Perceptions and predictions of expertise in advanced musical learners

Introduction

The nature of expertise

The concept of expertise in popular thought has been related to notions of talent, skill, specialisation, credentialling, professionalism, age and experience (Bereiter and Scardamalia, 1993). Ericsson, Prietula and Cokely (2007) define expertise as having the following qualities: (a) leading to performance that is consistently superior to that of an expert's peers, (b) producing concrete results in terms of attainment and (c) being able to be replicated and measured in the laboratory. Based on these terms, an expert musician can be conceptualised as a person who consistently demonstrates exceptional levels of performance compared to other individuals of similar age and experience and whose level of expertise can be confirmed by some form of measurable outcomes (such as examination / audition results, recognition by other experts and / or the public). Although there may be conceptualisations of expertise that are nuanced by different musical genres or styles, such as in the relative requirement for improvisation in performance, the aforementioned qualities of musical expertise are used to characterise an expert within any musical genre or style for the purposes of this article.

Feltovich, Prietula and Ericsson (2006) argue that the development of expertise depends on obtaining extensive skills, as well as appropriate knowledge and mechanisms that monitor and control cognitive processes in order to be able to perform a set of tasks both efficiently and effectively. Expertise is not a simple matter of fact or skill acquisition, but is theorised as a complex construct of adaptations of mind and body to task environments (Feltovich, Prietula and Ericsson, op cit.). Elaborating on this issue, they say that 'expert performers need to acquire representations and mechanisms that will allow them to monitor, control and evaluate their own performance, so they can gradually modify their own mechanisms while engaging in training tasks that provide feedback on performance, as well as opportunities for repetition and gradual refinement' (Feltovich, Prietula and Ericsson, op cit., p. 61).

The development of expertise

The study of expert performance does not only relate to the achievement of high levels of performance quality, but also suggests that there are phases of development through which future performers pass in order to achieve recognised expertise in their domain (Feltovich, Prietula and Ericsson, op.cit.). Ericsson has put forward a theory of expertise that illuminates the process of its development (Ericsson and Smith, 1991). According to Ericsson (1996), expert performers in very different domains display the acquisition of similar mediating mechanisms for their performance, suggesting that there are common components necessary for the acquisition of any form of expert performance or knowledge. According to Ericsson's theory, an elite performer goes through four main stages in the ten years needed to attain expert performance. The first stage includes a certain but not specific period of playful interaction within a certain domain. The second phase is initiated when an individual reveals 'talent' or 'promise' in that domain. Following this, the individual may begin participating in structured lessons and minimal amounts of practice as encouraged by parents. Parents help the child to acquire regular practice habits and repeatedly stress the value of practice as evidenced by improvement in performance. Throughout the second phase, parents are perceived to help their child to find coaches that are considered to offer the best fit to their progressing performance levels, and practice continually increases. Phase three begins with a major commitment being made to reach the top levels possible in the domain. The best coaches possible are sought, as are optimal training conditions. This phase ends when an individual is able to make a living based on his or her performances. Whether or not an individual enters the fourth and final stage determines whether they reach a state of eminent performance, which is conceived as going beyond available knowledge in the domain to produce a unique contribution. Major innovations required for this fourth phase go beyond skills and knowledge that even the master teachers know and could possibly offer to the particular student (Ericsson and Charness, 1994; Ericsson, 1996; Ericsson, Krampe and Tesch-Romer, 1993).

Other research has also conceptualised expertise development as a long process that often takes many years. Bloom (1985) and Sosniak (1985, 1990), for example, suggested that musicians go through three phases: an introduction to activity in the

domain, the start of formal instruction and deliberate practice and, finally, a full-time commitment to music. Taking the time span further, Manturzewska (1990) suggested that the development of musicians across the life-span has six stages, which range from spontaneous expression and activity, intentional and guided musical activity, the formation of artistic personality, establishment within the music profession, then a teaching phase through to, finally, withdrawal from professional activity.

The theories described above have been based on the expertise development of classical[1] musicians and suggest that (i) expertise encompasses a process of development that normally spans many years; (ii) that formal instruction, practice and parental support are very important for expertise development and (iii) the longer a person engages in musical activities, the more expert they are likely to become as performers, assuming that they pass through each of the delineated stages successfully.

The figure below (Figure 1) offers a theorised developmental pathway for professional musicians across the lifespan, taking into account the expertise theories of Bloom (1985), Sosniak (1985, 1990), Manturzewska (1990) and Ericsson and Smith (1991), starting from the first introduction to the domain (first years of life) and ending at withdrawal from professional activity (retirement). Additionally, a key element of musical expertise development is the acquisition of appropriate skills (e.g. Hallam, 1998). Accordingly, these have been placed at the centre of this developmental pathway. Hallam (op.cit.), for example, lists the importance of aural, cognitive, technical, musicianship, performance, learning and life skills in the development of the professional musician and explains that a variety of combinations of these may be required for different tasks or branches of the music profession. Like expertise, research into skill development is also conceived in the literature as stage (or phase) driven. According to Fitts and Posner (1967), for example, learning a new skill passes through three phases, which are termed the *cognitive* phase, the *associative* phase and the *autonomous* phase. The main characteristic of the *cognitive* phase is that learning is under cognitive control and includes identification and

[1] The Merriam-Webster Online Dictionary (2005) defines classical music as "of, relating to, or being music in the educated European tradition that includes such forms as art song, chamber music, opera, and symphony as distinguished from folk or popular music or jazz.

development of the component parts of the skill and the formation of a mental image. During the *associative* phase, the learner begins to link the component parts of the skill into a smooth action that becomes more fluent in time. This takes place through continuous practising and feedback, which help the learner to refine the skills. In the most advanced phase of skill learning, the *autonomous* phase, the skill is so well learned that it becomes automatic and its performance does not require conscious thought anymore. This final stage is what we would expect to characterise those advanced musicians who engage with music at a professional level and are able to support themselves financially through performance activities.

FIGURE 1 ABOUT HERE

Factors involved in the development of expertise

Writings on musical expertise have tended to suggest either that exceptional performance is a result of innate musical abilities or that advanced musical performance depends upon effortful practice and other environment factors (Lehman and Gruber, 2006). Some researchers have posed doubt as to whether it is possible to identify innate characteristics that facilitate the development of expertise (e.g. Ericsson, 2003). It is not yet clear whether practice on its own is sufficient for achieving high standards in performance (Lehman and Gruber, 2006), and whilst cumulative practice can be a good predictor of expertise level, the quality of performance at any given point in time may not be related to this (Barry and Hallam, 2002; Hallam, 1998; Williamon and Valentine, 2000). Nevertheless, most researchers would probably agree that practice is certainly necessary for invoking the cognitive, physiological and psychological motor adaptations that we often see in experts (Lehman and Gruber, 2006).

McNamara, Holmes and Collins (2006) interviewed renowned musicians and identified certain psychological characteristics that were perceived as developing excellence in musical performance. These characteristics included both generic characteristics such as dedication, planning and commitment, and more phase-specific application of these characteristics. A range of non-musical skills, such as interpersonal skills, realistic performance evaluation, goal setting and confidence

were also reported to be necessary to excel professionally and to gain high status positions within orchestras and conservatoires.

Most research conducted on the area of expertise theory to date has focused on musicians within the Western Classical tradition. In general, less has been reported about the musical development of popular musicians, not least because musical cultures other than the classical (such as pop, jazz and folk) have not received as much attention in the music psychology research literature (Sloboda, 2000). Within the available literature, research has reported that jazz musicians began their training at a later age compared to classical musicians (Gruber, Degner and Lehmann, 2004). Similarly, in a complimentary analysis to the focus of the present paper, musicians in other-than-classical genres, such as pop, jazz and folk traditions, typically began to engage with music at a later age compared to their classical peers and were less influenced in their choice of instrument by parents (Creech et al., 2008).

Furthermore, in addition to likely differences in their early genre biographies, the notion of practice may differ between musicians coming from diverse musical traditions. There is evidence to suggest that, whilst classical musicians focus on solitary practice, mastery of technical requirements and acquiring new pieces, jazz musicians are likely to try to improve their performance through communal practice in addition to solitary practice, as well as observation of jam sessions and active listening of other musicians (Gruber et al., 2004). Additionally, musicians across diverse musical genres seem to differ in the importance that they attribute to various skills for improving their performance (Creech et al., 2008). Classical musicians were found to attach greater importance to musical skills associated with the drive to excel musically and technically, as well as those skills involving notation. Other-than-classical musicians (pop, jazz, Scottish traditional) attached greater importance to non-notation musical skills, such as memorizing and improvising. Although classical and other-than-classical musicians did not differ substantially in their attitudes towards the relevance of music-specific skills in improving the quality of performance (e.g. sharing values on the importance of practising, rehearsing, lesson taking and performing), differences were observed in attitudes to non-musical activities (e.g. networking, organizing, acquiring general musical knowledge), with greater relevance being attributed to these by other-than-classical musicians (Creech et al., 2008).

The indications that musicians across different musical genres have similarities and differences in their approaches to practice and the relative importance that they attribute to various musical skills raise questions as to whether musicians also differ in their attitudes with respect to the nature of musical expertise. Although the literature on expertise has investigated some of the factors involved in its development, such as innate and general psychological characteristics, not much research has yet explored the influence of characteristics such as gender, age, experience and genre preference on musicians' attitudes towards, and self-assessments of, musical skills and expertise.

The research questions addressed in this paper concentrated around three themes:

1. Is there a relationship between musicians' views regarding musical skills and constituents of expertise in musical performance and personal characteristics such as gender, age, musical genre and professional status?
2. How do musicians' self-reported 'ideal' level of musical skills and expertise in musical performance compare with their perceptions of themselves concerning these attributes?
3. Which are the variables that predict musicians' self-assessed level of musical skills and expertise in musical performance?

The prime focus of this paper, therefore, is to make a contribution to the literature on expertise development in music by exploring how musicians from different genre backgrounds view expertise, taking into account also the variables of age, gender and experience. Comparisons are made across musical genres (classical vs. other-than-classical musicians), gender, age and professional status (student musicians vs. portfolio career musicians). Additionally, musicians' ideal versus perceived levels of musical skills and expertise are also compared and the factors that predict musicians' self-reported level of skills and expertise are investigated.

Methodology and participants

The research reported here formed part of a larger project, Investigating Musical Performance: Comparative Studies in Advanced Musical Learning (IMP) (Welch et

al., 2006, see http://www.tlrp.org.proj/Welch.html), a two-year comparative study of advanced musical performance (2006-2008). The IMP project was devised to investigate how classical, popular, jazz and Scottish traditional musicians deepen and develop their learning about performance in undergraduate, postgraduate and wider music community contexts. Data reported in this paper were obtained from a specially devised web-based questionnaire that was completed by advanced musicians representing four musical genres (classical, pop, jazz and Scottish traditional) and varying degrees of professional musical experience (tertiary education music students and portfolio career musicians).

Survey instrument

An innovative, web-based, Portable Document Format (PDF)[2] survey instrument was designed, which allowed data from participants at remote sites to be sent automatically to a central server for collation. The 623-field online survey instrument was piloted and refined accordingly in preparation for the main data collection. The contents of the questionnaire survey included 57 questions that embraced a wide range of perspectives on musical performance that built on diverse literature sources, and included:

(a) musical biographies (e.g. variables related to the effects of age, sex, musical genre, instrumental type, experience),
(b) psychological and social-psychological issues related to performance (e.g. performance anxiety, self-esteem, self-efficacy, musical identity, and the development of expertise), including an application of aspects of expertise theory and self-theories and
(c) attitudes to learning (e.g. practice behaviours, views on teaching – ideal versus personal experience) and the social and environmental contexts for learning.

More specifically, the questionnaire design included the following concepts and literatures relevant to the current paper:

- Demographic background information and biographic information concerning participants' engagement with music;

[2] PDF is a fixed-layout document format used for representing two-dimensional documents in a manner independent of the application software, hardware, and operating system

- Self-efficacy in general; with regard to musical skills and performance-specific self efficacy (Bandura, 1997; Hargreaves, Welch, Purves and Marshall, 2003; Sherer et al., 1982);
- Attitudes to practice and other musical and non-musical activities (Ericsson et al., 1993);
- Self-esteem (Rosenberg, 1989);
- Performance and general life anxiety (Nagel, Himle and Papsdorf, 1989; Spielberger, 1983);
- Views on the importance of musical skills in improving performance (Williamon and Thompson, 2002; Williamon 2004; Hargreaves, Welch, Purves and Marshall, 2003);
- Attitudes towards the nature of musical expertise (Hallam, 2005);
- Musical learning and self-regulation (Bandura, 1997; Hargreaves, Welch, Purves and Marshall, 2003; Hargreaves, Purves, Welch and Marshall, 2007; Zimmerman and Martinez-Pons, 1986).

Description of participants

Respondents were 244 musicians, who included 170 undergraduates in UK Higher Education Institutions (70% of participants) and 74 portfolio career musicians, self-reported as following an active performing and teaching career in the UK (30% of participants). 55% of the participants were male and 45% were female.

Musicians were asked to report what they considered to be their main performance genre affiliation, and on this basis, were classified into a music genre group. Almost half of the respondents were classical musicians (N = 117; 48%), whilst the remainder comprised 66 popular (27%), 45 jazz (18.4%) and 16 Scottish Traditional musicians (6.6%). However, the inter-relationship between participant gender and genre was significantly uneven ($\chi^2(3) = 14.18$, $p = .003$). For example, whilst participant females constituted a majority of classical musicians (57%), they were minorities in popular music (36%), Scottish traditional (38%) and jazz (29%). Moreover, these proportions reflected common genre x gender annual recruitment biases reported for each participant HEI in the previous three years.

The mean age for the classical musicians was 29.1 (SD = 11.5) and the mean age for the 'other-than-classical'[3] was 22.8 (SD = 7.20). More specifically, in terms of the 'other-than-classical' genres, the mean age for popular musicians was 21.2 (SD = 4.46), for Scottish Traditional musicians 26.8 (SD = 11.69) and for jazz musicians 23.8 (SD = 7.94). For the purposes of comparisons in age, musicians were categorised into three age groups: (a) age 20 and below (47% of sample), (b) aged 21-26 (27% of sample) and (c) age 27 and over (26% of sample). The continuous age variable was transformed into a categorical variable with three categories using the option 'Equal Percentiles Based on Scanned Cases'. This generated banded categories with an equal number of cases in each band using the aempirical algorithm for percentiles (Empirical Distribution Function with Averaging)[4] (SPSS, 2005).

Measures

Two pairs of questions were chosen for analysis in accordance with the focus of this paper. One pair (Scales A1 and A2) focused on musicians' views regarding musical skills; the second (Scales B1 and B2) investigated musicians' attitudes towards expertise in musical performance. Measures of reliability revealed highly satisfactory Cronbach α values for all four scales, which confirmed that there was high internal consistency in the four measures (see Table 1 below).

TABLE 1 ABOUT HERE

Regarding musical skills, the first question asked musicians to rate the importance of musical skills (see Table 2) and the second requested musicians to rate their own musical skills (see Table 3), both on a 7-point Likert-type scale.

TABLE 2 ABOUT HERE

[3] For the purposes of this paper, we refer to popular, jazz and Scottish traditional music genres as 'other than classical'. This classification was made on the basis of an ANOVA test, where participants across these three musical genres were found to be statistically homogenous on the focus measures of the current paper (for details, see the 'method of analysis' section)

[4] Please note that if there are multiple identical values at a cutpoint, they will all go into the same interval and therefore the actual percentages in each category may not always be exactly equal.

TABLE 3 ABOUT HERE

The pair of questions dealing with expertise in musical performance asked musicians to identify the constituents of expertise in musical performance (see Table 4) and then identify their own, personal level of expertise (see Table 5) on a 7-point Likert-type scale.

TABLE 4 ABOUT HERE

TABLE 5 ABOUT HERE

Method of analysis

An initial statistical analysis (ANOVA) was undertaken to investigate any differences between participants across the three 'other-than-classical' genres (jazz, Scottish traditional, popular) on the four focus questions. With one exception, no statistical differences were evidenced between these genres. The exception concerned views on the nature of musical expertise, with jazz musicians agreeing more highly with the listed constituents of musical expertise than their Scottish traditional peers ($F(2,123) = 4.49$, $p < .05$). Consequently, given the relative statistical homogeneity across these three genre groups on these particular focus measures, the following analyses explore the extent to which classical music participants were distinctive compared to those who were 'other-than-classical' (jazz, Scottish traditional, popular). Additional reasons for this classification related (a) to the established status of the degrees that the undergraduate students were taking (classical – being more established; popular, jazz, Scottish Traditional – relatively newer and more innovative) and (b) group size considerations, in that classical musicians comprised almost half of the participants. Grouping musicians in these two broad categories allowed a comparison of similar sized samples and, because of this, it also had the advantage of providing more robust statistical results.

Factor analyses were conducted on each of the scales measuring (1) views regarding the importance of musical skills, (2) rating of own musical skills, (3) views regarding the constituents of expertise in musical performance and (4) assessment of personal level of expertise, in order to determine whether the items in the scales could be summarised into a smaller number of categories. The suitability of the data for factor analysis was investigated with the Kaiser-Meyer-Olkin (KMO) measure of sampling adequacy and Bartlett's Test of Sphericity; these confirmed the suitability of the data (KMO measure was above .6 and Bartlett's Test of Sphericity was statistically significant in all cases) (Field, 2000). The Varimax Rotation method was selected to ensure that the extracted components were uncorrelated and to aid interpretation of the extracted factors. In accordance to the sample size (200+), factor loadings below .364 were suppressed (Field, 2000). Multivariate analysis of variance (MANOVA) was conducted to investigate differences across gender, age, musical genres (classical vs. other-than-classical) and professional status (student musicians vs. portfolio career musicians) and to explore interactions between these variables. Musicians' 'ideal' versus perceived personal levels of skills and expertise, measured by calculating their total score on each of the scales, were compared using paired samples t-tests. Factors that predicted and accounted for variance in musicians' level of skills and expertise in musical performance were investigated using multiple regression.

Results

The influence of gender, age, genre and professional status

Views regarding the importance of musical skills

The factor analysis revealed six components relating to participants views regarding the importance of musical skills, explaining 65.21% of the variance: (1) Importance of performance skills, (2) Importance of drive to excel musically, (3) Importance of drive to excel technically, (4) Importance of coping skills, (5) Importance of non-notation music skills, (6) Importance of notation-based music skills (Table 6).

TABLE 6 ABOUT HERE

Multivariate analysis of variance was conducted on the six factors to investigate the effects of gender, musical genre, age group and professional status and their

interactions. In relation to gender, statistically significant differences were observed in 'importance of drive to excel technically' ($F(6, 196) = 3.96$, $p = .04$, partial eta squared = .019) and 'importance of coping skills' ($F(6, 196) = 7.98$, $p = .005$, partial eta squared = .038). An inspection of the mean scores indicated that male musicians attributed higher significance to 'importance of drive to excel musically' (males $\underline{M}$ =.087, females $\underline{M}$ = -.02), whilst female musicians considered 'importance of coping skills' to be more significant (males $\underline{M}$ = -.14, females $\underline{M}$ = .42).

In relation to musical genre, statistically significant differences were observed in 'importance of drive to excel musically'($F(6, 196) = 8.20$, $p = .005$, partial eta squared = .039), 'importance of drive to excel technically'($F(6, 196) = 7.98$, $p = .005$, partial eta squared = .038), 'importance of non-notation music skills'($F(6, 196) = 25.37$, $p < .0001$, partial eta squared = .112) and 'importance of notation-based music skills'($F(6, 196) = 4.19$, $p = .04$, partial eta squared = .020). An inspection of the mean scores indicated that classical musicians attributed higher significance to the drive to excel musically (Classical $\underline{M}$ = .19, other than classical $\underline{M}$ = -.17), the drive to excel technically (classical $\underline{M}$ = .19, other than classical $\underline{M}$ = -.11) and notation-based music skills (classical $\underline{M}$ = .22, other than classical $\underline{M}$ = -.18, whilst 'other-than-classical' musicians believed that non-notation music skills were more important (classical $\underline{M}$ = -.58, other than classical $\underline{M}$ = .51).

In relation to age group, statistically significant differences were observed in 'importance of drive to excel technically' ($F(12, 394) = 5.26$, $p = .006$, partial eta squared = .050), and 'importance of notation-based music skills' ($F(12, 394) = 4.25$, $p = .015$, partial eta squared = .041). The drive to excel technically appeared to gain more significance as musicians grew in age (age 20 and below $\underline{M}$ = -.019, age 21-26 = -.14, age 27 and above = .32). The same pattern was evident for the importance of notation-based musical skills (age 20 and below $\underline{M}$ = -.21, age 21-26 = .14, age 27 and above = .28).

In relation to professional status, 'importance of drive to excel technically' ($F(6, 196) = 5.85$, $p = .016$, partial eta squared = .028), and 'importance of non-notation music skills' ($F(6, 196) = 4.41$, $p = .037$, partial eta squared = .021), were the components that yielded differences between undergraduates and portfolio musicians. The drive to

excel technically was considered to be more important by portfolio musicians (undergraduates M = -.0817511, portfolio M = .0633264). Non-notation music skills appeared to be more important for undergraduate musicians (undergraduates M = .19, portfolio M = -.48).

Interactions were observed between variables in some of the components. The interaction between gender and genre was significant for 'importance of drive to excel technically' ($F(6, 196) = 5.75$, $p = .017$, partial eta squared = .028). Classical musicians attributed higher importance to this component, with the effect of genre being stronger for female musicians.

Another significant interaction was observed between gender and age group on 'importance of coping skills' ($F(12, 394) = 3.78$, $p = .025$, partial eta squared = .036). Musicians in the middle age group (ages 21-26) considered coping skills to be more important, but the means for female musicians were much higher.

A significant interaction between genre and professional status was observed for 'importance of drive to excel musically' ($F(6, 196) = 10.88$, $p = .001$, partial eta squared = .051). Portfolio musicians considered drive to excel musically to be more important, but the gap between undergraduates and portfolio musicians was much higher for classical musicians.

Age group and professional status had a significant interaction effect on 'importance of notation-based music skills' ($F(12, 394) = 5.26$, $p = .006$, partial eta squared = .05). Whilst portfolio musicians considered notation-based musical skills to be less important in the lowest and higher age groups, in the middle age group (ages 21-26) they considered these skills to be more important compared to undergraduate musicians.

These findings are graphically illustrated in Figure 2 below:

FIGURE 2 ABOUT HERE

Rating of own musical skills

Factor analysis was again conducted to see whether areas that musicians focused on when rating their own musical skills could be identified. The analysis revealed three components, explaining 58.4% of the variance: 1) Self-assessment of performance skills and performance quality, 2) Self-assessment of drive to excel technically 3) Self-assessment of coping skills (table 7).

TABLE 7 ABOUT HERE

The multivariate analysis of variance revealed a significant effect for gender on component 'self-assessment of coping skills' ($F(3, 203) = 9.56$, $p = .002$, partial eta squared = .045), with males rating their coping skills higher compared to females (male $\underline{M} = .22$, Female = -.27).

In relation to musical genre, significant differences were observed in 'self-assessment of performance skills and performance quality' ($F(3, 203) = 4.77$, $p = .03$, partial eta squared = .023), with classical musicians reporting higher personal ratings of performance skills and quality (classical $\underline{M} = .04$, other than classical $\underline{M} = -.001$).

Whilst no significant main effects were observed for age groups in any of the components relating to rating of own musical skills, a significant main effect was observed for professional status in 'self-assessment of performance skills and performance quality' ($F(3, 203) = 6.47$, $p = .01$, partial eta squared = .031), with portfolio musicians reporting higher personal ratings of performance skills and quality (undergraduates $\underline{M} = -.26$, portfolio $\underline{M} = .64$).

Interactions between musical genre, age group and professional status were observed. In all cases, the middle age group (ages 21-26) appeared to report a higher rating of coping skills compared to the other two age groups, with the exception of 'other-than classical' portfolio musicians, who evidenced a higher rating of coping skills in the 'ages 27 and above' age group ($F(3, 203) = 7.13$, $p = .008$, partial eta squared = .034).

These findings are graphically illustrated in Figure 3 below:

FIGURE 3 ABOUT HERE

Views regarding the constituents of expertise in musical performance

Factor analysis was conducted to see whether the items forming views regarding constituents of expertise could be summarised into a smaller number of categories. The analysis revealed three components, explaining 66.44% of the variance: 1) Analytical musical skills, 2) Practical musical skills, 3) Transferable musical skills (table 8).

TABLE 8 ABOUT HERE

Multivariate analysis of variance was conducted on the three extracted components to investigate the effects of gender, musical genre, age group and professional status. No effects were observed for gender in any of the components, indicating that male and female musicians shared similar views on what constitutes expertise in musical performance. It was, however, suggested that more female classical musicians considered 'analytical musical skills' to be less representative of musical expertise compared to male classical musicians (see description of significant interactions below).

Differences between classical and 'other than classical' musicians were observed in 'analytical musical skills' ($F(3, 210) = 10.41$, $p = .001$, partial eta squared = .047), and 'practical musical skills' ($F(3, 210) = 7.55$, $p = .007$, partial eta squared = .034). Classical musicians considered analytical musical skills to be more important in musical expertise (classical $\underline{M} = .26$, other than classical $\underline{M} = -.18$), whilst 'other than classical musicians' viewed practical musical skills as the elements that constitute expertise in musical performance (classical $\underline{M} = -.09$, other than classical $\underline{M} = .09$).

Differences were observed in relation to age group for 'analytical musical skills' ($F(6, 422) = 5.03$, $p = .007$, partial eta squared = .045), with the older age group (ages 27 and above) considering analytical musical skills to be more important in the development of expertise in musical performance compared to the other two younger age groups (age 20 and below $\underline{M} = -.019$, age 21-26 = -.17, age 27 and above = .45).

Differences between undergraduate and portfolio musicians were only observed in relation to 'practical musical skills' ($F(3, 210) = 4.61$, $p = .033$, partial eta squared = .021), with portfolio musicians considering them to be more representative of what constitutes expertise in musical performance compared to undergraduate musicians (undergraduate $\underline{M} = -.04$, portfolio $\underline{M} = .14$).

Significant interactions were observed between gender and musical genre in 'analytical musical skills', with female musicians considering these to be less representative of musical expertise in both musical genres, but a much greater difference was observed between the two genders in the classical musicians compared to the 'other than classical' group ($F(3, 210) = 4.49$, $p = .035$, partial eta squared = .021).

Another significant interaction was observed between musical genre and age group in 'analytical musical skills'. The importance attributed to analytical musical skills as components of musical expertise increased with age in both musical genres, but the effect was stronger for 'other than classical' musicians ($F(6, 422) = 3.32$, $p = .038$, partial eta squared = .03).

Interactions were also observed between musical genre, age group and professional status in 'analytical musical skills'. In all cases, the oldest age group (age 27 and above) gave the highest score in this component. However, in 'other than classical' (both undergraduates and portfolio) the score appeared to increase with age. In classical musicians, the opposite pattern was observed, with the middle age group (age 21-26) evidencing a decrease in score in the undergraduate group and an increase in the portfolio musicians group ($F(3, 210) = 4.64$, $p = .032$, partial eta squared = .021).

These findings are graphically illustrated in Figure 4 below:

FIGURE 4 ABOUT HERE

Assessment of personal level of expertise

The factor analysis on the scale dealing with assessment of personal level of expertise revealed three components, explaining 70.91% of the variance: 1) Self-assessment of analytical musical skills, 2) Self-assessment of practical musical skills, 3) Self-assessment of transferable musical skills (table 9).

TABLE 9 ABOUT HERE

A previously, multivariate analysis of variance was conducted on the three extracted components. No effects were observed for gender in any of the components, indicating that male and female musicians shared similar views on their personal level of expertise.

A significant main effect for musical genre was observed on the 'self-assessment of transferable musical skills' ($F(3, 200) = 4.46$, $p = .036$, partial eta squared = .022), indicating that, overall, 'other than classical' musicians rated their transferable skills higher compared to classical musicians (classical $\underline{M} = -.11$, other than classical $\underline{M} = .12$).

Differences in relation to age group were only observed for 'self-assessment of analytical musical skills' $F(6, 402) = 8.05$, $p < .0001$, partial eta squared = .074), suggesting that as musicians matured, they considered their analytical musical skills to improve (age 20 and below $\underline{M} = -.22$, age 21-26 = -.10, age 27 and above = .58). However, a significant main effect for professional status was not observed, suggesting that the change in the self-assessment of analytical skills was related to maturity rather than professional experience.

A significant interaction was observed between gender and professional status in 'self-assessment of practical musical skills' $F(3, 200) = 6.40$, $p = .01$, partial eta squared = .031), with the difference between undergraduates and portfolio musicians being much greater in male compared to female musicians.

These findings are graphically illustrated in Figure 5 below:

FIGURE 5 ABOUT HERE

Comparisons of ideal versus perceived skills and expertise

Views on musical skills vs. assessment of own skills

A paired samples *t*-test was conducted to explore whether there was a statistically significant difference between the importance that the participants attributed to musical skills and the rating of their own musical skills. Essentially, this was an investigation of the difference between what musicians considered 'ideal' musical skills (evidenced through the importance they attributed to the musical skills listed) and the 'perceived' skills that they thought that they had acquired, at the time of data collection (evidenced through the rating of their musical skills). Results can be seen in Table 10, and show that there was a statistically significant difference between ideal and perceived musical skills ($t(235) = 13.42$, $p < .0001$) taking the sample as a whole. The mean value of ideal skills was higher than the perceived skills that musicians believed that they had acquired, indicating a gap between the skills that musicians aspired to obtain and their self-assessed competence at the time of data collection.

TABLE 10 ABOUT HERE

To investigate these results further, the difference between ideal and perceived skills (calculated by subtracting the mean values of the two variables) was compared across different groups in the sample. Results are shown in Table 11 below. Significant differences were observed for gender ($t(233) = -3.36$, $p = .001$) and professional status ($t(234) = 3.85$, $p < .0001$), with females and undergraduate musicians evidencing a larger gap between their ideal and perceived musical skills.

TABLE 11 ABOUT HERE

Attitudes towards constituents of expertise in musical performance vs. assessment of personal level of expertise

Similarly to the musical skills analysis, a paired samples *t*-test was conducted to explore differences between participants' views on the nature of musical expertise and

the rating of their own musical expertise. The investigation of the difference between what musicians 'ideal' and 'perceived' expertise at the time of data collection showed that there was no statistically significant difference ($t(236) = 1.31$, $p = .189$).

TABLE 12 ABOUT HERE

The difference between ideal and perceived expertise (calculated by subtracting the mean values of the two variables) was compared across different groups in the sample and results are shown in Table 13 below. Significant differences were only observed for professional status ($t(235) = 3.05$, $p = .003$). Portfolio musicians evidenced that their 'ideal' level of expertise was lower than their 'perceived' level of expertise, whilst the opposite was the case for the undergraduate musicians.

TABLE 13 ABOUT HERE

Prediction of level of skill and expertise

Prediction of importance attributed to musical skills

A stepwise multiple regression was performed with 'total importance of musical skills' as the dependent variable. A number of independent variables hypothesised to influence the importance allocated to musical skills were entered into SPSS, which, using the stepwise method, was able to calculate the optimal model of prediction based on these data. The optimal model was calculated by SPSS on the basis of the independent variables meeting certain statistical criteria. The regression model as a whole was statistically significant [$F(4, 99) = 22.82$, $p < .0001$). The effect size, as calculated by the multiple R was .688, $R^2 = .47$ and the adjusted $R^2 = .45$, indicating that the model explained 45% of the variance in the importance attributed to musical skills. The final model consisted of four independent (predictor) variables, which were 'total control over own musical skills' (beta = .406, $p < .0001$), 'total importance of musical learning and self-regulation skills' (beta = .300, $p = .001$), 'total general self-esteem' (Rosenberg, 1989) (beta = .348, $p = .001$) and 'total specific performance efficacy' (beta = .284, $p = .012$). The scales that formed these variables can be seen in the Appendix.

Prediction of rating of own personal musical skills

A stepwise multiple regression was performed with 'total rating of own musical skills' as the dependent variable. A number of independent variables hypothesised to influence one's personal assessment of musical skills were entered into SPSS, which, using the stepwise method, was able to calculate the optimal model of prediction based on these data. Overall, the multiple regression model as a whole was statistically significant [$F(4, 99) = 61.95$, $p < .0001$). The effect size, as calculated by the multiple R was .845, $R^2 = .72$ and the adjusted $R^2 = .70$, indicating that the model explained 70% of the variance in the rating of own musical skills. The final model consisted of four independent (predictor) variables, which were 'total control over own musical skills' (beta = .442, p = <.0001), 'total general life anxiety' (Spielberger, 1983) (beta = -.252, p = <.0001), 'total musical self-efficacy attitudes' (beta = .225, p = .005) and 'total pleasure obtained from musical activities' (beta = .146, p = .029). The scales that formed these variables can be seen in the Appendix.

Prediction of views regarding the constituents of musical expertise

The third stepwise multiple regression had 'total views on nature of musical expertise' as the dependent variable, and variables hypothesised to influence views on the nature of musical expertise were used as predictors. Overall, the multiple regression model as a whole was statistically significant [$F(1, 102) = 79.50$, $p < .0001$). The effect size, as calculated by the multiple R was .662, $R^2 = .44$ and the adjusted $R^2 = .43$, indicating that the model explained 43% of the variance in the rating of own musical expertise. The final model consisted of one independent (predictor) variable, 'total rating of own musical expertise' (see table 5) (beta = .662, p = <.0001).

Prediction of assessment of own musical expertise

The final stepwise multiple regression was performed with 'total rating of own musical expertise' as the dependent variable. The regression model as a whole was statistically significant [$F(3, 100) = 36.44$, $p < .0001$). The effect size, as calculated by the multiple R was .723, $R^2 = .52$ and the adjusted $R^2 = .51$, indicating that the model explained 51% of the variance in the assessment of own musical expertise. The final model consisted of three independent (predictor) variables, which were 'total views on nature of musical expertise' (see Table 4) (beta = .609, $p < .0001$), 'total specific

performance preparation efficacy' (see Appendix) (beta = .203, p = .008) and 'total importance of musical skills' (see Table 2) (beta = .152, p = .044).

Discussion

The influence of gender, age, genre and experience in perceptions of skill and expertise in music

Findings from this study suggest that conceptions and self-assessments of skill and expertise in advanced musical learners is a complex phenomenon that relates to gender, age, musical genre and professional experience. Some differences were observed in musicians' perceptions and attitudes in relation to all four variables. Most of the differences were observed between classical and 'other than classical' musicians.

Male musicians appeared to attribute higher significance to the drive to excel musically in terms of achieving success. Female musicians attributed higher importance to coping skills for achieving success, but, at the same time, they rated their coping skills significantly lower than males. This may relate to why female musicians have generally been reported as coping less effectively with the demands of performance and experiencing higher levels of musical performance anxiety (Wesner et al., 1990; Fishbein et al., 1988; Dews and Williams, 1989; Ryan, 2004; Rae and McCambridge, 2004; Kenny and Osborne, 2006; Papageorgi, 2007). Additionally, females considered analytical musical skills to be less representative of musical expertise compared to males, especially classical female musicians. This suggests that musical genre may influence perceptions of what constitutes expertise in male and female musicians.

The influence of musical genre was confirmed with the second multivariate analysis. Overall, a number of differences were observed between classical and 'other than classical' musicians. Most of the differences centred on the identification of important musical skills and the constituents of expertise and on self-assessments of skill and expertise. Classical musicians considered the drive to excel musically and technically, notation-based skills and analytical skills to be the most important musical skills, whilst 'other than classical' musicians considered non-notation music skills to be

more important. This is not surprising if we compare the conventions of classical music with those of popular, jazz and folk music. The latter rely more heavily on skills such as improvisation, memorisation and playing by ear, whilst classical music has been associated with notation reading and mastering the Western musical canon. Classical musicians were found to rate themselves higher in terms of their performance skills and quality. It is possible that this may relate to the nature and length of time that classical performance behaviours have been subject to formal assessment in higher education compared to those in other-than-classical genres, and / or that 'other-than-classical' musicians have idealised views of expertise that relate to individual 'stars' (well-known performers) in their chosen genre – a finding suggested elsewhere from the wider data set (Creech et al., 2008). Furthermore, the musicians in 'other-than-classical' genres typically begin to engage with music at a later age (Gruber, Degner and Lehmann, 2004; Creech et al., 2008) and, as a consequence, may feel less proficient compared to classical musicians because of this. 'Other than classical' musicians rated themselves higher in terms of transferable musical skills, which may be explained by the fact that musicians in popular, jazz and folk genres often have to be versatile and apply their skills to a greater variety of related musical genres.

Older musicians (ages 27 and above) have been found to attribute higher significance to the drive to excel musically in terms of being a successful musician and to analytical skills as constituents of expertise in musical performance. They also rated their analytical skills higher compared to younger musicians (ages 21 and below).

Portfolio musicians considered the drive to excel technically to be more important in being a successful musician, and considered practical musical skills to be the most important constituents of expertise. On the contrary, undergraduate musicians considered non-notation musical skills to be more important in being a successful musician. Portfolio musicians, overall, rated their performance skills and quality higher compared to undergraduate musicians.

The findings relating to age group and professional status suggest that as musicians mature, develop and gain more experience professionally, their internal standards of what constitutes an effective musician may elevate, but at the same time they also

appear to be more confident and develop musically, as they rate themselves higher in some musical skills. The latter finding is in line with existing theories of expertise development (Bloom, 1985; Sosniak, 1985, 1990; Manturzewska, 1990; Ericsson and Smith, 1991, Ericsson, 1996).

The relation between ideal and perceived skill and expertise in musicians

Comparisons of 'ideal' versus 'perceived' musical skills in the participating musicians suggest that there may be a gap between the two. Results suggest that, overall, musicians rated their ideal musical skills higher in comparison to how they evaluated themselves in such skills. This difference is likely to be a product of the undergraduate nature of a large proportion of participants who are likely to realise that further study is needed in comparison with their more experienced performer peers. The data indicate that this was the case for females and undergraduate musicians, as these two groups evidenced a larger gap between their ideal and perceived musical skills. This may also suggest that these two groups of musicians are less confident and that they are, therefore, more at risk of having negative performance experiences and suffering from performance anxiety.

When comparing 'ideal' versus 'perceived' levels of expertise, it was found that there were no significant differences, taking the sample as whole. A closer investigation of various subgroups within the participants did, however, reveal that portfolio career musicians and undergraduates differed in how they conceptualised their 'ideal' and 'perceived' expertise. Whilst undergraduate musicians' responses indicated that they had not yet achieved their ideal level of expertise, portfolio career musicians expressed a lower level of 'ideal' expertise compared to their 'perceived' self-assessed level of expertise. This is an indication that professional musicians believed that they had already achieved and surpassed their ideal level of expertise, perhaps even appearing overly confident, or that the 'ideal' was some form of 'average' that they individually had surpassed (in the way that most car drivers are reported to believe that they are better than average). Interestingly, research in the domain of expertise in the domains of chess playing, physics and music has found that experts can often miscalibrate their capabilities by being overly confident (Chi, 2006).

The prediction of expertise in advanced musical learners

Predictors of high levels of agreement with listed musical skills included having control of own musical skills, attributing high importance to learning and self-regulation skills, having high self-esteem and having high performance self-efficacy. Musicians that expressed higher levels of personal expertise also evidenced higher agreement with the listed expertise-related qualities. It appears that the more self-confident musicians are, the higher they value musical skills and expertise, perhaps because they feel that they are closer to achieving these ideals. The closer musicians feel that they are to achieving their ideals, they more motivated they may be to focus their efforts on achieving them. A possible link between musical ability and achievement motivation has also been cited in Asmus' work on achievement motivation (Asmus, 1986a, 1986b, 1994), where musical ability (which in our data relates to musicians' perceived skill and expertise) has been reported as one of the factors that influence students' attributions of success and failure in music, along with effort, background, classroom environment and affect for music.

Characteristics that predicted musicians' rating of their own musical skills and accounted for variability in their self-assessments included a sense of having control over own musical skills, having low levels of trait anxiety, having high musical self-efficacy and deriving pleasure from musical activities. The regression data on musicians' rating of own musical expertise suggested that significant predictors of a high rating of personal expertise relate to reported high performance preparation efficacy and the attribution of high importance to the listed musical skills. It seems that the acquirement of confidence in one's musical abilities may be related to feelings of being in control and efficacious in music, having low levels of life anxiety, obtaining pleasure from engagement with music and aspiring to high levels of musical skill and expertise.

Conclusions

This study offers insights into perceptions of expertise in advanced musical learners. An examination of the factors that shape musicians' views towards musical skills and expertise indicates that key variables of gender, age, musical genre and professional experience are linked to musicians' attitudes and the way that they assess themselves.

Findings indicate that female musicians, 'other-than-classical' musicians and undergraduate musicians may be more prone than male, classical and professional musicians respectively to having less positive attitudes towards aspects of their own performance skills and expertise. A wider difference between 'ideal' and 'perceived' musical skills and expertise was observed in female and undergraduate musicians. Whilst this may reflect appropriate levels of realism on the part of such skilled musicians, it is important that both musicians and those who educate them are aware of this difference and try to limit the gap between 'ideal' and 'perceived'. Musicians' aspirations should remain within reasonable boundaries so that they do not end up measuring themselves against unobtainable benchmarks that might threaten their self-esteem. Teachers should promote a healthy and balanced approach to performance by explaining that musicians should aim at producing personal interpretations of music rather than comparing their performance against their peers or trying to emulate well-established figures in the chosen musical genre. They should also try to facilitate a more constructive view of performance by stressing that each performance should be conceived as an opportunity to learn and improve performance skills.

Finally, the study has highlighted characteristics that predict and account for the variability in advanced musicians' views and attitudes regarding musical expertise and self-assessments of personal levels of expertise. These include having control of own musical skills, attributing high importance to learning and self-regulation skills, having high self-esteem, having low levels of trait anxiety, having high musical performance and preparation self-efficacy, deriving pleasure from musical activities and attributing high importance to the listed musical skills and expertise-related qualities. Our analysis has also highlighted reference points that musicians may use when assessing the importance of musical skills and when rating their own musical skills and expertise. These reference points represent broad areas that higher education music curricula can focus upon. For example, activities that aim to develop musicians' performance coping skills (such as management of performance anxiety, stamina and every day stress), improve technical preparation skills (such as quantity and quality of practice, perseverance and motivation) and promote the development of transferable skills (such as presentation skills, organisational skills, time management

skills, interpersonal skills) will be beneficial for developing performance confidence, improving practice efficiency and maintaining career longevity.

Further research is needed to explore the factors that influence the perceptions of expertise in musical performance, and to investigate in more depth the effects of gender, age, musical genre, experience and other personal factors on musicians' views regarding the nature and personal assessments of expertise. Gaining insights into how different groups of musicians conceptualise expertise is very useful in understanding the benchmarks that they set themselves. We do not know yet how experts in the field of musical performance approach novel tasks and whether they apply their existing musical skills to new situations. Future research in the field may benefit from investigating the notion of 'adaptive expertise' (Bransford et al., 1999) in musicians, which relates to how experts approach new problems. Approaching new tasks with the aim to apply existing knowledge and solve a problem as efficiently and quickly as possibly (a quality of a 'routine expert' or 'artisan') or approaching new problems with the purpose to expand existing solution strategies (a quality of an 'adaptive expert' or 'virtuoso') may bear implications on how musicians approach their personal practice and the points of reference they may use when making assumptions about their own expertise.

(Word count: 8328)

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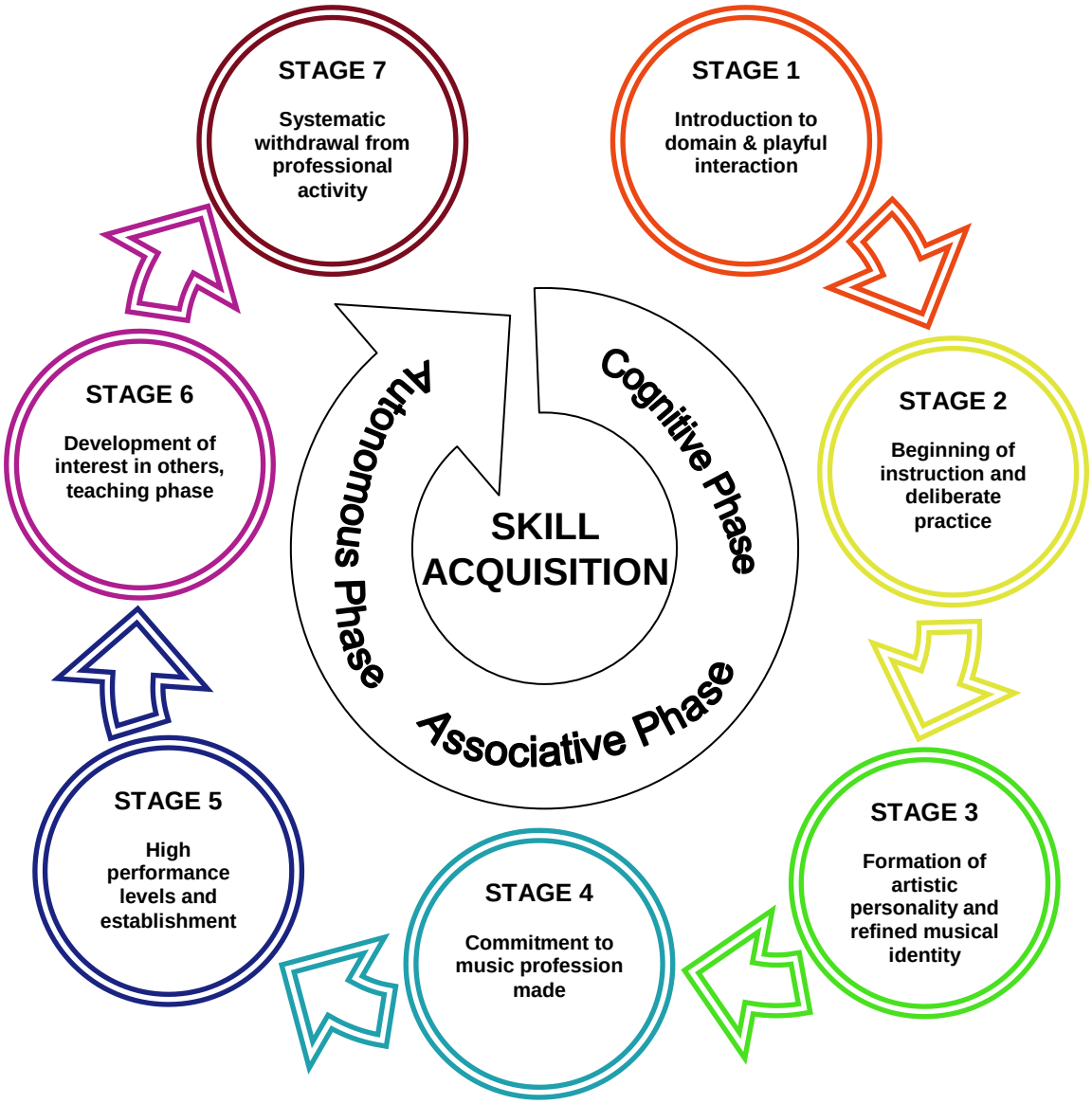

Figure 1: The developmental pathway of professional musicians

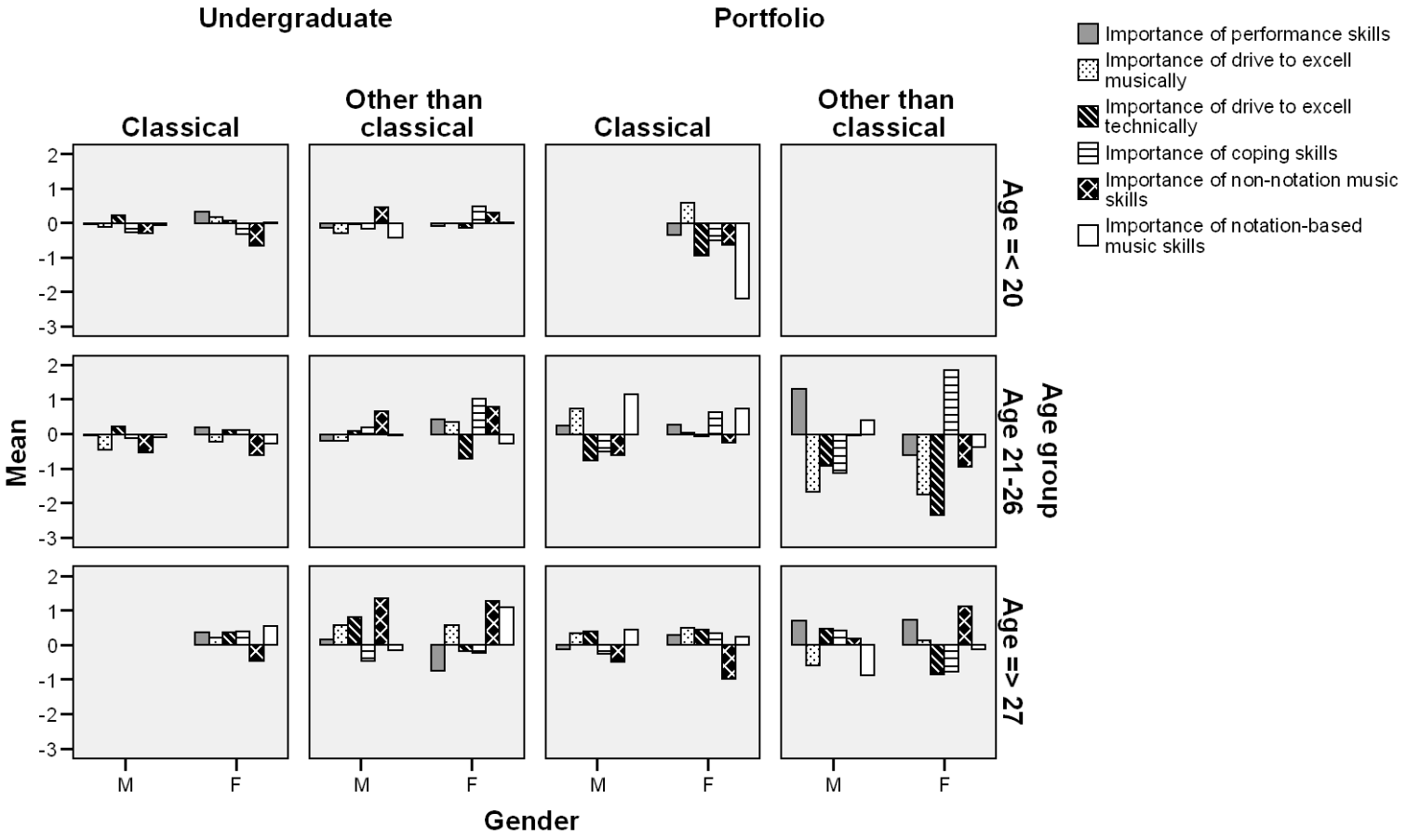

Figure 2: Views regarding the importance of musical skills

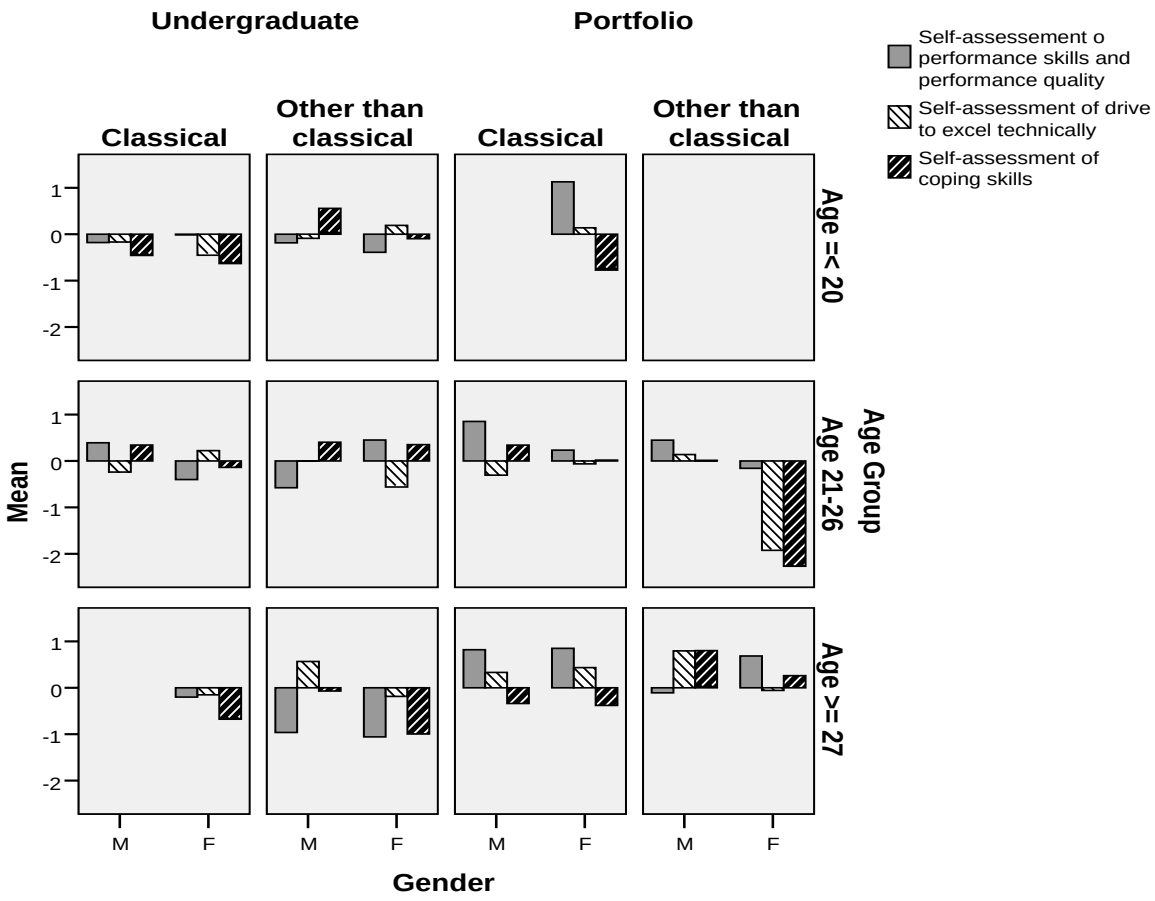

Figure 3: Ratings of own musical skills

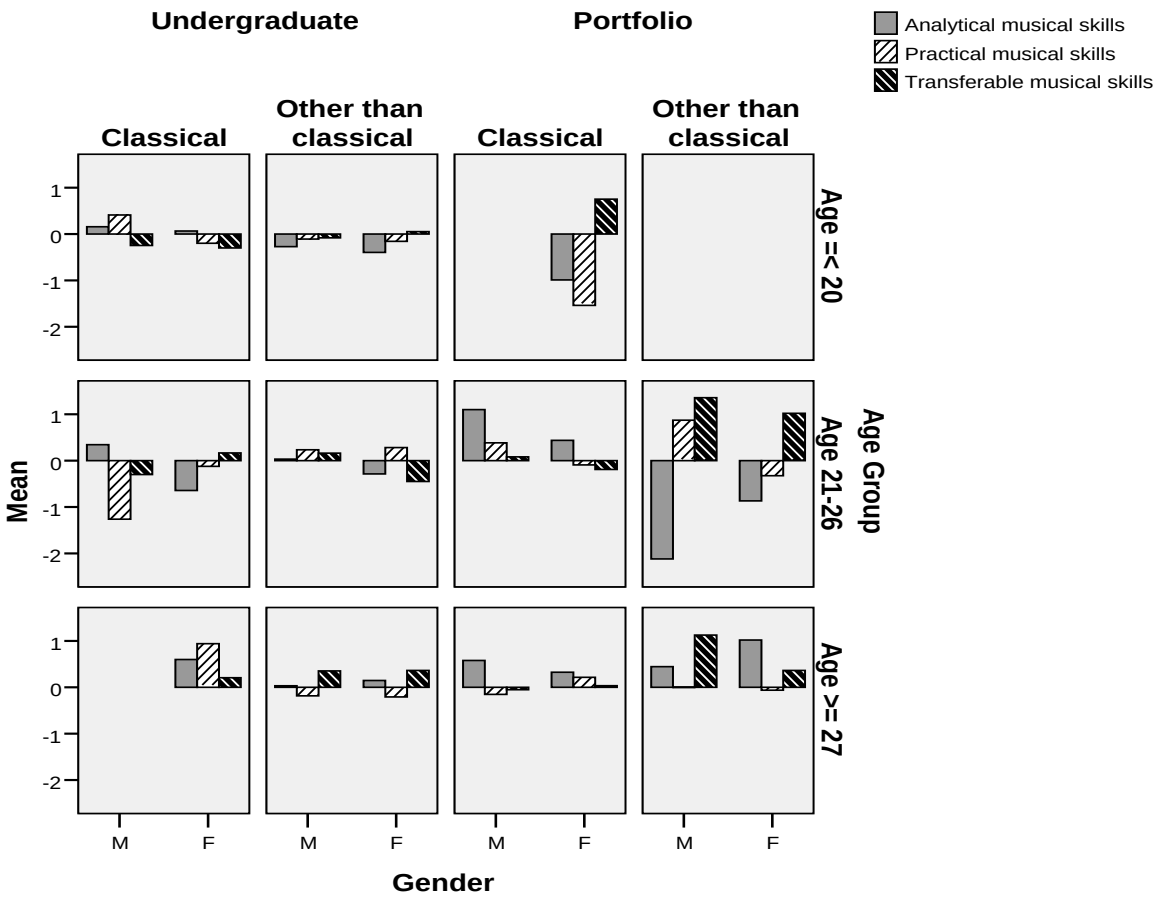

Figure 4: Views regarding constituents of expertise

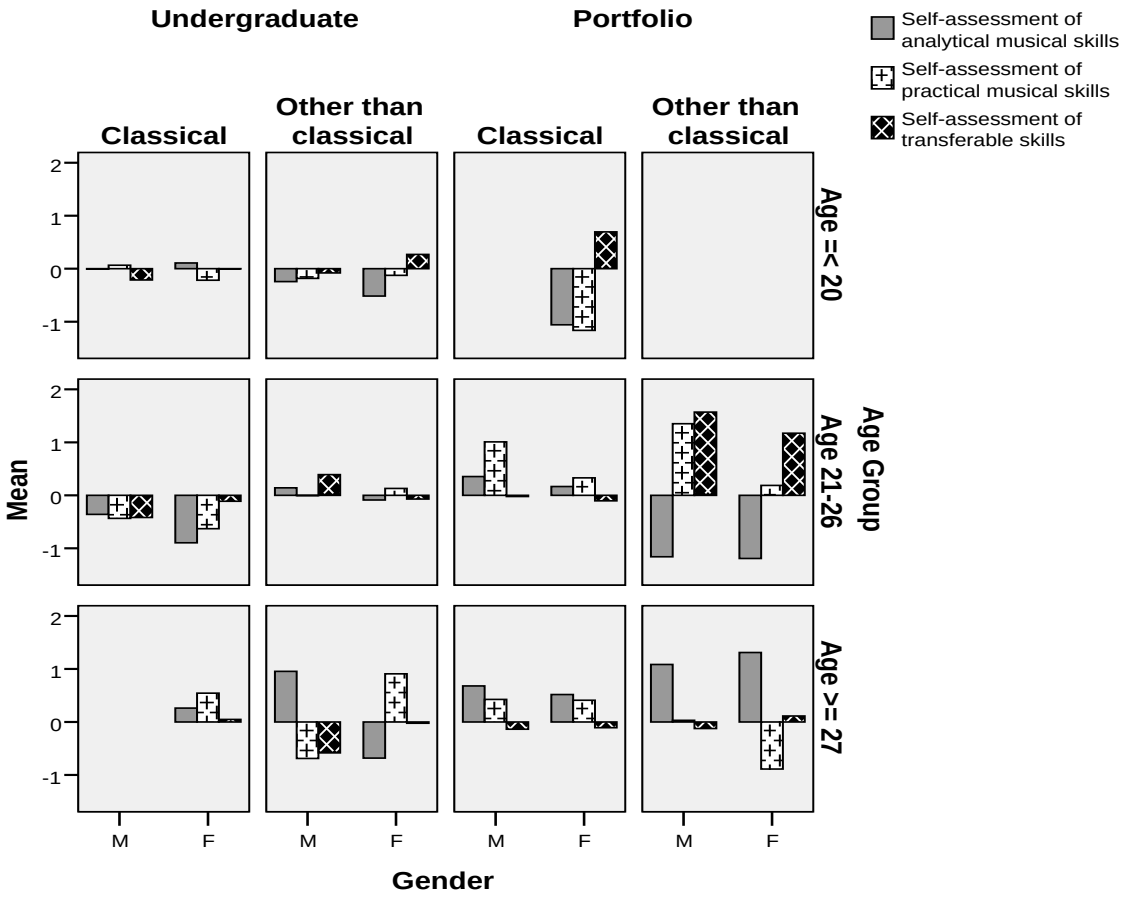

Figure 5: Self-assessment of personal level of expertise

Scale	Cronbach α value
A1	.886
A2	.929
B1	.771
B2	.819

Table 1: Internal consistency measures for four scales used

To be a successful musician in your area of performance, how important is a musician's: 1 = not at all important, 7 = extremely important
1. Natural ability
2. Ability to collaborate/work with other performers
3. Management of everyday stress
4. Stamina
5. Acute ear/detailed listening
6. Ability to memorise
7. Ability to sight read
8. Ability to improvise
9. Quantity of practice
10. Technical proficiency
11. Quality/effectiveness of practice
12. Quality and control of tone
13. Ability to engage in effective mental rehearsal
14. Musicality, interpretative or expressive skills
15. Sense of stylistic appropriateness
16. Ability to communicate musically with the audience
17. Ability to learn new musical material and concepts quickly and easily
18. Level of perseverance
19. Ability to manage stage fright
20. Motivation and drive to excel
21. Overall standard of playing
22. Overall standard of performance

Table 2: Scale 1A - Importance of musical skills

Considering your abilities in relation to other musicians on your first study instrument (of a similar age and experience), how do you rate your own: 1 = much less ability, 7 = excellent ability
1. Natural ability
2. Ability to collaborate/work with other performers
3. Management of everyday stress
4. Stamina
5. Acute ear/detailed listening
6. Ability to memorise
7. Ability to sight read
8. Ability to improvise
9. Quantity of practice
10. Technical proficiency
11. Quality/effectiveness of practice
12. Quality and control of tone
13. Ability to engage in effective mental rehearsal
14. Musicality, interpretative or expressive skills
15. Sense of stylistic appropriateness
16. Ability to communicate musically with the audience
17. Ability to learn new musical material and concepts quickly and easily
18. Level of perseverance
19. Ability to manage stage fright
20. Motivation and drive to excel
21. Overall standard of playing
22. Overall standard of performance

Table 3: Scale 1B **– Rating of own musical skills**

We are interested in your views on the nature of expertise and excellence in musical performance. Please rate your agreement with each of these statements:

As applied to musicians in general:

1 = disagree 7 = agree

1. A highly skilled musician cannot automatically transfer their skills to another area of human behaviour
2. A highly skilled musician cannot automatically transfer their skills to another musical genre (such as from classical to jazz, pop or traditional music)
3. Expert performers are much more competent in reading musical notation
4. Expert performers are much quicker at much quicker at learning new music than those less skilled
5. Expert performers have superior musical memory
6. Expert performers have more refined problem-solving skills
7. Expert performers spend a great deal of time analysing a significant musical problem before attempting a solution
8. A highly skilled musician is better at self-monitoring
9. A highly skilled musician is better at knowing how to address errors
10. A highly skilled musician is better at sustaining skills

Table 4: Scale 2A – Constituents of expertise in musical performance

We are interested in your views on the nature of expertise and excellence in musical performance. Please rate your agreement with each of these statements:

This applies to me as a performer:

1 = disagree, 2 = agree

1. A highly skilled musician cannot automatically transfer their skills to another area of human behaviour
2. A highly skilled musician cannot automatically transfer their skills to another musical genre (such as from classical to jazz, pop or traditional music)
3. Expert performers are much more competent in reading musical notation
4. Expert performers are much quicker at much quicker at learning new music than those less skilled
5. Expert performers have superior musical memory
6. Expert performers have more refined problem-solving skills
7. Expert performers spend a great deal of time analysing a significant musical problem before attempting a solution
8. A highly skilled musician is better at self-monitoring
9. A highly skilled musician is better at knowing how to address errors
10. A highly skilled musician is better at sustaining skills

Table 5: Scale 2B – Identification of personal level of expertise

	Views on importance of musical skills component					
	Importance of performance skills	**Importance of drive to excel musically**	**Importance of drive to excel technically**	**Importance of coping skills**	**Importance of non-notation music skills**	**Importance of notation-based music skills**
Ability to communicate musically with the audience	.767					
Sense of stylistic appropriateness	.745					
Musicality, interpretative or expressive skills	.646	.462				
Ability to learn new musical material and concepts quickly and easily	.631					
Level of perseverance	.547			.407		
Ability to engage in effective mental rehearsal	.492					
Overall standard of performance	.346	.723				
Overall standard of playing		.714				
Natural ability		.691				
Quality and control of tone		.505				
Quality/effectiveness of practice			.742			
Quantity of practice			.732			
Technical proficiency		.397	.672			
Motivation and drive to excel		.409	.422			
Management of everyday stress				.824		
Stamina				.773		
Ability to manage stage fright				.441		
Ability to improvise					.871	
Ability to memorize					.793	
Ability to sight read						.792
Ability to collaborate/work with other performers				.419		.489
Acute ear/detailed listening						

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 6: Factor loadings for views regarding the importance of musical skills

	Ratings of own musical skills component		
	Self-assessment of performance skills and performance quality	Self-assessment of drive to excel technically	Self-assessment of coping skills
Musicality, interpretative or expressive skills	.794		
Sense of stylistic appropriateness	.781		
Ability to communicate musically with the audience	.765		
Ability to collaborate/work with other performers	.716		
Ability to learn new musical material and concepts quickly and easily	.683		
Acute ear/detailed listening	.675		
Natural ability	.657		
Quality and control of tone	.647	.475	
Overall standard of performance	.632	.430	.403
Overall standard of playing	.595	.502	
Ability to sight read	.545		
Ability to engage in effective mental rehearsal	.461		
Quantity of practice		.836	
Quality/effectiveness of practice	.419	.692	
Motivation and drive to excel		.661	.392
Technical proficiency	.513	.617	
Level of perseverance	.413	.471	
Ability to manage stage fright			.660
Ability to improvise			.633
Stamina			.621
Ability to memorize			.618
Management of everyday stress			.581

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 7: Factor loadings for rating of own musical skills

	Views on constituents of expertise component		
	Analytical musical skills	**Practical musical skills**	**Transferable musical skills**
A highly skilled musician is better at knowing how to address errors	.912		
A highly skilled musician is better at sustaining skills	.906		
A highly skilled musician is better at self-monitoring	.858		
Expert performers have superior musical memory		.767	
Expert performers are much quicker at learning new music than those less skilled		.761	
Expert performers are much more competent in reading musical notation		.683	
Expert performers spend a great deal of time analysing a significant musical problem before attempting a solution		.575	
Expert performers have more refined problem-solving skills	.379	.509	
A highly skilled musician cannot automatically transfer their skills to another musical genre			.842
A highly skilled musician cannot automatically transfer their skills to another area of human behaviour			.822

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 8: Factor loadings for views regarding constituents of expertise

	Assessment of personal level of expertise component		
	Self-assessment of analytical musical skills	**Self-assessment of practical musical skills**	**Self-assessment of transferable musical skills**
A highly skilled musician is better at knowing how to address errors (*applies to me*)	.889		
A highly skilled musician is better at self-monitoring (*applies to me*)	.877		
A highly skilled musician is better at sustaining skills (*applies to me*)	.828		
Expert performers have more refined problem-solving skills (*applies to me*)	.720	.393	
Expert performers spend a great deal of time analysing a significant musical problem before attempting a solution (*applies to me*)	.614	.307	
Expert performers are much more competent in reading musical notation (*applies to me*)		.828	
Expert performers are much quicker at learning new music than those less skilled (*applies to me*)	.331	.827	
Expert performers have superior musical memory (*applies to me*)	.342	.711	
A highly skilled musician cannot automatically transfer their skills to another area of human behaviour (*applies to me*)			.820
A highly skilled musician cannot automatically transfer their skills to another musical genre (*applies to me*)			.749

Extraction Method: Principal Component Analysis.
Rotation Method: Varimax with Kaiser Normalization.

Table 9: Factor loadings for self-assessment of personal level of expertise

	Possible scores on each variable		Mean	Std.	
	Minimum	Maximum	(Total sample)	Deviation	Sig.
1A - Total importance of musical skills	22.00	154.00	127.31	15.86	<.0001
1B - Total rating of own musical skills	22.00	154.00	110.36	19.70	

Table 10: Comparison of ideal versus perceived musical skills for the whole sample

	Comparisons	Mean	Std. Deviation	Sig.
Difference between ideal skills and perceived skills	**Gender**			.001
	Male	13.27	18.53	
	Female	21.64	19.56	
Difference between ideal skills and perceived skills	**Age group**			n.s.
	Age 20 and below	18.03	20.06	
	Age 21-26	19.82	18.89	
	Age 27 and above	12.48	18.23	
Difference between ideal skills and perceived skills	**Musical genre**			n.s.
	Classical	16.38	18.73	
	Other-than-classical	17.43	20.01	
Difference between ideal skills and perceived skills	**Professional status**			<.0001
	Undergraduate	19.98	20.37	
	Portfolio musician	9.59	14.48	

Table 11: Comparison of ideal versus perceived musical skills for different groups in the sample

	Possible scores on each variable		Mean (Total sample)	Std. Deviation	Sig.
	Minimum	Maximum			
2A - Total views on nature of musical expertise	10.00	70.00	45.28	9.57	n.s.
2B - Total rating of own musical expertise	10.00	70.00	44.64	9.48	

Table 12: Comparison of ideal versus perceived musical expertise for the whole sample

	Comparisons	Mean	Std. Deviation	Sig.
Difference between ideal and perceived expertise	**Gender**			n.s.
	Male	.84	6.89	
	Female	.45	8.23	
Difference between ideal and perceived expertise	**Age group**			n.s.
	Age 20 and below	1.12	7.55	
	Age 21-26	1.03	7.82	
	Age 27 and above	-.64	7.12	
Difference between ideal and perceived expertise	**Musical genre**			n.s.
	Classical	.11	8.75	
	Other-than-classical	1.11	6.20	
Difference between ideal and perceived expertise	**Professional status**			.003
	Undergraduate	1.57	7.85	
	Portfolio musician	-1.66	6.02	

Table 13: Comparison of ideal versus perceived musical expertise for different groups in the sample