SC in singing across all grades?

RQ2: What are the relationships between students' demographic variables (grades, class types, and parental education) and MM, MP, and SC in singing?

RQ3: What are the predictive effects of demographic variables (gender, grade, and parental education) on students' MM, MP, and SC in singing?

3. Materials and Methods

3.1. Participants

This study includes a total sample of 586 elementary school students from 28 classes in Hungary, including four grades: grade 1 (155), grade 3 (143), grade 5 (132), and grade 7 (156).

The samples were divided into several subsamples based on demographic information, such as class type (specialized music and non-specialized music), gender, and parental education (mother's education and father's education, separately). Parental education was divided into three groups, namely primary, secondary, and tertiary. The distribution of these subsamples of demographic variables is described in Table 1.

Table 1. Distribution of subsamples in this study.

Samples	Numbers	Percentages (%)
1. Class type (Total)	(586)	(100)
Specialized music	145	24.70
Non-specialized music	441	75.30
2. Grade (Total)	(586)	(100)
Grade 1	155	26.50
Grade 3	143	24.40
Grade 5	132	22.50
Grade 7	156	26.60
3. Gender (Total)	(586)	(100)
Boy	261	44.50
Girl	325	55.50

3.2. Instrument

Based on Fiedler and Spychiger (2017), Janurik et al. (2023), and Józsa et al. (2017) a self-developed questionnaire was administered in this study. Students' mastery motivation (MM), mastery pleasure (MP), and self-concept (SC) in singing were investigated on a 5-point Likert scale, ranging from 1—*strongly disagree* to 5—*strongly agree*. The 1–5 scale was marked with emoji faces on the questionnaire, which helped the children understand it. It included 18 items in total: MM (6 items), MP (5 items), and SC (7 items). The normality test for the whole questionnaire was also detected. The skewness and Kurtosis values were -0.58 and -0.83 (recommended values ranged from -3 to $+3$ by Calchei et al. (2023)), showing the nearly normal distribution of the assessment. Its internal consistency reliability ranged from 0.77 to 0.94, highlighting that the instrument was reliable for assessing students' MM, MP, and SC in singing (Table 2).

Table 2. Distribution and reliability values of the questionnaire.

Scales	Items	Mean	Std. Deviation	Skewness	Kurtosis	Cronbach's Alpha
Mastery motivation	6	3.59	1.31	-0.68	-0.87	0.93
Mastery pleasure	5	3.33	1.17	-0.53	-1.03	0.86
Self-concept	7	3.16	0.81	-0.41	-0.65	0.77
Total	18	3.36	1.01	-0.58	-0.83	0.94

3.3. Analytical Procedure

In this study, several analyses were conducted using IBM SPSS Statistics 23, Microsoft Excel 2019, and MPlus version 8.4. First, a normality test was conducted to investigate the skewness and kurtosis values of the instrument. Calchei et al.'s (2023) recommended values (ranging from -3 to $+3$ for both skewness and kurtosis) were employed for testing the normality of the subscales of the instrument. Then, the internal consistency reliability of the instrument was detected using Cronbach's alpha with the recommended value of >0.70 (Kline, 2015). Then, a confirmatory factor analysis (CFA) was conducted to explore the factor validity of the instrument. To detect the model fit measures of the instrument, several reliable fit indices were investigated, such as the comparative fit index (CFI), Tucker–Lewis index (TLI), root mean square error of approximation (RMSEA), and standardized root

mean squared residual (SRMR). To select the most appropriate structural model, a chi-square test was also conducted. The recommended values of several researchers (Habók & Magyar, 2018; Kline, 2015) for these fit indices were employed in this study, e.g., ≥ 0.90 for CFI and TLI, ≤ 0.08 for RMSEA, and ≤ 0.07 for SRMR.

Furthermore, the differences in demographic variables such as class type, gender, grade, and parental education in MM, MP, and SC in singing were investigated through several analyses: one-way analysis of variance (one-way ANOVA), factorial analysis or two-way ANOVA, and mixed ANOVA (Leech et al., 2005). One-way ANOVA with a post hoc test was conducted to explore the differences in class types and genders for MM, MP, and SC in singing. Two-way ANOVA was employed to explore the differences between genders and class types in MM, MP, and SC in singing across all grades. Then, mixed ANOVA was conducted to reflect the interaction effects of class type, gender, and grade on students' MM, MP, and SC in singing. Moreover, correlational analyses were also involved in this study to explore how the relationship exists between the demographic variables (class type, grades, genders, and parental education) and MM, MP, and SC in singing. Finally, a SEM model and regression analyses were conducted to detect the individual and combined predictive effects of demographic variables on students' MM, MP, and SC in singing.

3.4. Confirmatory Factor Analysis (CFA)

The instrument has three factors, such as MM, MP, and SC in singing (Figure 1).

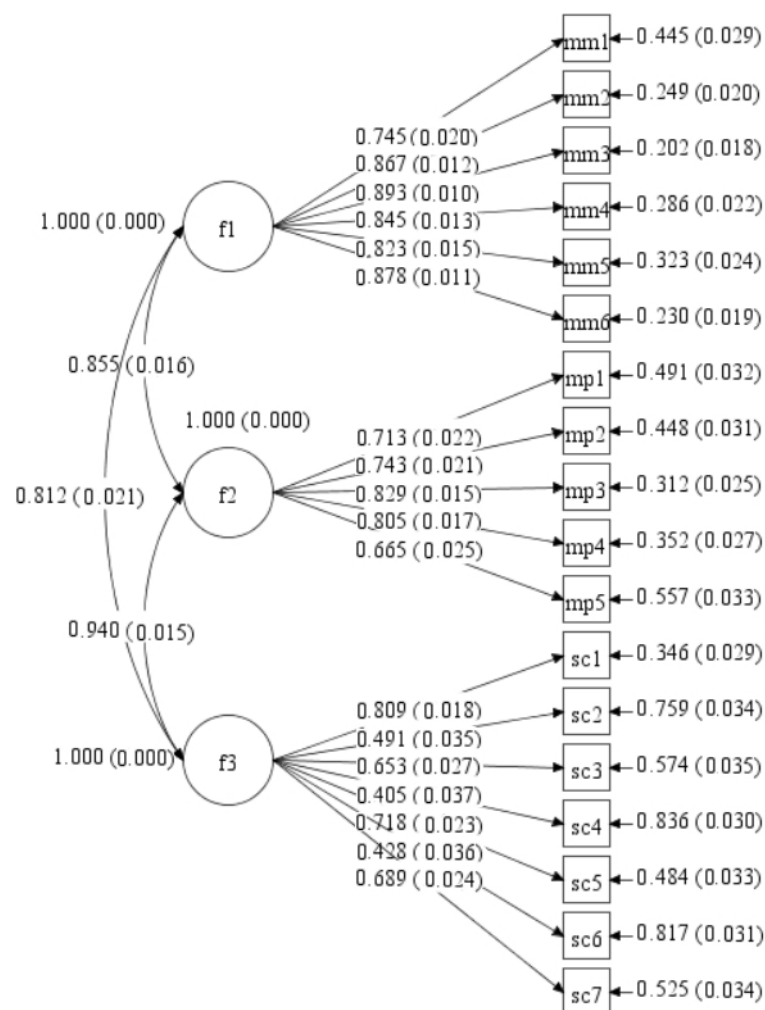


Figure 1. Factorial validity of the instrument. Note: f1 (mastery motivation), f2 (mastery pleasure), and f3 (self-concept).

To confirm its factorial validity (item–factor correlations and factor–factor correlations), the CFA was also conducted using structural equation modeling (SEM) in MPlus Version 8.4. The CFA model was well fitted with good fit indices, such as Chi-square = 553.244, $df = 132$, $p = 0.000$, CFI = 0.938, TLI = 0.928, RMSEA = 0.074 [0.067, 0.080], and SRMR = 0.049. The results showed acceptable factor loadings (>0.40) and factor–factor correlations (ranging from 0.81 to 0.94). Therefore, the factorial validity was confirmed for the instrument in singing education

4. Results

4.1. Comparison Across Class Types for MM, MP, and SC

A one-way ANOVA with a post hoc test was conducted to investigate the differences in class type (specialized music and non-specialized music) on students' MM, MP, and SC in singing. The findings showed that there were significant differences between students of specialized music ($M = 3.95$, $SD = 1.05$) and non-specialized music ($M = 3.47$, $SD = 1.36$) for the assessment of MM. Similarly, students from specialized music classes had higher MP ($F(1, 585) = 8.47$, $M = 3.58$, $SD = 0.99$, $p < 0.01$) and SC ($F(1, 585) = 8.47$, $M = 3.39$, $SD = 0.70$, $p < 0.01$) than those from non-specialized music classes in MP ($M = 3.25$, $SD = 1.22$) and SC in singing ($M = 3.08$, $SD = 0.82$). This is shown in Figure 2 for clarity.

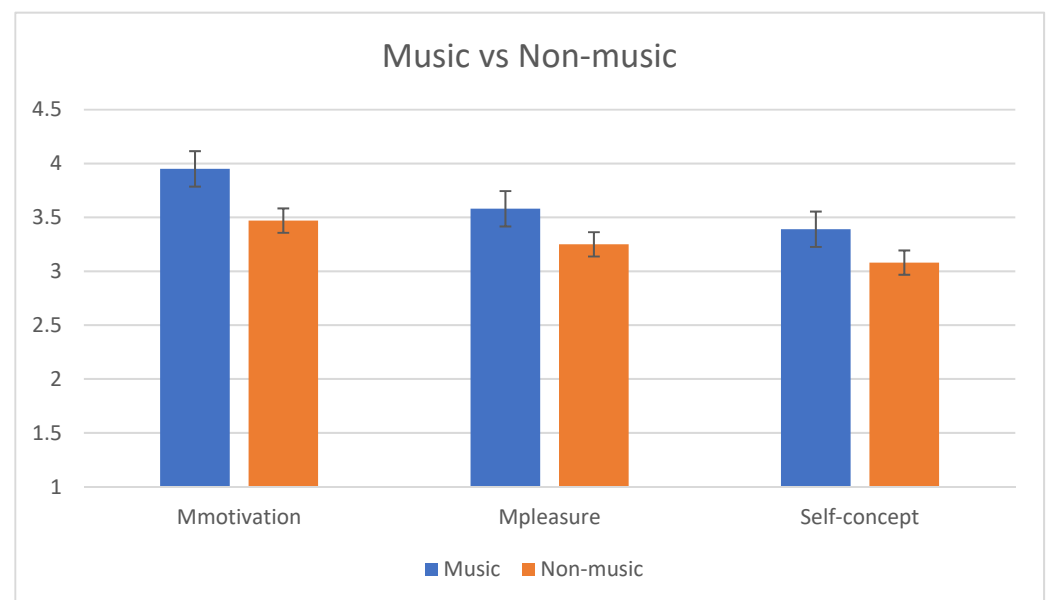


Figure 2. Comparison of class types for MM, MP, and SC in singing. Note: Number of students in music (145) and non-music (441) classes.

Furthermore, a two-way ANOVA was also conducted to explore the differences in class types across all grades (grades 1, 3, 5, and 7) for the separate assessment of MM, MP, and SC in singing. First, in the assessment of MM between music- and non-music-specialized students in all grades, although no significant differences were found in the younger ages (grades 1 and 3), there were significant differences ($p < 0.001$) in the older grades: grade 5 ($M = 4.08$, $SD = 0.17$ for music, and $M = 2.88$, $SD = 0.09$ for non-music) and grade 7 ($M = 3.49$, $SD = 0.16$ for music, and $M = 2.22$, $SD = 0.09$ for non-music). In both grades 5 and 7, students from specialized music classes had higher MM than those from non-specialized music classes (MM in Figure 3).



Figure 3. Comparisons of students from specialized and non-specialized music classes. Note: Number of students in grade 1 (155), grade 3 (143), grade 5 (132), and grade 7 (156).

In the assessment of MP in singing, similar results were found in that there were no significant differences in MP in singing across the younger grades 1 and 3. Still, significant differences ($p < 0.01$) were found in the older grades 5 and 7. In grade 5, students from specialized music classes ($M = 3.45$, $SD = 0.15$) were more pleased to learn singing than those of non-specialized music classes ($M = 2.75$, $SD = 0.09$). The results for grade 7 also showed a significant difference ($p < 0.001$), favoring music-specialized students ($M = 3.15$, $SD = 0.14$) over non-specialized music students ($M = 2.13$, $SD = 0.08$) (MP in Figure 3).

Similar significant results were found in the assessment of singing SC in the older grades 5 and 7. In grade 5, students from specialized music classes had a higher SC in singing ($M = 3.39$, $SD = 0.11$) than those from non-specialized music classes ($M = 2.77$, $SD = 0.06$). In grade 7, students from specialized music classes also had a higher SC in singing ($M = 3.06$, $SD = 0.10$) than those from non-specialized music classes ($M = 2.43$, $SD = 0.06$) (SC in Figure 3).

To conclude, the results from the assessment of MM, MP, and SC in singing of the older grades 5 and 7 (differing from the younger grades 1 and 3) revealed that students from specialized music classes had higher MM, MP, and SC than those from non-specialized music classes.

4.2. Comparison Across Genders for MM, MP, and SC in Singing

Comparing gender differences in the assessment of MM, MP, and SC in singing, a one-way analysis was conducted, as demonstrated in Figure 4. The results showed significant differences in the total assessment ($F(1, 584) = 46.54, p < 0.001$) between boys and girls across MM, MP, and SC in singing. As shown in Figure 4, girls have significantly higher MM ($M = 3.88, SD = 1.22$), MP ($M = 3.59, SD = 1.06$), and SC in singing ($M = 3.36, SD = 0.72$) than boys ($M = 3.23, SD = 1.34$ for MM; $M = 3.02, SD = 1.23$ for MP; and $M = 2.92, SD = 0.85$ for SC).

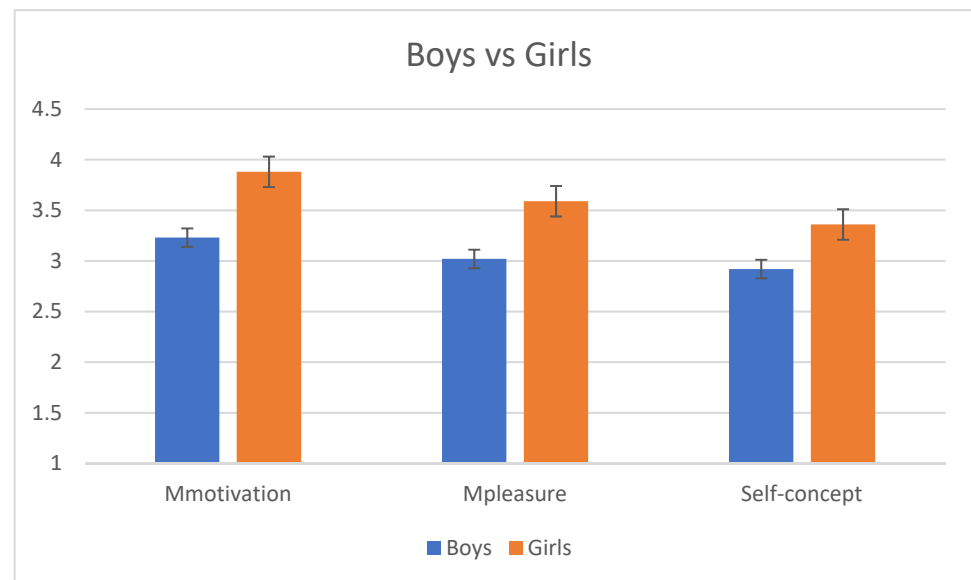


Figure 4. Comparison of genders for MM, MP, and SC in singing.

Then, a two-way ANOVA was also conducted to investigate gender differences in MM, MP, and SC in singing across all grades 1, 3, 5, and 7. First, for the assessment of MM, the findings show that there were significant differences ($p < 0.01$) between boys and girls for all grades 1, 3, 5, and 7, favoring girls' MM for singing. Girls had higher MM for all grades ($M = 4.53, SD = 0.11$ for grade 1; $M = 4.46, SD = 0.11$ for grade 3; $M = 3.45, SD = 0.12$ for grade 5; and $M = 2.96, SD = 0.11$ for grade 7) than boys ($M = 4.21, SD = 0.12$ for grade 1; $M = 3.96, SD = 0.14$ for grade 3; $M = 2.89, SD = 0.12$ for grade 5; and $M = 2.04, SD = 0.12$ for grade 7) (MM in Figure 5).

For the assessment of MP across all grades 1, 3, 5, and 7, there were also significant differences between the genders, favoring girls' MP in singing. Boys had significantly lower MP in singing ($p < 0.001$) than girls across all grades. For grade 1, girls had considerably higher MP ($M = 4.30, SD = 0.09$) than boys ($M = 3.93, SD = 0.11$). Similarly, girls had higher MP in singing in older grades ($M = 4.06, SD = 0.09$ for grade 3; $M = 3.24, SD = 0.11$ for grade 5; and $M = 2.64, SD = 0.09$ for grade 7) than boys ($M = 3.60, SD = 0.12$ for grade 3; $M = 2.61, SD = 0.11$ for grade 5; and $M = 2.07, SD = 0.10$ for grade 7) (MP in Figure 5).

Similarly, assessing singing SC between the genders, girls had significantly higher SC ($p < 0.001$) than boys across all grades 1, 3, 5, and 7. Girls had higher SC in singing for all grades ($M = 3.79, SD = 0.07$ for grade 1; $M = 3.65, SD = 0.07$ for grade 3; $M = 3.15, SD = 0.08$ for grade 5; and $M = 2.77, SD = 0.07$ for grade 7) than boys ($M = 3.43, SD = 0.08$ for grade 1; $M = 3.26, SD = 0.09$ for grade 3; $M = 2.69, SD = 0.08$ for grade 5; and $M = 3.60, SD = 0.08$ for grade 7) (SC in Figure 5).

In conclusion, girls had significantly higher MM, MP, and SC in singing than boys across all grades.



Figure 5. Comparison of boys and girls across grades.

4.3. Relationship Among Parental Education and MM, MP, and SC in Singing

Correlational analyses were conducted to investigate the relationships among parental education (mother's and father's education levels) and MM, MP, and SC in singing. First, for all grades including all participants, it was found that the grade had negative correlations (ranging from the correlation coefficient $r = 0.52$ to $r = 0.60$, $p < 0.01$) with students' MM, MP, and SC in singing. This means that the lower the grades, the higher MM, MP, and SC in singing. It is also clearly shown in Table 3 that the students from the younger grades 1 and 3 had more MM, MP, and SC in singing than the older grades 5 and 7.

Moreover, in separate analyses of the individual grades, no significant relationship was found ($p > 0.05$) between parental education (primary, secondary, and tertiary) and students' MM, MP, and SC in singing. This means that students' development in MM, MP, and SC in singing is not because of their parental education but because of other factors such as their grades. Then, significant relationships were found between the mother's education and the father's education (ranging from $r = 0.28$ to $r = 0.59$, $p < 0.01$), as well as among MM, MP, and SC in singing for all grades (ranging from $r = 0.54$ to $r = 0.77$, $p < 0.01$).

Table 3. Correlational analysis.

Variables	1	2	3	4	5	6
Total participants (586)						
1. Grade	1	−0.06	−0.11 **	−0.58 **	−0.60 **	−0.52 **
2. Mother's Education		1	0.50 **	0.03	0.06	0.05
3. Father's Education			1	0.10 *	0.13 **	0.13 **
4. Mastery Motivation				1	0.77 **	0.74 **
5. Mastery Pleasure					1	0.79 **
6. Self-concept						1
Grade 1 (155)						
1. Mother's Education		1	0.55 **	0.12	0.12	0.07
2. Father's Education			1	0.01	0.09	0.20 *
3. Mastery Motivation				1	0.68 **	0.58 **
4. Mastery Pleasure					1	0.59 **
5. Self-concept						1
Grade 3 (143)						
1. Mother's Education		1	0.49 **	−0.07	0.07	0.09
2. Father's Education			1	0.04	0.15	0.15
3. Mastery Motivation				1	0.57 **	0.54 **
4. Mastery Pleasure					1	0.74 **
5. Self-concept						1
Grade 5 (132)						
1. Mother's Education		1	0.28 **	−0.01	0.04	−0.02
2. Father's Education			1	0.06	0.21 *	−0.01
3. Mastery Motivation				1	0.62 **	0.62 **
4. Mastery Pleasure					1	0.68 **
5. Self-concept						1
Grade 7 (156)						
1. Mother's Education		1	0.59 **	0.01	−0.05	−0.04
2. Father's Education			1	0.09	−0.04	0.01
3. Mastery Motivation				1	0.66 **	0.69 **
4. Mastery Pleasure					1	0.77 **
5. Self-concept						1

Note: * ($p < 0.05$), ** ($p < 0.01$).

4.4. Interaction Effects of Demographic Variables

Mixed ANOVAs were conducted to investigate the interaction effects of demographic variables on the significant difference in MM, MP, and SC in singing. Although there were significant differences among the variables MM, MP, and SC ($F(1.88, 1.88) = 79.49$, $p < 0.001$, $\eta^2 = 0.11$), these significant differences were not due to the interaction of class types (music and non-music classes), showing a Greenhouse–Geisser effect with $F(1.88, 1.88) = 2.54$, $p = 0.08$ (>0.05), $\eta^2 = 0.004$.

However, there was a small interaction effect $F(1.88, 1.88) = 4.74$, $p < 0.010$, $\eta^2 = 0.01$, of gender on these significant variables (MM, MP, and SC). Based on a post hoc multiple comparison test, it was also shown that there was a significant interaction effect between students' grades and these significant variables (MM, MP, and SC). For clarity, Table 4 shows the results from the tests on the within-subject effects from mixed ANOVA.

Table 4. Mixed ANOVA.

Variables	Source	df	Mean Square	F	Sig	Partial Eta Square
Variables (MM, MP, and SC)	Sphericity assumed	2	24.64	79.49	<0.001	0.11
	Greenhouse–Geisser	1.88	26.16			

Table 4. Cont.

Variables	Source	df	Mean Square	F	Sig	Partial Eta Square
Variables (MM, MP, and SC)	Huynh–Feldt	1.88	26.04	79.49	<0.001	0.11
	Lower bound	1.00	49.27			
Variables*class type	Sphericity assumed	2	0.87	2.54	0.079	<0.01
	Greenhouse–Geisser	1.88	0.93		0.083	
	Huynh–Feldt	1.88	0.92		0.083	
	Lower bound	1.00	1.74		0.112	
Variables*gender	Sphericity assumed	2	1.62	4.74	0.009	0.01
	Greenhouse–Geisser	1.88	1.72		0.010	
	Huynh–Feldt	1.88	1.71		0.010	
	Lower bound	1.00	3.25		0.030	
Variables*grade	Sphericity assumed	6	7.01	22.60	<0.001	0.10
	Greenhouse–Geisser	5.52	7.62			
	Huynh–Feldt	5.56	7.56			
	Lower bound	3.00	14.02			

Note: * (the interaction sign between variables); Etas, $\eta^2 = 0.15$ (big), 0.1 (not bad), and 0.01 (small).

4.5. Individual Predictive Effects of Demographic Variables

Structural equation modeling (SEM) was conducted to investigate the individual predictive effects of demographic variables (class type—music-specialized or non-music specialized; grade; gender; mother’s and father’s education) on students’ MM, MP, and SC in singing (Figure 6).

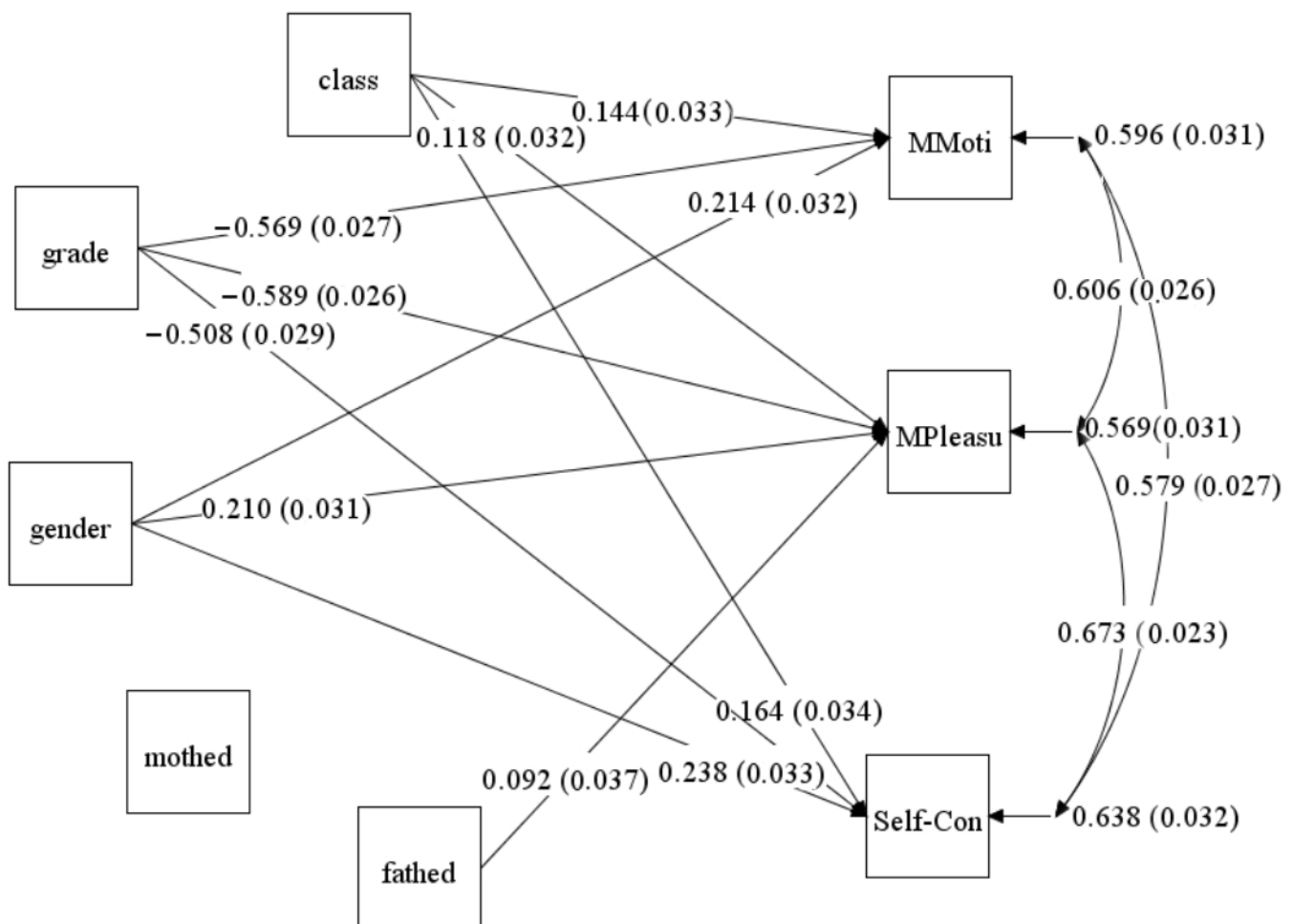


Figure 6. The individual predictive effects of demographic variables on MM, MP, and SC in singing. Note: fathed = Father’s education, mothed = Mother’s education, class = class type (music, non-music).

The prediction model demonstrated a good fit with acceptable indices, such as *Chi-square* = 157.94, *df* = 18, $p < 0.001$, *CFI* = 0.98, *TLI* = 0.98, *RMSEA* = 0.003, and *SRMR* = 0.002. Figure 6 shows that class type ($\beta_{MM} = 0.14$, $\beta_{MP} = 0.12$, $\beta_{SC} = -0.16$), grade ($\beta_{MM} = -0.57$, $\beta_{MP} = 0.59$, $\beta_{SC} = -0.51$), and gender ($\beta_{MM} = 0.21$, $\beta_{MP} = 0.21$, $\beta_{SC} = 0.24$) stand as significant predictors on students' MM, MP, and SC in singing. Nevertheless, parental education was not a significant predictor of students' MM, MP, and SC in singing. The possible reason may be that children's development in MM, MP, and SC does not depend on their parents' education levels, but rather on their class type, gender, and grade.

4.6. Combined Predictive Effects of Demographic Variables

Multiple linear regression analyses were conducted to investigate the combined predictive effects of background/independent variables (class type, grade, gender, and mother's and father's education) on the dependent variables, such as MM, MP, and SC in singing. The results showed that the multiple regression coefficient (adjusted R^2) was 0.41, meaning that 41% of the variance in MM could be predicted from the combined effects of the background variables. Except for parental education, class type (music and non-music) ($\beta = 0.12$, $p = 0.001$), grade ($\beta = -0.58$, $p < 0.001$), and gender ($\beta = 0.20$, $p < 0.001$) all had significant predictive effects on students' MM in singing. To investigate the combined predictive effects on MP, 44% (adjusted $R^2 = 0.44$) could be predicted from the combined effects of the variables. Similarly, except for parental education, class type ($\beta = 0.09$, $p = 0.005$), grade ($\beta = -0.61$, $p < 0.001$), and gender ($\beta = 0.19$, $p < 0.001$) appeared as significant predictive effects on students' MP in singing ability. In addition, class type, grade, and gender similarly contributed (adjusted $R^2 = 0.37$) as significant combined predictors of students' SC in singing ability, as shown in Table 5. To conclude, students' class type, grade, and gender are significant predictors of their MM, MP, and SC in singing.

Table 5. Regression analysis.

Dependent Variables	Independent Variables	Std. Beta (β)	Std. Error	Sig	Correlations			Collinearity Effects (VIF)
					Zero-Order	Partial	Part	
MM	Class type	0.12	0.11	0.001	0.14	0.15	0.11	1.01
	Grade	−0.58	0.02	0.000	−0.60	−0.60	−0.58	1.01
	Gender	0.20	0.09	0.000	0.25	0.25	0.20	1.01
	Mother's education	0.01	0.07	0.757	0.06	0.01	0.01	1.34
	Father's education	0.04	0.06	0.291	0.10	0.05	0.04	1.45
MP	Class type	0.09	0.09	0.005	0.11	0.12	0.09	1.01
	Grade	−0.61	0.02	0.000	−0.63	−0.63	−0.61	1.01
	Gender	0.19	0.08	0.000	0.24	0.25	0.19	1.01
	Mother's education	0.01	0.06	0.842	0.07	0.01	0.01	1.34
	Father's education	0.06	0.05	0.091	0.13	0.07	0.06	1.45
SC	Class type	0.13	0.07	0.000	0.05	0.17	0.13	1.01
	Grade	−0.52	0.01	0.000	−0.54	−0.54	−0.52	1.01
	Gender	0.24	0.06	0.000	0.28	0.29	0.23	1.01
	Mother's education	0.03	0.04	0.527	0.08	0.03	0.02	1.34
	Father's education	0.07	0.04	0.096	0.13	0.07	0.06	1.45

Note: MM (mastery motivation), MP (mastery pleasure), SC (self-concept), VIF (variance inflation factor), R^2 (MM) = 0.41, R^2 (MP) = 0.44, and R^2 (SC) = 0.37.

5. Discussion

This study investigated the MM, MP, and SC of students in specialized and non-specialized music classes from the following four grades: 1, 3, 5, and 7. It aimed to explore the differences caused by class types and genders on MM, MP, and SC in singing across all four grades, and simultaneously, it explored the significant predictors of students' development in MM, MP, and SC in singing. Therefore, three research questions were

addressed in this study. Before addressing these questions, the reliability and validity of the instrument were confirmed by appropriate values of Cronbach's alpha and CFA indices.

The first research question aimed to investigate differences in class types and genders across all grades regarding students' development in MM, MP, and SC in singing. There was no significant difference in MM, MP, and SC between the specialized and non-specialized music classes in the younger grades 1 and 3. At the same time, in specialized music classes, the singing skill was significantly higher in all grades, even in the first grade. This is because children enter these classes after a music entrance exam (Kovács et al., 2024). That means, in the first grade, the singing skills of the specialized music classes are better, but they do not differ in motivation or self-concept from the non-specialized music classes. However, students from specialized music classes had higher MM, MP, and SC than those from non-specialized music classes in grades 5 and 7. This is due to students' interests, motivation, and satisfaction to take the specialization-in-music classes (Ng, 2017; Sepúlveda-Durán et al., 2024). In comparing gender differences, female students had higher MM, MP, and SC at all grade levels. This finding aligns with several different studies (e.g., Janurik et al., 2023; Lippolis et al., 2023), proving the higher level of female students in MM, MP, and SC in music education. In both the comparisons of classes and genders, it was clearly found that younger students had higher MM, MP, and SC in singing than the older students, and this finding aligns with Svalina and Zelić's (2020) study favoring younger students in musical preferences. Based on our results, we can conclude that in Hungarian school music education, the primarily singing-centered curriculum typical of primary school, the types of game forms related to folk children's play songs mostly realized by singing together, and the methods used in them to develop singing effectively support MM, MP, and SC. From the point of view of MM, these forms of learning are optimal challenges for learners at this age. At the same time, they enjoy learning more. Another advantage of the playful, common singing form may be that it puts less emphasis on social comparison, and students may be less aware of individual differences in the development of singing, thus supporting a more positive singing self-image. Especially for boys, bodily changes during adolescence can have a negative impact on singing SC.

The second research question concerns the relationships between the students' demographic variables, such as grade and parental education levels, and their MM, MP, and SC in singing. A negative correlation was found between the students' grade and their MM, MP, and SC. This means that the lower the grade of the student, the higher levels of MM, MP, and SC they possess in music education. In the analyses of each grade, parental education had no significant correlation with students' MM, MP, and SC in singing. However, only information about parental education levels was collected and employed in our study. This study did not go deeply into parental involvement and their support of their children's musical development. According to Upitis et al.'s (2017) study, parental involvement, such as support during practice sessions, enhances students' MP and progress in music. Moreover, McClellan (2011) also supported the importance of parental involvement in students' musical learning and that parental influence significantly impacts students' SC as future music educators. Therefore, parental involvement and support, not just their education levels, are important for children's MM, MP, and SC in music learning. Additionally, it was also found that students' MM, MP, and SC are significantly and positively related to each other, which aligns with Szenczi et al.'s (2018) study about these relationships. One possible reason may be that as students are satisfied and enjoy musical learning, they have more motivation to learn the music. Alternatively, if they have a negative SC (e.g., they think of themselves as 'bad or poor singers'), they will not have MM and MP in learning music (Demorest et al., 2017; Mizener, 1993; Sloboda et al., 2005). As students' average ratings were significantly different in their affective variables, such as MM, MP, and SC in

singing, the authors also investigated whether there were interaction effects between the students' demographic variables and these affective variables. There were no significant interaction effects between students' class types and their MM, MP, and SC in singing. However, gender and grade had significant interaction effects with these affective factors.

Therefore, in the third research question, this study explored the predictive effects of demographic variables, such as gender, grade, class type, and parental education, on students' MM, MP, and SC in singing. In this study, the authors conducted separate analyses of the individual and combined effects of these variables on students' MM, MP, and SC in singing. Exploring the individual effects of these variables, gender, grade, and class type were found as significant predictors of students' MM, MP, and SC. This aligns with some studies (e.g., [Janurik et al., 2023](#); [Schmidt, 2005](#)) showing the significant influence of gender and grade on students' MM and SC in music education. However, parental education levels were not found as significant predictors of these cognitive variables. One possible reason may be that this study collected just information about parents' education levels, not their support and engagement or involvement in their children's musical learning. In several studies (e.g., [McClellan, 2011](#); [Upitis et al., 2017](#); [Wieser et al., 2024](#)), children's parental involvement was found as a significant predictor of students' MM and SC in music education. Similarly, in the investigation of the combined predictive effects of these demographic variables, parental education levels had no significant predictive effects on students' MM, MP, and SC in singing, while class type, gender, and grade contributed as significant predictors. Therefore, it can be seen that these individual and combined effects of demographic variables, namely class type, gender, and grade, are significant predictors of students' development in MM, MP, and SC in singing.

As for practical implications, the results showed that students' MM declined with age. Therefore, it would be useful to develop activities that enhance students' MM, especially at more advanced ages. This research was conducted in the specific context of elementary schools in Hungary, which has strong music traditions. Accordingly, it would be interesting to conduct future research exploring the extent to which these findings apply to different educational contexts with different levels of musical emphasis. Furthermore, engagement in musical activities can extend beyond formal schooling, and thus, it may be interesting to explore MM trends among older ages to determine whether this decline in motivation is progressive as students age or if there is a certain dip at a certain age that is later overcome. Moreover, broader qualitative interpretations of the results—considering psychological, social, economic, and pedagogical factors—could further explain why younger students reveal higher levels of MM, MP, and SC in singing. Ultimately, this study is a valuable contribution to the field of music education and educational psychology.

This study has some limitations. The findings are not generalizable in other research contexts because different cultural, regional, and educational backgrounds can change the results. Another limitation is that the current study collected only parental education levels, and not all aspects of their involvement or support in their children's musical learning. Moreover, this study focused only on singing which may not capture other aspects of music education that could influence students' MM, MP, and SC.

6. Conclusions

This study explored the differences in MM, MP, and SC in singing among elementary students. Students' demographic variables, such as class type (specialized and non-specialized music classes), gender, grade, and parental education, were also studied, and their influencing roles in students' MM, MP, and SC were presented in this study. The findings revealed that students in specialized music classes demonstrated significantly higher MM, MP, and SC in singing, particularly in older grades. Gender differences were

also significant, with girls consistently outperforming boys across all grades. Moreover, it was also found that younger students had significantly higher MM, MP, and SC in singing compared to older students. In this study, parental education showed no significant impact on students' MM, MP, and SC in singing. These results highlight the importance of specialized music education and its potential influence on students' musical development and self-perception. Daily singing and music classes in all grades provide more opportunities for various forms of singing and thus support its development. An important goal of music education is to foster the joy of making music and singing while motivating students to engage in music learning and musical activities. A positive singing self-image can also influence how actively students seek musical activities throughout their lives and whether these activities bring them joy. However, the declining MM, MP, and SC values in both forms of education highlight the need for differentiated educational programs and teaching methods, as well as diverse singing approaches, that enhance music learning and make singing more enjoyable—especially in the upper grades. The selection of curriculum at different ages may also play a crucial role in this regard. Furthermore, our gender-related findings indicate that teachers should pay particular attention to these factors when working with boys.

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