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# Competitiveness and performance anxiety as predictors of performance success and intent to quit playing: deliberate practice as mediator and moderator

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**ABSTRACT**

This study examined how music performance anxiety (MPA) and competitiveness were associated with intent to quit playing one's musical instrument and perceived performance success in a sample of 281 aspiring professional musicians. Most importantly, both the mediating and moderating role of DP were explored with these outcomes. The hypotheses were partially supported: MPA predicted intent to quit playing positively, and performance success negatively. Competitiveness did not significantly relate to either of the outcomes. Notably, the results revealed that the more involvement in DP the less MPA, which in turn predicted lower intent to quit playing and greater performance success among the participants. Indirect effects indicated that DP partially mediated the relationship between MPA and both outcomes. Competitiveness was not related to DP, and indirect effects via DP were not significant. Hierarchical regression analyses showed that DP accounted for additional variance beyond MPA and was strongly associated with greater performance success and lower turnover intention. The interaction term (DP × MPA) did not predict outcomes, providing no clear evidence for a buffering role of DP. These findings highlight the direct association of DP with positive outcomes in aspiring professional musicians, rather than any moderating effect on the negative consequences of MPA.

## Introduction

Deliberate practice (DP) is 'a highly structured activity, the explicit goal of which is to improve performance. Specific tasks are invented to overcome weaknesses, and performance is carefully monitored to provide clues for ways to improve it further' (Ericsson, Krampe, and Tesch-Römer 1993, 364). DP is generally not inherently enjoyable but is instead motivated by a desire for progress and mastery. Both the quantity and quality of practice are essential to achieving and maintaining expertise (Ericsson, Krampe, and Tesch-Römer 1993; Krampe and Ericsson 1996). In fact, research among performance students at the Norwegian Academy of Music indicates that, on average, music students accumulate 7,800 hours of individual practice over five years (Jørgensen 1996). Accumulating DP over time – through formal rather than informal practice – consistently predicts

superior performance (e.g. Platz et al. 2014; Sloboda et al. 1996; Sosniak 1985; Williamon and Valentine 2000) and promotes evenness in skill-specific motor control (Jabusch et al. 2009).

While DP contributes to technical and artistic development, performance programmes in higher music education are competitive and can impose significant physical and psychological demands on students (Miksza, Evans, and McPherson 2021; Williamon and Thompson 2006). The motivation and competition to succeed is high, and it is not uncommon for students to hear each other practicing through the often poorly soundproofed walls between practice rooms. In fact, MPA, 'the experience of marked and persistent anxious apprehension related to musical performance (…), which is manifested through combinations of affective, cognitive, somatic, and behavioural symptoms' (Kenny 2011, 433), is a stable and highly prevalent issue among both aspiring and professional musicians (Barros et al. 2022; Fishbein et al. 1988). Nearly 60% of US music students recently reported that they experience moderate to severe levels of depression, with 70% indicating moderate to severe anxiety (Payne, Lewis, and McCaskill 2020). A follow-up study by the same authors showed increases in these rates three years later, with 70% reporting depression and 74% reporting anxiety, largely due to time constraints and high environmental expectations (Payne 2023). In essence, performances we witness in recitals, concert halls, and examinations are built on hours of DP, yet most likely considerable degrees of competitiveness, worry and anxiety as well (e.g. Barros et al. 2022; Fishbein et al. 1988).

Intuitively, one may expect that DP would alleviate music students' worry and anxiety by building confidence and skill mastery, thus reducing uncertainty about whether challenging passages can be successfully performed (Ericsson, Krampe, and Tesch-Römer 1993). However, such intensive practice can also lead to overly meticulous, perfectionistic tendencies that contribute to stress and maladaptive tension (Haraldsen et al. 2020; Miksza, Evans, and McPherson 2021). In severe cases, MPA may even lead some students to abandon their studies altogether (Kenny 2011; Nideffer and Hessler 1978).

Despite extensive research on competitiveness, DP, and MPA – each widely recognised as integral to the experience of aspiring musicians – the relationship between MPA and DP remains insufficiently understood. Exploring this relationship is crucial, as while DP might help reduce MPA, other psychological and contextual factors are likely also at play (e.g. competitiveness), making MPA a complex phenomenon that demands further investigation. Accordingly, we aim to test to what extent involvement in DP strategies mediates the relation between the independent variables MPA and competitiveness and the dependent variables perceived performance success and intent to quit playing among aspiring professional musicians (for review see Figure 1).

## Review of literature and hypotheses

### *The role of competitiveness and MPA on performance success and intent to quit*

Competitiveness in the conservatoire environment can be both explicit and implicit. For example, masterclass performances often create highly vulnerable learning situations, where the pressure to perform at or above the level of other participants can be intense. As a result, students may avoid performing in these settings unless they are exceptionally prepared and confident in their ability to meet socially acceptable standards (Hatfield 2016). Recent studies among aspiring professional musicians have linked perceived competitiveness with perfectionism and career-related doubts (Haraldsen et al. 2021; Herrera et al. 2021; Miksza, Evans, and McPherson 2021), low self-efficacy in performance (Hendricks, Smith, and Legutki 2016), and diminished enjoyment in performance contexts (Perkins et al. 2017). While some high-achieving students are positively motivated by competition and a drive for achievement, these individuals may also be particularly vulnerable when faced with failure or setbacks (Weiner 2014). Studies have accordingly linked high competitiveness with increased stress, depression, and anxiety (e.g. Payne, Lewis, and McCaskill 2020). A recent study found that depression, fear of negative evaluation, social avoidance, maladaptive achievement
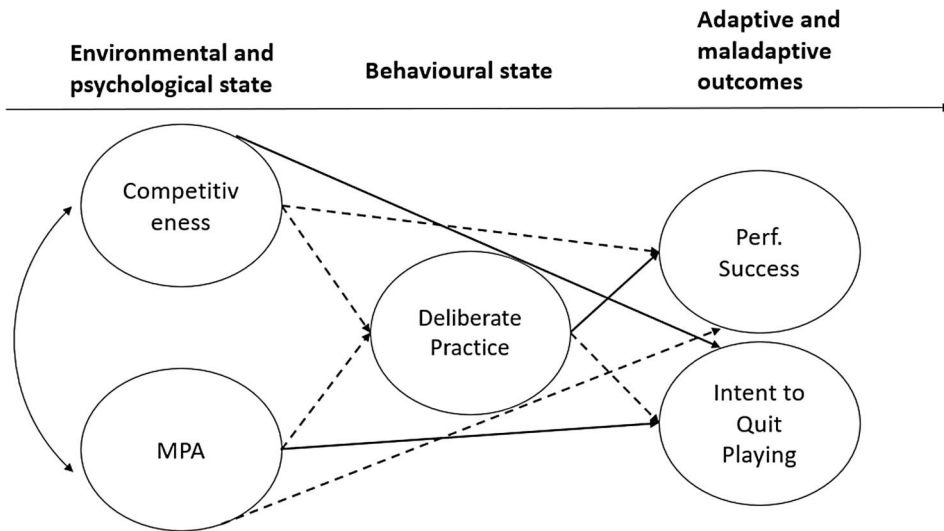
**Figure 1.** Overview of the hypothesised theoretical model.

Note. Solid lines indicate hypothesised positive associations, while dashed lines represent hypothesised negative associations. MPA = Music performance anxiety.

motivation, and substance use were associated with increased MPA in Spanish music students (Lupiáñez et al. 2022). Thus, the impact of competitiveness in higher music education is multifaceted, influenced by both personal characteristics and motivational states.

Although controlling teaching styles appear less prevalent in higher music education (redacted for anonymity), both competitiveness and MPA seems to remain highly prevalent over the recent decades (Hyry-Beihammer 2011; Kemp 1996; Miksza, Evans, and McPherson 2021). Competitiveness within music programmes can have both positive and negative effects: while pressure and self-imposed expectations may drive students to enhance their performance in line with their peers and aim for excellence, this same pressure can sometimes become overwhelming, contributing to MPA (Liston, Frost, and Mohr 2003). Moreover, studies have shown that professional experience and frequent performance are negatively associated with MPA (Hamann and Sobaje 1983; Paliaukiene et al. 2018), music students are especially anxious about performing in front of knowledgeable audiences (Robinson and Nigbur 2018). Research persistently shows that catastrophic thoughts related to social and personal pressures are key predictors of MPA (Liston, Frost, and Mohr 2003). Yet, aspiring musicians' perceptions of negative evaluation and competitiveness often differ significantly from the actual conditions of the performance environment. In severe cases, MPA may even lead some students to abandon their studies altogether (Kenny 2011; Nideffer and Hessler 1978), however, the latter phenomenon is poorly understood in music education research. *Turnover intention* (i.e. adapted as intent to quit playing in the present study) is a construct frequently used in organisational psychology to assess an individual's likelihood of leaving their job (Kuvaas 2006; Spector, Dwyer, and Jex 1988). Research on turnover intentions has predominantly focused on high-stress work environments (e.g. Basic Psychological Need Frustration) and examined how various stress-related outcomes influence employees' intentions to leave (e.g. Halvari and Olafsen 2022; Olafsen et al. 2021; Williams et al. 2014). However, turnover intention (i.e. referred to as intent to quit playing in the present study) has been less studied within music research. Recent findings indicate that turnover intention among professional musicians has been linked to job insecurity during Covid-19 (Alfarone and Merlone 2022) and, among jazz freelancers, to job stress, limited career advancement, and social isolation (Elstad 2015). Additionally, basic psychological need frustration (Parker, Jimmieson, and Amiot 2021) has been shown to contribute to musicians' turnover intentions.

Qualitative studies have also reported that musicians facing long-term MPA may perceive leaving their career as preferable to ongoing struggle (Kenny 2011).

To date, turnover intention/intent to quit playing has rarely been examined as a parameter within higher music education, and no studies have investigated the link between varying levels of MPA and intent to quit playing among aspiring musicians. Only one study, which assessed 570 aspiring Spanish professional musicians, found that 20% considered abandoning their careers entirely due to MPA-related burdens (Ballester Martínez 2015). In essence, we examine performance success (i.e. overall outcomes in exams, concerts, and auditions) and intent to quit playing as dependent variables to capture both adaptive and maladaptive outcomes associated with competitiveness, DP, and music performance anxiety (MPA). Notably, we were unable to identify prior research directly linking perceived competitiveness to either intent to quit playing or perceived performance success. Nevertheless, based on the literature reviewed above, we propose the following baseline hypothesis:

> **H1:** Both competitiveness and MPA are expected to be a) negatively related to performance success and b) positively related to intent to quit playing.

### The mediating role of deliberate practice on performance success and intent to quit playing

It is reasonable to expect that DP may help reduce music students' performance anxiety by enhancing confidence and technical mastery, thereby decreasing uncertainty about their ability to execute challenging passages (Ericsson, Krampe, and Tesch-Römer 1993). However, the intensity and structure of such practice can also foster perfectionistic tendencies and heightened self-monitoring, potentially increasing stress and maladaptive performance-related tension (Haraldsen et al. 2020; Miksza, Evans, and McPherson 2021). The potential mediating role of DP in the relationship between MPA, perceived competitiveness, and both adaptive (performance success) and maladaptive (intent to quit playing) outcomes remains poorly understood. Nonetheless, a recent study among aspiring flautists found that high levels of technical and musical expertise were negatively associated with MPA and fear of negative evaluation, although no relationship was found between weekly practice hours and anxiety levels (Kenny, Fortune, and Ackermann 2013). Further, research has shown that DP among music students is positively associated with mindfulness, which in turn is negatively related to both depression and performance anxiety (Wynn 2022). One study also found that skill level moderated the relationships between task difficulty, flow, and MPA in aspiring musicians (Fullagar, Knight, and Sovern 2013), and that experiences of flow were negatively associated with MPA – suggesting a potential indirect negative relationship between DP and MPA. MPA is further known to correlate with self-efficacy: higher levels of self-efficacy are generally associated with better performance and lower MPA, whereas lower self-efficacy is linked to higher MPA (Bersh 2022; González, Blanco-Piñeiro, and Díaz-Pereira 2018; Robson and Kenny 2017). However, this association was not replicated in a more recent study (MacAfee and Comeau 2020). Meta-analytic findings nonetheless support a strong link between DP and high levels of musical performance and achievement (Platz et al. 2014). Since self-efficacy is primarily shaped by mastery experiences – which are, in turn, influenced by DP and the use of performance-enhancing strategies during practice (Hatfield, Halvari, and Lemyre 2016) – we find strong theoretical grounds for expecting that DP may buffer the negative impact of MPA on performance. In short, the relationship between DP and MPA appears complex and somewhat inconclusive, yet theoretically promising. Based on this, we propose the following two mediation hypotheses (Figure 1):

> **H2:** Involvement in DP negatively mediates the relation between both a) competitiveness and b) MPA, and performance success.
>
> **H3:** Involvement in DP positively mediates the relation between both a) competitiveness and b) MPA and intent to quit playing.

## Methods

### *Participants and procedures*

This study is based on a major research project assessing various aspects of aspiring professional musicians' psychological and physiological attributes in the realm of higher music education. A survey battery was implemented during the spring of 2022 among 281 aspiring professional musicians attending music performance programmes in leading academies/conservatoires of music (i.e. educating future professional musicians) in Scandinavia and England (for review see, blinded). The participant demographic comprised 55.2% females, 40.2% males, and 4.6% identifying as other genders. Most of the participants, 65.2%, were undergraduates, followed by 29.5% at the master's level, and a minority of 5.3% were either diploma or doctoral candidates. A significant portion of the participants, 90.8%, engaged in daily practice ranging from 1 to 7 hours, with a mean of 3.4 hours (SD ± 1.4 hours). Within this group, 75.8% were part of the Western classical music stream. Others were involved in jazz, folk, music education, or church music.

The breakdown of their primary instruments included 26.4% string instrumentalists, 19.2% vocalists, 15.3% woodwind musicians, 12.1% brass instrument players, 8.2% pianists, 7.5% guitarists, 3.2% percussionists, 2.8% organ players, 1.4% harpists, 0.7% conductors, and 2.8% played other instruments. The questionnaire was disseminated through the administrative channels of the participating music academies, with an emphasis on voluntary engagement and guaranteed anonymity. The opportunity for participants to opt out was clearly communicated. During the survey's two-month open period, respondents were sent a total of three reminder emails. This research received ethical clearance from the Norwegian Social Science Data Service (NSD) and the research ethics committee of Conservatoires UK.

### *Measures*

*Environmental competitiveness* was evaluated through a set of three statements: 'The environment at college is very competitive', 'I feel that I´m competing against my peers to performing well,' and 'I feel pressure from the environment to outperform my peers' These statements were crafted to assess music students' perception of the competitive intensity in their academic surroundings. The items were adapted from Miksza, Evans, and McPherson (2021). Factor analysis indicated that the three items consistently corresponded to a distinct factor, with factor loadings ranging between .71 and .83, illustrating their relevance to the construct (Appendix A). Items were scored on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The reliability of these items was confirmed with a satisfactory Cronbach's $\alpha$ coefficient of .85.

### *Music performance anxiety*

Measurement of MPA involved utilising seven items chosen from the Kenny-Music Performance Anxiety Inventory (Kenny 2016). The inventory included five items focusing on immediate physical anxiety symptoms and concerns about performance execution. For example: 'Prior to, or during a performance, I get feelings similar to panic', and 'my worry and nervousness about my performance interferes with my focus and concentration'. Two items evaluated the worry/dread associated with self-evaluation and audience perception, such as: 'Thinking about the evaluation I may get interferes with my performance' and 'After the performance, I worry about whether I played well enough'. Items were scored on a 7-point Likert scale ranging from 1 (*Strongly disagree*) to 7 (*Strongly agree*). The Cronbach's alpha test revealed a high level of internal consistency ($\alpha$ = .89).

### *Deliberate practice*

This construct pertains to music students' proficiency in addressing particularly intricate and challenging practice tasks with intentionality and focused effort. The evaluation of DP was conducted using a 9-item measure covering music student's ability to solve particularly challenging and complex practice tasks deliberately and purposefully e.g. 'I thoroughly check how well I am doing while

solving complex practice tasks'; 'When facing a very challenging practice task, I make sure to solve it deliberately'; example of a reversed item: 'I usually fail to be deliberate when practice tasks are taxing and complex'. Of these nine items, three originated from the self-observation aspect of the Self-regulated Learning in Music Questionnaire (Hatfield, Halvari, and Lemyre 2016). The other six items were formulated in alignment with the key principles of DP (Ericsson and Harwell 2019; Ericsson, Hoffman, and Kozbelt 2018). Items were scored on a 7-point Likert scale ranging from 1 (*Strongly disagree)* to 7 (*Strongly agree).* Collectively, these nine items effectively measured DP efforts as indicated by satisfactory reliability in this research (Cronbach's $\alpha$ = .85).

### Performance success

In light of GDPR and administrative constraints, accessing specific exam scores was unfeasible. As a result, the assessment of performance success was conducted using two distinct measures: The first question asked, 'What mark/result do/did you typically receive in various music performance exams and tests?' utilising a 6-point Likert scale ranging from 1 (*F or equivalent*) to 6 (*A or equivalent*). The second measure inquired, 'What outcome do/did you generally achieve in auditions and/or competitions?' rated on a similar 6-point Likert scale from 1 (*performing significantly below the average, not advancing to semi-finals*) *to* 6 (*achieving exceptional performance, winning prizes in competitions*). The correlation between these two measures was moderately weak but deemed acceptable given the limited number of items involved (Cronbach's $\alpha$ = .64).

### Intent to quit playing

One item was applied to capture music students' intentions to quitting playing their instrument altogether. Intent to quit was adapted from Spector, Dwyer, and Jex (1988) one-item measure of turnover intention, which has proved itself as a robust measure of this construct in a large body of research within organisational psychology. The original item wording was adapted to fit the context of music performance (i.e. 'How often have your seriously considered quitting your current job?' = 'How often have you recently seriously considered to quit playing your instrument?'). For review see (Spector, Dwyer, and Jex 1988). The item was scored on a 6-item Likert scale ranging from 1 (*never*) to 6 (*extremely often*).

### Data analysis

To address the aims and hypotheses of the present study, our main analyses consisted of structural equation modelling (SEM), which allows for simultaneous testing of multiple hypotheses while accounting for measurement error in both latent constructs and residual terms. SEM further enables the examination of multiple predictive pathways within a single, integrated model framework. As a foundation, confirmatory factor analyses (CFA) were used to validate the measurement model and ensure that each latent construct was reliably represented by its observed indicators. As a basis for these analyses, we conducted an exploratory factor analysis using the maximum likelihood method to explore adapted and newly developed items. The analysis revealed that the items predominantly clustered into four distinct factors. A fifth factor emerged for two items related to DP. However, these items were more strongly associated with the first factor, and the inclusion of a fifth factor did not substantially contribute to the analysis (refer to Appendix A for details). All factor loadings fell within the accepted range, exceeding .46 but not surpassing .84 (Bryman and Cramer 2009).

Subsequent SEM and CFA assessments were grounded in fit indices for model validation and hypothesis testing, employing standardised benchmarks applied within social sciences (Hu and Bentler 1999; Marsh 1995). These included the Chi-square test ($\chi2$), Comparative Fit Index and Incremental Fit Index (CFI and IFI – with values above .95 indicating a well-fitting model and those above .90 suggesting an acceptable fit), and the Root Mean Square Error of Approximation (RMSEA – where a value below .06 signifies a good fit and below .08 an acceptable fit).

Finally, to complement the structural equation models, we conducted hierarchical regression analyses to further explore the potential role of deliberate practice (DP) in predicting outcomes. These analyses were performed to assess whether DP contributed additional explained variance beyond music performance anxiety (MPA) and to examine whether DP moderated (buffered) the negative effects of MPA on (a) performance success and (b) intention to quit playing. In each model, MPA was entered at the first step, DP at the second step, and the interaction term (DP × MPA) at the third step. This approach enabled us to clarify direct, additive, and interactive effects between predictors and outcomes, providing a supplementary perspective beyond the indirect pathways tested in SEM.

The dataset adhered to the criteria for normality essential in structural equation modelling, specifically skewness below 2.3 and kurtosis under 7.0 (Byrne 2009; Lei and Lomax 2005). All analyses were executed using IBM SPSS version 30 and IBM Amos version 28. The raw data will be made available upon request to the first author of the present study.

## Results

### *Descriptive and bivariate analyses*

The initial descriptive analyses revealed that most participants reported being moderately to highly deliberate and purposeful in their daily practice activities (76.4%; $M = 5.11$, SD = .97). Notably, 46% of the participants reported perceiving their environment as moderately to strongly competitive *(M = 3.60, SD = 1.64)*. Furthermore, many participants reported moderate to high levels of MPA (58.4%; $M = 3.96$, $SD = 1.34$). There was a low number of participants who reported intentions about quitting to play their instruments ($M = 2.21$, $SD = 1.17$). Yet, 12.4% of the participants fell within the range of considering quitting playing their instruments *somewhat often* to *extremely often*. Finally, the majority of the participants reported gaining good to outstanding results on exams, auditions and competitions (reversed scale: $M = 4.41$, $SD = 1.52$). For further examination of pairwise correlations, please refer to Table 1.

### *Confirmatory factor and structure analyses*

A five factor CFA model including all the constructs was tested against the underlying data and yielded to have a strong model fit (see Table 2; Appendix B; Hu and Bentler 1999; Marsh 1995). The standardised factor loadings ranged between .46 and .87 (for reviewing items see Appendix E). The three hypotheses were thereafter tested through SEM. First, a four-factor structure model including direct relations was tested to develop a baseline structure for our baseline and final five-factor structure models (Figure 2; Appendix C and D). The models yielded a strong fit with the underlying data (see Table 2).

### Primary results

H1 was partially supported. As expected, MPA was positively associated with intent to quit playing ($β = .32, p < .001$) and negatively associated with performance success ($β = −.36, p < .001$). However,

**Table 1.** Descriptive statistics and correlations among variables.

| Kurtosis | Skew | SD | M | Variable | 1 | 2 | 3 | 4 | 5 |
|---|---|---|---|---|---|---|---|---|---|
| .29 | −.65 | .97 | 5.11 | 1. Deliberate Practice | 1.00 | | | | |
| −.89 | .32 | 1.64 | 3.60 | 2. Competitiveness | −.11 | 1.00 | | | |
| −.83 | .09 | 1.34 | 3.95 | 3. MPA | −.29** | .34** | 1.00 | | |
| 1.47 | 1.13 | 1.77 | 2.21 | 4. Intent to Quit Playing | −.34** | .14 | .29** | 1.00 | |
| 1.24 | −1.15 | 1.17 | 4.41 | 5. Performance Success | .23* | .02 | −.27** | −.15* | 1.00 |

Note. Correlations are Pearson's r coefficients. ** $p < .01$ (2-tailed), * $p < .05$ (2-tailed). MPA = Music performance anxiety.

**Table 2.** Model fit indices for the CFA model, the SEM baseline model, and the SEM full mediation model.

| Model | $\chi^2$ | df | $p$ | $\chi^2$/df | IFI | CFI | RMSEA |
|---|---|---|---|---|---|---|---|
| CFA model | 432.03 | 238 | <.001 | 1.81 | .94 | .94 | .054 |
| SEM baseline model | 300.24 | 185 | <.001 | 1.62 | .94 | .94 | .049 |
| SEM full mediation | 627.87 | 409 | <.001 | 1.53 | .93 | .93 | .044 |

Note. $\chi^2$ = chi-square; df = degrees of freedom; $p$ = probability value; $\chi^2$/df = chi-square divided by degrees-of-freedom ratio; IFI = Incremental Fit Index; CFI = Comparative Fit Index; RMSEA = Root Mean Square Error of Approximation. Values of $\chi^2$/df less than 3 indicate acceptable fit; IFI and CFI values close to or above .90 indicate good fit; RMSEA values less than .08 indicate a reasonable error of approximation (for review see Hu and Bentler 1999; Marsh 1995).

competitiveness did not significantly predict intent to quit (β = .04, ns), and was only marginally positively related to performance success (β = .15, $p$ = .06). Together, these predictors explained 14% of the variance in intent to quit and 23% of the variance in performance success (see Table 2 and Figure 2a).

H2 and H3 were partially supported. Higher levels of MPA were associated with lower involvement in DP (β = −.28, $p$ < .001), which in turn predicted greater intent to quit (β = −.34, $p$ < .001) and lower performance success (β = .27, $p$ < .01). Significant indirect effects were found from MPA to intent to quit via DP (β = .09, $p$ < .001), and from MPA to performance success via DP (β = −.08, $p$ < .001). In contrast, competitiveness was not significantly related to DP (β = −.02, ns), and indirect effects via DP were also non-significant (Table 3 and Figure 2b) (Table 4).
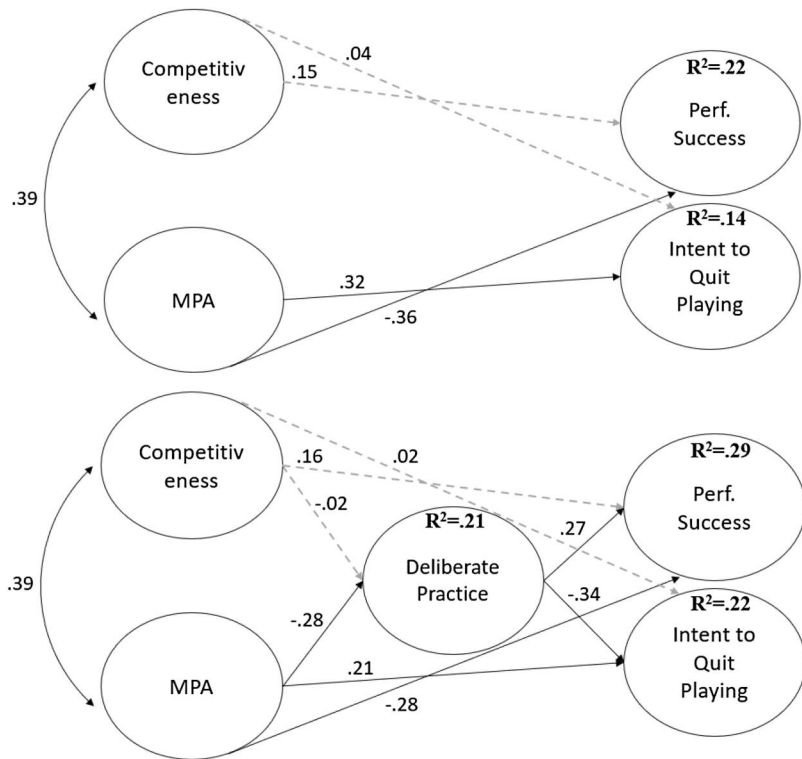


**Figure 2.** a and b. Results for the baseline and full mediation structure models.

Note. Standardised regression coefficients are shown. Solid lines represent statistically significant paths (p < .05), whereas dashed lines indicate nonsignificant paths. R² values reflect the proportion of variance explained in each endogenous variable. For clarity and visual simplicity, observed indicator variables are omitted from the diagram (for review see Appendix). MPA = Music performance anxiety.

**Table 3.** Baseline structural equation model controlling for demographic variables.

| Variable | Performance success | Intent to Quit |
|---|---|---|
| Control Variables | | |
| Age | −.11 | .14 |
| Gender | .05 | .01 |
| Instrument | .16* | −.11 |
| Age of Starting to play | −.15* | .03 |
| Study Level | .09 | .08 |
| Study Programme | .05 | .06 |
| Practice Hours | −.04 | −.01 |
| Sleep Hours | .01 | −.03 |
| Work Status | −.17* | −.03 |
| Independent Variables | | |
| Music Performance Anxiety | −.36*** | .32*** |
| Competitiveness | .15† | .04 |
| R² | .23 | .14 |

Note. Standardised regression coefficients (β) are reported.
$p < .05 = *$, $p < .01 = **$, $p < .001 = ***$, † = $p < .10$.

**Table 4.** Mediation structural equation model controlling for demographic variables.

| Variable | Deliberate practice | Performance success | Intent to Quit |
|---|---|---|---|
| Control Variables | | | |
| Age | .13 | −.18† | .13 |
| Gender | .04 | .04 | .03 |
| Instrument | .03 | .17* | −.09* |
| Age Starting to Play | .02 | −.14† | .04 |
| Study Level | −.03 | .07 | .07 |
| Study Programme | −.05 | .04 | .04 |
| Practice Hours | .29*** | .13† | .08 |
| Sleep Hours | .08 | −.05 | −.00 |
| Work Status | −.03 | −.14* | −.02 |
| Independent Variables | | | |
| Competitiveness | −.02 | .16† | .02 |
| Music Performance Anxiety | −.28*** | −.28*** | .21** |
| Mediator | | | |
| Deliberate Practice | – | .27** | −.34*** |
| Indirect Effects | | | |
| Compet → DP → Outcome | – | −.01 | .01 |
| MPA → DP → Outcome | – | −.08*** | .09*** |
| R² | .21 | .29 | .22 |

Note. Standardised regression coefficients (β) are reported. $p < .05 = *$, $p < .01 = **$, $p < .001 = ***$, † = $p < .10$.
Indirect effects were computed by multiplying standardised path coefficients. Deliberate practice (DP) is included as both a dependent and mediating variable.

## Control variables

Most control variables were not significantly related to the outcomes. However, earlier age of starting an instrument (β = −.15), playing certain instruments (β = .16), and work status (β = −.17) were weakly related to performance success. Practice hours showed a moderate association with DP (β = .29, $p < .001$) supporting the link between time invested and self-reported DP (see Table 3). These results indicate that although certain background characteristics (e.g. age of onset, instrument type, work status) may play a minor role, the main explanatory power in the models came from the psychological behavioural predictors (MPA, competitiveness, and DP), not demographic factors.

We conducted hierarchical regression analyses to assess the unique contribution of deliberate practice (DP) and its potential moderating role in the relationships between music performance anxiety (MPA) and the outcomes. Since competitiveness was not significantly associated with either outcome in the SEM models, these supplemental regressions focused exclusively on MPA and DP.

**Table 5.** Hierarchical regression analysis predicting performance success and turnover intention.

| Variables | Performance success | | | Turnover intention | | |
|---|---|---|---|---|---|---|
| | Step 1 | Step 2 | Step 3 | Step 1 | Step 2 | Step 3 |
| MPA (centred) | −.27*** | −.22*** | −.22*** | .29*** | .21*** | .21*** |
| DP (centred) | – | .17** | .17** | – | −.28*** | −.28*** |
| Interaction (DP × MPA) | – | – | −.01 | – | – | −.02 |
| R | .27 | .31 | .31 | .29 | .40 | .40 |
| R² | .07 | .10 | .10 | .09 | .16 | .16 |
| ΔR² | – | .03** | .00 | – | .07*** | .00 |
| F | 21.23*** | 14.72*** | 9.80*** | 26.34*** | 25.93*** | 17.27*** |
| VIF (Max) | 1.00 | 1.10 | 1.10 | 1.00 | 1.10 | 1.10 |

Note. Standardised regression coefficients (β) are reported. $p < .05$, **$p < .01$**, **$p < .001$**. MPA = Music Performance Anxiety. D$P$ = Deliberate Practice. R² = proportion of variance explained. ΔR² = change in explained variance from previous step. VIF = Variance Inflation Factor. All VIF values were well below critical thresholds (VIF < 5.0).

In both models, MPA was entered in the first step, followed by DP in the second step, and the interaction term (DP × MPA) in the third step. Adding DP to the model significantly improved explained variance in both intent to quit playing (ΔR² = .07, F(1, 278) = 17.13, $p < .001$) and performance success (ΔR² = .03, F(1, 278) = 14.72, $p < .001$). DP was directly associated with higher performance success and lower intent to quit playing. However, the interaction terms (DP × MPA) did not significantly predict either outcome (performance success: β = −.01, ns; turnover intention: β = −.02, ns), and ΔR² for these interaction steps was negligible. This indicates that DP did not buffer the negative effects of MPA on performance success or intent to quit playing (Table 5).

## Discussion

The aim of the present study was to examine whether deliberate practice (DP) mediates the relationships between competitiveness and music performance anxiety (MPA), and two key outcomes: performance success and intent to quit playing.

Contrary to our expectations, competitiveness showed no significant direct association with performance success. There was a non-significant positive predictive tendency (β = .15, $p < .08$), suggesting a weak marginal positive relationship that may align with the idea that some competitive individuals perform better under pressure. However, the non-significant findings overall indicate that competitive pressure may neither drive better nor worse outcomes in music students. Although previous research has linked competitiveness to perfectionism and career-related doubts (Haraldsen et al. 2021; Herrera et al. 2021; Miksza, Evans, and McPherson 2021), we did not find a significant negative association between competitiveness and intent to quit playing.

By contrast, MPA was positively associated with intent to quit playing and negatively associated with performance success. These findings are consistent with prior studies indicating that MPA undermines both performance quality and musical persistence (e.g. Robson and Kenny 2017; González, Blanco-Piñeiro, and Díaz-Pereira 2018). This relationship was anticipated and aligns with research linking MPA to low self-efficacy in music performance (e.g. Bersh 2022; González, Blanco-Piñeiro, and Díaz-Pereira 2018; Robson and Kenny 2017), which in turn predicts poorer performance. Notably, participants high in MPA were more likely to report intentions to quit playing altogether. We were unable to identify previous quantitative studies that explored this specific link between MPA and quitting intentions. However, Kenny (2011) reported a similar tendency in interviews with individual musicians who indicated that leaving their careers was a plausible alternative to the continuous struggle with MPA. In sum, the negative impact of MPA appears to be potentially more detrimental to both performance and quitting intentions than competitiveness.

When DP was introduced into the model (i.e. H2 and H3; Figure 2b), the strong bivariate correlation between competitiveness and MPA (r = .39) remained, suggesting shared variance.

Furthermore, DP did not significantly mediate the relationship between competitiveness and the outcome variables, as observed in the baseline model (H2a and H3a). However, participants high in DP were both less likely to report intentions to quit playing and less likely to experience decreased performance success compared to participants low in DP (H2b and H3b). These findings underscore the importance of purposeful, goal-oriented instrumental practice for performance outcomes (Ericsson 2014). Previous research has indicated that high achievers are less likely to experience MPA (Kenny, Fortune, and Ackermann 2013), and DP has been positively associated with mindfulness, which in turn is negatively associated with MPA (Wynn 2022). Although DP was directly associated with better outcomes, our hierarchical regression analysis did not confirm an interaction effect; higher involvement in DP did not significantly attenuate the maladaptive effects of MPA on either perceived success or intention to discontinue musical pursuits. Nonetheless, these findings are preliminary, given the cross-sectional nature of the study and the lack of experimental or qualitative data. Future studies should investigate the causal relations between DP and MPA using longitudinal or experimental designs.

The potential mediating role of DP is also notable from a theoretical perspective, considering that the classic definition of DP (Ericsson, Krampe, and Tesch-Römer 1993) describes it as not inherently enjoyable. This suggests that, in the long run, the pursuit of mastery may overshadow the claimed unenjoyable aspects of engaging in an activity that is inherently time-consuming and demanding. We therefore call for future research to explore the psychological consequences of DP, examining the extent to which DP or its absence affects well-being, vitality, and life satisfaction.

Finally, descriptive results indicated that most participants reported engaging in DP while perceiving their learning environment as competitive. These findings are consistent with prior work showing that conservatory contexts often foster performance-focused climates (Hyry-Beihammer 2011; Miksza, Evans, and McPherson 2021). The majority of participants also reported experiencing MPA, and approximately 12% expressed strong intentions to quit playing altogether. Although intent to quit playing has rarely been measured in music performance studies, this finding aligns with qualitative reports suggesting that sustained MPA can result in career withdrawal (Kenny 2011). Notably, the item measuring intent to quit did not differentiate between giving up one's instrument and leaving music as a profession – something future studies should clarify. However, our findings are broadly consistent with prior research showing that most aspiring professional musicians report positive career intentions (Miksza, Evans, and McPherson 2021; Wang and Wong 2022).

## Limitations

The present study is subject to several limitations that need to be noted. Even though this study is based on theoretically causal paths that may seem logical in theory, the cross-sectional nature of the present study renders causal relations impossible and should thus only be interpreted as associative predications. As such, future studies should apply a longitudinal design to track the development of the included constructs over time on both individual and group levels. Furthermore, the study consisted of 281 participants, which is within acceptable levels for conducting SEM (Byrne 2009). Yet, due to applying convenience sample, it would be inappropriate to generalise the findings to higher music education in general (Tabachnick and Fidell 2013; Williamon et al. 2021). When feasible, survey studies ought to be randomised for enhancing contextual generalizability.

Another limitation of this study lies in the use of self-reported measures and convenience sampling, which increase the risk of selection bias and limit the generalizability of the findings to the broader population of music performance students. Notably, participants tended to rate themselves highly in terms of performance success (i.e. reporting high grades in exams, auditions, and competitions). Future research should therefore consider incorporating objective indicators such as actual exam scores or audition results to enhance validity.

In addition, there are certain limitations concerning the measurement of DP. DP is a multifaceted construct involving strategic planning, goal setting, reflective evaluation, and problem-solving during practice. In the present study, we used nine items that primarily focused on the practice process itself. Future studies should expand the measurement framework to include validated subscales capturing concentration, attentional focus, immersion in the task, and strategic problem-solving skills related to particularly difficult passages. More traditional research methods, such as think-aloud protocols and systematic observation through video-based analysis of practice sessions, are recommended over self-report measures to capture the dynamic and effortful nature of DP more accurately.

Finally, although the study controlled for several background variables – including age, gender, instrument, age of onset, study level, programme type, practice hours, sleep hours, and work status – most of these showed weak or nonsignificant associations with the outcomes. However, a moderate positive association between weekly practice hours and DP was found, in line with theoretical expectations (Ericsson, Krampe, and Tesch-Römer 1993). No significant relationship emerged between instrument type and DP, though it is plausible that certain instruments (e.g. piano and strings) facilitate more practice time than others (e.g. winds and voice). Future research should further explore how instrument-specific practice constraints influence reported levels of DP.

While the present study offers valuable insights into the interplay between competitiveness, MPA, and DP, a mixed-methods approach would have deepened the understanding of these associations. Future research could benefit from integrating qualitative follow-up interviews with participants who demonstrate contrasting profiles across the measured constructs (e.g. Hatfield and Soløst 2024).

## Conclusion and educational implications

The present study tested a hypothesised model examining the mediating and moderating role of DP in the interrelations between competitiveness, MPA, performance success, and intent to quit playing among aspiring professional musicians.

The study found that participants who perceive their environment as competitive are significantly more likely to experience MPA. This implies that teachers should motivate collaboration, which we indeed see as potentially valuable also in regard to DP strategies. Hence, rather than isolating oneself in a practice room, we recommend aspiring musicians to systematically collaborate through various goal setting procedures and collective evaluation (see Hatfield 2024). As expected, and in line with previous research, participants high in MPA were less likely to perform well in exams and more likely to report intentions to quit playing. Participants who reported engaging in DP were less likely to report intentions to quit playing and more likely to succeed in their music performances. Although DP was directly associated with better outcomes, it did not significantly mitigate or buffer the negative effects of MPA.

Although further research is needed, these findings indicate that both music teachers and students could benefit from adopting DP strategies. Essentially, this involves identifying weaknesses and developing targeted strategies to address them. In doing so, musicians and teachers should set specific, task-relevant goals, monitor progress, and adjust practice strategies as needed (for reviews, see Hatfield, Roberts, and Lemyre 2022; McPherson, Miksza, and Evans 2017; Nielsen 2001; Miksza 2022). In other words, DP appears to foster a sense of control and purpose in practice that is associated with positive performance outcomes. We therefore encourage aspiring professional musicians to approach performance preparation by viewing various performance situations (e.g. masterclasses, student concerts, auditions) as opportunities rather than as anxiety-provoking settings to be avoided. Simulation and visualisation are also strongly recommended as methods to overcome specific practice and performance challenges (for reviews, see Hatfield, Roberts, and Lemyre 2022; Williamon, Aufegger, and Eiholzer 2014). Finally, participants high in MPA were significantly more likely to report intentions to quit playing, potentially indicating

an intention to give up their instrument altogether. By contrast, participants reporting high levels of DP showed the opposite tendency. However, the negative association between MPA and intent to quit playing was not significantly moderated by DP. Future research should further investigate these relationships using research designs that allow for causal inferences.

## Disclosure statement

No potential conflict of interest was reported by the author(s).

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