



Recordings as learning and practising resources for performance: Exploring attitudes and behaviours of music students and professionals

Journal:	<i>Musicae Scientiae</i>
Manuscript ID	MS-16-0029.R1
Manuscript Type:	Original Manuscript
Keywords:	recordings, musical performance, practice, listening preferences, expertise
Abstract:	<p>This article examines how musicians use recordings as learning resources in preparing for performance. While previous research has partially acknowledged the contribution of external factors on self-regulated learning, the specific impact of recordings on performers' approaches to practising remains largely uncharted. A survey was designed to assess the use and importance of recordings on musicians' listening and practising behaviours, their preferences when choosing recordings, and the type of influence exerted by recordings over self-regulatory processes. Respondents (N=204) completed an online survey, and the data were analysed according to level of expertise: advanced music students (n=147) and professional musicians (n=57). The results show clear differences between students and professionals in the frequency of use and level of reliance on recordings, with students consistently exhibiting a greater preference for these resources. Students were more likely to listen to recordings and, consequently, change aspects of their interpretations in the early stages of practising. Additionally, students were influenced by other people's recommendations, especially their teachers', and by other performers' reputations when choosing recordings. The need to develop a distinct style had a positive influence on students' practising and performing habits. The study shows that listening to recordings forms an integral part of self-regulated learning activities and contributes to musicians' development by increasing musical knowledge and stylistic awareness.</p>

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3 **Recordings as learning and practising resources for performance: Exploring attitudes and**
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5 **behaviours of music students and professionals**
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10 **Abstract**

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12 This article examines how musicians use recordings as learning resources in preparing for
13 performance. While previous research has partially acknowledged the contribution of external
14 factors on self-regulated learning, the specific impact of recordings on performers' approaches to
15 practising remains largely uncharted. A survey was designed to assess the use and importance of
16 recordings on musicians' listening and practising behaviours, their preferences when choosing
17 recordings, and the type of influence exerted by recordings over self-regulatory processes.
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19 Respondents ($N = 204$) completed an online survey, and the data were analysed according to level of
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22 recordings, with students consistently exhibiting a greater preference for these resources. Students
23 were more likely to listen to recordings and, consequently, change aspects of their interpretations in
24 the early stages of practising. Additionally, students were influenced by other people's
25 recommendations, especially their teachers', and by other performers' reputations when choosing
26 recordings. The need to develop a distinct style had a positive influence on students' practising and
27 performing habits. The study shows that listening to recordings forms an integral part of self-
28 regulated learning activities and contributes to musicians' development by increasing musical
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51 **Keywords**

52 recordings, musical performance, practice, listening preferences, expertise
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5 Listening to others' interpretations of a piece of music, by listening to recordings, is
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8 common among performers. This can have direct consequences for practising. For example,
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10 listening to recordings may facilitate the deciphering of expressive intentions from the
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12 score, or it may provide guidance on evaluative reflection of the performer's own
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14 interpretation. While the active use of external resources, such as scores, particular editions
15
16 or recordings, is often recognised as an element of effective practising and self-regulated
17
18 learning (Papageorgi et al., 2010; Araújo, 2016), the specific nature and extent of the
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20 contribution of recordings to performers' practising habits remains under-explored.
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24 Some authors point out the mixed reactions to the cultural and historical reception
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26 of recordings (Clarke, 2007; Leech-Wilkinson, 2009a, 2010). On the one hand, recordings are
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28 viewed favourably as salient historical documents of performance practice that have
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30 opened a valuable aural window into the past (Philip, 1992; Day, 2000). Musicological,
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32 historical and empirical research on recordings (Cook et al., 2009; Bayley, 2010; Fabian,
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34 2014) suggests that they can actively inform today's performers, for instance by elucidating
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36 stylistic changes in a range of repertoires, by exploring historically informed performance
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38 practice based on recordings, by digitizing and preserving rare discographies and by
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40 documenting the recording process. On the other hand, recordings have been regarded
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42 negatively for allegedly stifling artistic originality and significantly reducing performance
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44 individuality and variability. This cultural phenomenon has been especially prevalent across
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46 the second half of the twentieth century, which exemplifies a stark narrowing in stylistic
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48 trends and the elimination of performance spontaneity, due to the cultural syndrome of
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3 note-perfect executions driven largely by the heavy editing of recordings (Philip, 1992; Katz,
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5 2004; Leech-Wilkinson, 2009b; Alessandri et al., 2014; 2015).
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8 Psychological and educational research, however, has shown that recordings are
9
10 useful as sources of aural modelling in learning and teaching and can contribute to, rather
11
12 than detract from, musicians' creative space. Performers actively learn via aural modelling
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14 by observing their teachers' demonstrations and acting upon their understanding of
15
16 expressive features to concretize their learning experience (Lindström et al., 2003; Woody,
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18 2002, 2006). Besides teachers' input, listening to recordings offers an alternative aural
19
20 pathway of musical influence by engaging performers in a dynamic dialogue with the
21
22 musical past. Performers can explore novel interpretative possibilities from recordings by
23
24 attending to a variety of expressive and technical features of performance (Tait, 1992; Repp,
25
26 2000). Solo and ensemble performers are able to internalize the musical ideals
27
28 demonstrated by recorded models and can make evaluative judgments about the quality of
29
30 their preparation and final performances (Clarke, 1993; Repp, 2000; Morrison, Montemayor
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32 & Wiltshire, 2004). Lisboa et al. (2005) showed that the influence of imitative strategies
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34 based on the recording of a designated great artist, the violinist Jascha Heifetz, was highly
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36 individual specific for a small group of advanced conservatoire violinists.
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43 The notion of musical influence – by drawing ideas from other interpretations and, in
44
45 some cases, imitating them as part of the learning process – remains a contested issue
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47 especially within the Western art music performance tradition, which places originality and
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49 novelty extremely high on musicians' creative agenda (Clarke, 2005; Williamon et al., 2006;
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51 Alessandri, 2014; Alessandri et al., 2014, 2015, 2016). Findings from Hallam's investigation
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53 (1995) of professional musicians' attitudes to interpretation supported both openness and
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3 resistance to musical influence from other performances (pp. 120-123). The study of
4
5 student performers by Lisboa et al. (2005), however, revealed that: 'the imitation process
6
7 did not suppress individuality and novel interpretative insights. Rather it compelled
8
9 [participants] to exercise their listening, evaluation and decision-making skills' (p. 104). In
10
11 non-classical music genres, such as pop and jazz, imitation and assimilation by listening to
12
13 other performances (live and/or recorded) are widely recognised as essential steps towards
14
15 musical development and the attainment of high-level performance skills (Berliner, 1994;
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17 Green, 2002; Creech et al., 2008a), although in these musical domains too mere copying is
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19 treated as suspect for professional recognition.
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25 Given the availability of recordings on digital mobile platforms and the increased
26
27 social versatility of contemporary technologically-mediated listening practices (De Nora,
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29 2000; Born, 2009, 2010), it is virtually impossible to sustain any claims to 'influence-free'
30
31 originality in musical performance. Performance preparation does not happen in sealed,
32
33 closed environments, and clearly a lot more is required to attain musical expertise apart
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35 from the quantity of deliberate practice (cf. Ericsson, Krampe & Tesch-Römer, 1993;
36
37 Sloboda, Davidson, Howe & Moore, 1996). Given the inextricably social nature of musical
38
39 development, especially the social contexts underpinning the attainment of performance
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41 expertise (Davidson, 1997; Hallam, 2006; McPherson & Zimmerman, 2011), listening and
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43 responding to a variety of musical sources appears to be an integral part of teaching and
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45 learning practices. The impact of recordings on performers' practising strategies remains,
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47 however, largely uncharted.
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53 As Lisboa et al. (2005, p. 77) acknowledge and Woody (2006, p. 22) and Miksza
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55 (2011, p. 71) further re-iterate, only a few studies of the influence of recordings on
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3 performers' approaches to learning exist, and of those even fewer examine the role of aural
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5 models or recordings *per se* as sources of musical influence. For instance, in the large survey
6
7 by Creech et al. (2008a), which asked 244 participants to rate the importance of listening to
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9 music from both within and outside one's performance genre, recordings were not
10
11 specified. Other large questionnaire surveys, such as those by Papageorgi et al. (2010) on
12
13 advanced musicians' perceptions of expertise or Araújo (2015) on self-regulated practising
14
15 behaviours, have only partially considered the contribution of recordings, and then in
16
17 conjunction with other external resources (books, videos, scores, etc.) and not separately.
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19 The handful of studies that have specifically investigated aural models or recordings in
20
21 musicians' imitative learning tend to focus on classroom-size, or even smaller, samples of
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23 participants (e.g., Lisboa et al., 2005; Montemayor and Moss, 2009), and do not address the
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25 reasons why performers may turn to recordings or the factors underpinning their choices
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27 and preferences. Another limitation is that these studies tend to impose a particular
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29 recorded model; whether a historical recording by an acclaimed performer (Lisboa et al.,
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31 2005), a suitable commercial modern recording (e.g., Morrison et al., 2004; Montemayor &
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33 Moss, 2009), or even less naturalistic recorded stimuli of just a few expressive parameters,
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35 such as timing and dynamics, derived from real performances (e.g., Repp, 2000). Similarly,
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37 studies of professional musicians' learning habits and use of recorded models for training
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39 (Hallam, 1995; Montemayor & Moss, 2009) are few, and findings are derived from modest
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41 samples but without fully addressing when, how or why professionals engage specifically
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43 with recordings.
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52 The purpose of our study was to explore how musicians at different stages in their
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54 careers (in particular, advanced students and professionals) use recordings as learning
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3 resources for performance. Existing research already indicates that practice strategies
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5 between advanced music students and professionals often differ in terms of what
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7 constitutes effective approaches to performance interpretation (Creech et al., 2008b;
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9 Jørgensen & Hallam, 2009; Papageorgi et al., 2010; Clark et al., 2014; Araújo, 2016). We
10
11 designed a survey study, therefore, (i) to elucidate how and to what extent musicians use
12
13 recordings in their practising and learning and (ii) to discern putative differences between
14
15 advanced students (at tertiary level) and professionals in their use.
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19 The notion of recordings functioning as “learning recourses” places them in a
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21 sociocultural framework of learning. The above literature review has already highlighted
22
23 that performance preparation and the shaping of musical interpretation are now widely
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25 recognised from a sociocultural rather than solely individualistic perspective. As Lev
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27 Vygotsky’s influential educational theory posits (Vygotsky, 1978; Kozulin, 2003), social
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29 mediation through the guidance of others (e.g., teachers), peer collaboration or the use of
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31 various resources (i.e., agents of mediation) is fundamental in the acquisition of a zone of
32
33 proximal development. This zone is an area of exploration – a kind of scaffolding (e.g.,
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35 Wood, 1999; Zimmerman, 2000) – to support the learner’s evolving knowledge and
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37 development of cognitive skills for the attainment of expertise. Concepts from Vygotsky’s
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39 sociocultural theory of learning (e.g., mediation, inter-subjectivity, scaffolding) continue to
40
41 resonate in recent models of musicians’ self-regulated learning (Zimmerman, 2000;
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43 McPherson & Zimmerman, 2011). Self-regulation increases as musicians mature and
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45 develop the ability to exercise greater autonomy in their learning through the acquisition of
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47 the necessary tools to gain control of their practice strategies and learn effectively. Common
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49 self-regulated behaviours of advanced musicians include: goal-setting and goal efficacy;
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3 metacognitive thinking; planning and time management; active search for resources and
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5 help-seeking; environmental control and self-evaluation (e.g., McPherson and Zimmerman,
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7 2011; Araújo, 2015).
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10 In the context of self-regulated learning, therefore, an external recourse like a
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12 recording is a tool, introduced either through adult guidance (usually teacher), peer
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14 collaboration or the individual's own search for self-help solutions. Such a tool can be
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16 expected to influence other self-regulatory processes, including time management and
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18 planning, goal setting (e.g., improving sight-reading, aural skills, facilitating memorization for
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20 performance), content learning (e.g., proficiency in playing a piece), acquisition of cognitive
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22 tools (e.g., internalization of musical structure, self-reflection and evaluation) or
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24 environmental control (e.g., facilitating ensemble rehearsal and performance). Given the
25
26 exploratory nature of our investigation and that little research exists on the specific use of
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28 recordings as resources for self-regulated learning, our discussion is data-driven than
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30 theory-driven, although evidently informed by sociocultural theories of learning and models
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32 of self-regulation.
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42 Method

43 Participants

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45 Two hundred and four participants (138 women, 66 men) completed the survey. The mean
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47 age was 28.63 years (range = 17–69 years, $SD = 13.25$), with 123 respondents (60.3%)
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49 reporting British nationality. The respondents were recruited according to level of expertise:
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51 advanced music students in conservatoires or university music departments undertaking
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53 Music Bachelor or Master's degree programmes ($n = 147$; 99 women, 48 men; 109
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3 undergraduates, 38 postgraduates; mean age = 22.31, $SD = 5.98$) and professional musicians
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5 ($n = 57$; 39 women, 18 men; mean age = 44.93, $SD = 12.94$) who were recruited from the
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7 same institutions as the students. Five further respondents completed the full survey but
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9 indicated 'other' for student/professional status and so were excluded from analysis. The
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11 four largest specialisms were keyboard ($n = 73$), strings ($n = 41$), vocal studies ($n = 31$) and
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13 woodwinds ($n = 21$), while the remaining were represented as follows: brass ($n = 11$);
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15 percussion ($n = 3$); conducting ($n = 3$); composition ($n = 8$) and 'other' ($n = 13$, including
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17 popular, community and folk music genres). This frequency of specialisms is largely
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19 consistent with reports from other recent surveys (e.g., Araújo, 2016). Only 23 respondents
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21 (11.3%) indicated a specialist interest in historical performance practice.
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27 For the purposes of analysis, respondents were collapsed into two groups: students
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29 (undergraduates and postgraduates) and professionals. As shown in Table 1, preliminary
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31 exploratory analyses revealed that students practised significantly more than the
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33 professionals ($U = 2,754.5$, $p = .0005$), while the professionals spent significantly more time
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35 teaching than the students ($U = 1348$, $p = .0005$; see section Data Treatment and Analysis
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37 for discussion of our use of non-parametric tests.) These characteristics are consistent with
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39 existing literature reporting that students need to invest heavily into their training for the
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41 acquisition of expert-level skills (Ericsson et al., 1993), whereas professional musicians
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43 spend less time practising due to various time constraints including teaching duties (e.g.,
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45 Creech et al., 2008b). Students also spent significantly more time than professionals
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47 listening to recordings, both casually ($U = 3,174.5$, $p = .007$) and attentively ($U = 2,853.5$, $p =$
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49 $.0005$; see Table 1). These differences may be explained by students needing to engage
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51 more explicitly in learning repertoire through listening to recordings. By contrast,
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3 professionals may rely less on these listening activities either because they are more
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5 experienced or have less time.
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10 [Insert Table 1 about here]
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14 Materials

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17 An online survey was designed to elicit information about musicians' general listening
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19 habits, the extent and importance of using recordings when preparing a piece for
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21 performance, their preferences when choosing recordings and the type of influence exerted
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23 by recordings (see Appendix). This study was concerned primarily with the role of recordings
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25 when preparing for Western art music performance since only 13 respondents (6.4%)
26
27 specified non-classical music specialisms (see *Participants* above). The survey was compiled
28
29 after a process of reviewing relevant literature and consulting with musicians to identify key
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31 questions. The survey was based on: (i) music psychology research focusing on practising
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33 behaviour (e.g., Jørgensen, 2004; Chaffin et al., 2003; Chaffin 2007); (ii) literature on
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35 imitative learning (e.g., Lisboa et al., 2005); (iii) criteria used for attending to specific
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37 expressive and technical features of performance (e.g., Tait, 1992; Repp, 2000; McPherson
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39 & Schubert, 2004); and (iv) general musicological literature on the influence of recordings
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41 on performers and listeners (e.g., Clarke, 2007; Leech-Wilkinson, 2009b, 2010).
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48 The term 'recording' was not pre-defined, although the questions make it clear that
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50 the notion of recording encompasses real performances (historical or modern) as opposed
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52 to artificially constructed listening probes. We deliberately left this term open, implying a
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54 generic rather than format-specific definition of recordings (e.g., 78s, vinyl, CD, MP3, etc.) in
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3 order to accommodate participants' ostensibly diverse interests and listening experiences
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5 stemming from an array of technological media (e.g., iPhones, MP3-players, laptops, tablets
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7 etc.).
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10 The first part of the survey (Qs 1-7) comprised demographic information about the
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12 participants, followed by a set of questions on general listening, practising, performing and
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14 teaching habits, which required an answer in terms of a weekly average number of hours
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16 devoted to each of these activities (Qs 8-13). These questions were intended to identify the
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18 general characteristics of particular demographic groups (e.g., students versus
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20 professionals). The remaining survey (Qs 14-30) consisted of a series of evaluative questions
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22 interspersed with open responses to elicit further comments. Questions 14-25 sought to
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24 identify how often, when and why musicians use recordings, what interpretative features
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26 they consider important (Qs 19-20), and what aspects of their performance they are likely to
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28 change as a direct result of listening to recordings (Qs 21-23). Two key questions framed this
29
30 part of the survey: question 14 sought to identify how often musicians use recordings when
31
32 preparing a performance, and question 24 probed the usefulness of recordings as learning
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34 resources. Questions 26-27 asked participants to rate the factors that affect their choice of
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36 recording. The final part of the survey (Qs 28-30) asked participants to evaluate the type of
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38 influence (positive or negative) attributed to recordings.
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48 Procedure

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50 The online survey was distributed to UK conservatories, university music departments and
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52 other music organisations via relevant email lists. Besides the initial invitation, reminders
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54 were sent periodically by email to boost responses.
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Data treatment and analysis

All statistical analyses were performed using SPSS (version 22). Following a preliminary screening of demographic variables (i.e., sex, institution type, specialism and status), we focused our between-group comparisons on status only (i.e., responses of students versus professional musicians).

Further inspection of the data using the Kolmogorov-Smirnov test revealed that responses to Qs 8-13 were non-normally distributed. These were analysed non-parametrically using the Mann-Whitney *U*-test in order to establish between-group differences. Data corresponding to Qs 14-28 were also non-normally distributed, in that responses were negatively skewed, and again non-parametric statistical tests were used. Firstly, the Wilcoxon signed-rank test (i.e., the non-parametric equivalent of one-sample *t*-test) was employed to identify how the median score of each group differed from a hypothesised median, corresponding to the mid-point of the Likert-type scale. The separate analyses for students and professionals were carried out by splitting the dataset accordingly. Secondly, the Mann-Whitney *U*-test was used to examine differences in the median scores of students and professionals. In the results tables that follow, apart from these non-parametric tests, the mean, standard deviation and Cohen's *d* (i.e., the standardized effect size for between group differences in the means) are also reported.

Free-response text comments were also extracted from the data. Given that only a small number of respondents supplied comments and that the information was often brief, the text analysis was conducted by hand by grouping comments into themes. For the

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3 purposes of this article only a selection of respondents' comments are reported below as a
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5 means of elaborating on and explaining certain aspects of the quantitative results.
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10 Results

11 *Attitudes and behaviours towards using recordings (Questions 14, 15 and 24)*

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13 To frame our analyses, Qs 14 and 24 offer an overview of the respondents' attitudes and
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15 behaviours towards using recordings (descriptive and inferential statistics for these
16
17 questions are provided in Table 2). Concerning the frequency of use of recordings when
18
19 preparing for performance (Q 14), median scores were significantly above the hypothesised
20
21 median of 3 for both students ($z = -8.97, p = .0005$) and professionals ($z = -4.00, p = .0005$),
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23 with students using recordings significantly more often than professionals ($U = 3157, p =$
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25 $.004$). As for the usefulness of recordings as learning resources (Q 24), median scores were
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27 again significantly higher than 3 for students ($z = -9.71, p = .0005$) and professionals ($z = -$
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29 $4.71, p = .0005$), but students attributed greater importance to them ($U = 3480, p = 0.044$).
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31 Respondents' text comments to Qs 25 and 30 offer additional insight on the usefulness of
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33 recordings as learning resources. Forty-six students but only 18 professionals reported that
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35 recordings help increase musical knowledge and stylistic awareness for informing
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37 interpretation. According to a 19 year old male undergraduate student:
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45 [. . .] As I learn more in my studies recordings serve many functions such as ear
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47 training, inspiration for gaining new interpretations and to be more aware of
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49 various styles of playing geographically.
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52 As another 25 year old female postgraduate commented:
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3 Before I was listening to recordings just to get introduced to the piece. Now I am
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5 paying more attention to the structure, style and interpretation of each
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7 performer.
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10 Concerning factors that affect whether to listen to recordings (Q 15), students'
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12 scores were on average significantly above the mid-point for all items except 'affordability
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14 of recordings' (Table 2). For professionals, 'type of repertoire', 'curiosity to explore other
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16 interpretations', 'reputation of performers who have recorded this repertoire' and
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18 'availability of recordings' were scored significantly higher than 3, whereas 'teacher's
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20 instructions' and 'other persons' recommendations' were scored significantly lower than 3
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22 indicating less importance, or more likely less relevance, for this group (Table 2). 'Time
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24 available to learn a piece', 'demands of performance situation' and 'affordability of
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26 recordings' did not differ significantly from the mid-point, suggesting that these carry only a
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28 neutral level of importance for professionals. Significant differences between students and
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30 professionals were observed for 'time available to learn a piece', 'demands of performance
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32 situation', 'teacher's instructions', 'other persons' recommendations' and 'curiosity to
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34 explore other interpretations', with students scoring these items significantly higher than
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36 professionals (Table 2).
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50 *Questions 17, 18 and 19: When to listen to recordings and importance of interpretative*
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52 *features*
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3 Regarding the stage(s) at which one is likely to listen to recordings (Q 17), students' average
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5 scores were significantly higher than 3 for 'before starting to practise' ($z = -6.37, p = .0005$),
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7 'early during practising' ($z = -5.52, p = .0005$) and 'later during practising' ($z = -5.13, p =$
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9 $.0005$), but significantly lower than 3 for 'after producing a polished performance' ($z = -$
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11 $5.27, p = .0005$, see Table 3). Professionals' average scores were significantly above 3 for
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13 'later during practising' ($z = -2.01, p = .045$), but significantly below 3 for 'after producing a
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15 polished performance' ($z = -3.12, p = .002$). Neither students nor professionals seem likely
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17 to listen to recordings after having produced a polished performance of that piece.
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22 Significant differences between students and professionals were found for 'before starting
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24 to practise' ($U = 2,934.5, p = .001$) and 'early during practising' ($U = 3,345.5, p = .019$).
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26
27 Students scored these items higher indicating that they are more likely to listen to
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29 recordings before starting to practise and during the early stages of practising than
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31 professionals.
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34 Concerning the type of listening (casual or attentive) across the different stages of
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36 practising (Q 18), students' average scores were significantly above 3 suggesting more
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38 attentive listening for the 'early' ($z = -5.68, p = .0005$) and 'later' ($z = -5.35, p = .0005$)
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40 stages of practising, but significantly below 3 for 'after producing a polished performance' (z
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42 $= -4.25, p = .0005$) (Table 3). Professionals' average scores were significantly above 3 only
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44 for 'later during practising' ($z = -4.63, p = .0005$). The only significant difference between
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46 students and professionals was observed for 'after producing a polished performance' ($U =$
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48 $3,138.5, p = .013$). Since professionals scored this item higher, although only marginally
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50 above the mid-point (Table 3), they report listening to recordings more attentively than
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52 students even after producing a refined performance. This difference could be attributed to
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3 professionals having to exercise continually more evaluative judgement on their
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5 performances due to work pressures or because they have more experience and critical
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7 ability to do so.
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10 In relation to the importance of technical and interpretative aspects of performance
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12 when listening to recordings (Q 19), students' average scores were significantly higher than
13
14 3 for all items listed, indicating that they were all deemed very or extremely important by
15
16 students (Table 3). Professionals' average scores were significantly higher than 3 for all
17
18 items except 'general technique', suggesting that in this sample professionals do not on
19
20 average glean technical aspects of performance directly from listening to recordings. The
21
22 only significant difference between students and professionals was observed for 'general
23
24 expression' ($U = 3,259, p = .007$), with students scoring this item higher than professionals
25
26 and designating it an extremely important aspect that can be garnered from recordings
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31 (Table 3).
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36 [Insert Table 3 about here]
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40 *Questions 21 and 23: Interpretative aspects affected by listening to recordings*
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42 Concerning the technical and interpretative aspects that students were likely to change as a
43
44 direct result of listening to recordings (Q 21), 'general interpretation', 'general expression',
45
46 'mood', 'dynamics', 'large-scale tempo', 'small-scale tempo', 'articulation and phrasing' and
47
48 'rhythm' were scored significantly higher than 3, while 'general technique' was scored
49
50 below 3 (Table 4). The items 'sound' and 'texture' were not significantly different from the
51
52 mid-point. For professionals 'general technique', 'sound' and 'mood' were scored
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3 significantly below the mid-point indicating that they are less likely to be changed as a direct
4
5 result of listening to recordings (Table 4). Significant differences between students and
6
7 professionals were found for 'general interpretation', 'general expression', 'sound', 'mood',
8
9 'dynamics', 'articulation and phrasing' and 'rhythm'. Students tended to rate these aspects
10
11 higher than professionals and were more likely to change them as a direct result of listening
12
13 to recordings (Table 4).
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19 [Insert Table 4 about here]
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24 From the combined results of Qs 19 and 21, students were found to attribute a
25
26 higher level of importance to more interpretative features when listening to recordings (Q
27
28 19, Table 3) and were also more likely to change a greater number of these than
29
30 professionals (Q 21, Table 4). A plausible explanation is differences in musical knowledge
31
32 and experience. However, the question arises whether students are less discerning listeners.
33
34 Forty-four students from a total of 66 respondents, who supplied additional text comments
35
36 to Qs 25 and 30, expressed that their listening to recordings has become more discerning
37
38 and critical over the years. As a 20 year old female undergraduate put it:
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42
43 Since coming to college I have been encouraged to listen more critically and to
44
45 actively apply attributes of certain select recordings to my playing [. . .].
46
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48 And according to another 23 year old male postgraduate student:

49
50 As I have matured as a performer I have used recordings more extensively [. . .].
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53 However, I have become increasingly assured in my ability to remain critical of
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3 what I listen to, without subconsciously absorbing too many of anyone else's
4
5 nuances.
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7
8 General instrumental and/or physical technique was not deemed as important a feature
9
10 garnered from recordings (Q 19, Table 3) or something that would be changed by either
11
12 students or professionals as a direct result of listening to recordings (Q 21, Table 4). Physical
13
14 and technical aspects of music making may have less to do with just listening, even very
15
16 attentively, and more with how the aural experience is integrated with the complex
17
18 psychomotor processes during the close bodily engagement with one's instrument or voice.
19
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21
22 Regarding the stage(s) during which one is likely to implement interpretative
23
24 changes as a direct result of listening to recordings (Q 23), students' average scores were
25
26 significantly higher than 3 for 'early during practising' ($z = -4.43, p = .0005$) and 'later during
27
28 practising' ($z = -2.39, p = .017$), but significantly below 3 for 'after producing a polished
29
30 performance' ($z = -6.46, p = .0005$) (Table 4). By contrast, professionals' average scores
31
32 were significantly below 3 for 'before starting to practise' ($z = -3.49, p = .0005$) and 'after
33
34 producing a polished performance' ($z = -4.73, p = .0005$). Significant differences between
35
36 students and professionals were found for 'before starting to practise' ($U = 3090, p = .003$)
37
38 and 'early during practising' ($U = 3,263.5, p = .009$), with students scoring these items higher
39
40 than professionals. Students, therefore, were more likely to implement interpretative
41
42 changes as a direct result of listening to recordings during the early stages of learning and
43
44 even before starting to practise.
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49
50 From the combined results of Qs 17, 18 and 23, students were more reliant on
51
52 recordings earlier on during practising than professionals. This could be attributed to
53
54 students' lack of repertoire knowledge and need to enhance their musical insight from the
55
56

1
2
3 very beginning of practising, or due to other constraints such as time pressures and type of
4
5 repertoire as reported in the results of Q 15 (see Table 2). As a 19 year old female
6
7 undergraduate commented in Q 25:

10 I am more likely to listen to a piece of music from recordings before learning, for
11
12 example symphonies or overtures for orchestras, due to the sheer lack of time
13
14 to learn them. Another example is listening to a recording whilst learning
15
16 repertoire from a genre I am unfamiliar with or uncertain how it is meant to be
17
18 performed.
19
20

21
22 Another 29 year old female postgraduate wrote:

23
24 I've found demands for good sight-reading high [. . .], therefore I feel the need to
25
26 at least listen to a piece to get an idea of it before I show up to a first rehearsal,
27
28 especially if it is a small ensemble where mistakes are more audible (I mostly do
29
30 choral music).
31
32

33
34 Although professionals were found to exercise more attentive listening even 'after
35
36 producing a polished performance' (Q 18, Table 3), neither professionals nor students
37
38 seemed likely to change interpretative aspects 'after producing a polished performance' (Q
39
40 23, Table 4). A possible explanation is that once a hierarchical cognitive structure of the
41
42 piece has been formed through deliberate practice and extended use of retrieval cues
43
44 (Williamon and Valentine, 2002; Chaffin, 2007) this is less likely to change in any radical way.
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50 *Factors affecting choice of recordings (Question 26)*

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53 In relation to how students choose recordings, the following were rated significantly higher
54
55 than 3: 'I ask others' ($z = -2.38, p = .017$), 'I listen to many different recordings' ($z = -6.29, p$
56
57

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3 = .0005); 'I listen to performers I already know' ($z = -6.66, p = .0005$); 'I listen to acclaimed
4 performers' ($z = -7.69, p = .0005$); and 'I listen to performers who are strongly associated
5 with that repertoire' ($z = -7.46, p = .0005$) (Table 5). Professionals also scored 'I listen to
6 acclaimed performers' ($z = -2.91, p = 0.004$) and 'I listen to performers who are strongly
7 associated with that repertoire' ($z = -3.73, p = .0005$) significantly higher than 3. For both
8 groups, therefore, the reputations of performers is a factor that affects the choice of
9 recording. The importance attributed to performers' reputations in evaluating other
10 interpretations from recordings resonates with similar findings stemming from research on
11 recording criticism (e.g., Alessandri, 2014).
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24 Significant differences between students and professionals were observed for five
25 items (Table 5). Students scored 'I search online' higher than professionals ($U = 3,441.5, p =$
26 $.042$), possibly hinting at subtle generation differences by this preference for online
27 resources, although both groups' scores were below 3. The item 'I listen to just a few
28 contrasting recordings' was also rated higher by the students ($U = 3,477, p = .048$), although
29 this was again below the mid-point. Items which the students scored above 3 and
30 significantly higher than the professionals included: 'I ask others' ($U = 2,849.5, p = .0005$); 'I
31 listen to performers I already know' ($U = 3,180.5, p = .004$); and 'I listen to acclaimed
32 performers' ($U = 3,244, p = .007$) (Table 5). These findings suggest greater receptiveness by
33 students to other people's recommendations and to acclaimed performers' reputations
34 when choosing recordings. This could be due to an underlying connection between the level
35 of impressionability and age, which in turn could be linked to levels of experience and
36 confidence in one's abilities. As a 27 year old female postgraduate student commented in Q
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3 [. . .] Listening to recordings significantly increases my confidence when
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5 performing the piece and gives me ideas of what is stylistically appropriate; it
6
7 helps me make my own interpretative decisions with greater awareness and
8
9 confidence [. . .].
10
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15 [Insert Table 5 about here]
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20 *Type of influence exerted by recordings on practising and performing habits (Question 28)*
21

22 Students scored the following items significantly higher than 4, the scale mid-point for this
23 particular question, attributing a positive influence on how these impact their practising and
24 performing habits: 'to produce note-perfect performances' ($z = -3.25, p = .001$); 'to re-
25
26 invent my style' ($z = -8.65, p = .0005$); 'to comply with current styles' ($z = -6.07, p = .0005$);
27
28 'to comply with past styles' ($z = -4.50, p = .0005$); 'to develop my own distinct style' ($z = -$
29
30 8.15, $p = .0005$); and 'to do things differently from what my teachers have taught me' ($z = -$
31
32 2.66, $p = .008$) (Table 6). The item 'to be acutely aware of what sells' ($z = -3.32, p = .001$)
33
34 was scored just below the mid-point by the students indicating on average a mildly negative
35
36 influence on their practising and performing habits.
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43 Professionals scored the following three items significantly higher than 4: 'to re-
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45 invent my style' ($z = -4.05, p = .0005$); 'to comply with current styles' ($z = -3.26, p = .001$);
46
47 and 'to develop my own distinct style' ($z = -2.72, p = .007$). The following three items were
48
49 scored just below the mid-point by professionals suggesting a mildly negative influence: 'to
50
51 be acutely aware of what sells' ($z = -2.96, p = .003$); 'to become more competitive' ($z = -$
52
53 3.41, $p = .001$); and 'to change my artistic image' ($z = -3.55, p = .0005$).
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5 [Insert Table 6 about here]
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8 Significant differences between students and professionals were observed for the
9
10 following: 'to become more competitive' ($U = 3,241.5, p = .009$); 'to change my artistic
11
12 image' ($U = 3,122, p = .003$); and 'to develop my own distinct style' ($U = 3,434.5, p = .04$).
13
14 Students scored all of these higher than professionals, although for the first two items both
15
16 groups' average scores were just below the mid-point hinting at mildly negative to neutral
17
18 levels of influence (Table 6). By contrast, the item 'to develop my own distinct style', which
19
20 was scored above 4, was deemed to have a positive influence on students' practising and
21
22 performing habits. Responses to Q 30 further elaborated on the usefulness of recordings in
23
24 the development of a distinct style. As a 19 year old female undergraduate wrote:
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28 [. . .] Now I spend more time researching and looking for a recording I know will
29
30 help me the most; one which differs from what I'm being taught to see where
31
32 variation can be achieved.
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36 As another 20 year old female undergraduate commented:
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38 I think as you grow as a musician you come to better understand what is a good
39
40 performance [. . .]. Only by putting in the effort to consider differing versions of
41
42 a chosen piece of repertoire can you as a musician hope to achieve a
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44 performance which is informed and represents the best aspects of your musical
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46 personality.
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52 Discussion
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3 The purpose of this study was to examine how musicians use recordings as learning
4
5 resources in preparing for performance and to identify differences between advanced
6
7 students at tertiary level and their professional counterparts. A learning resource is a tool
8
9 that actively partakes in the mediation of cognitive skills (e.g., attention, memory,
10
11 internalization of musical score) and the organization of other personal resources (e.g., self-
12
13 reflection and evaluation, practice goals, time management) during self-regulated learning.
14
15 The online survey, therefore, sought to address: how often and at what stages of practice
16
17 musicians listen to recordings; what interpretative features they consider important; what
18
19 aspects of their performance they are likely to change as a direct result of listening to
20
21 recordings; what factors affect their choice of recording; and the type of influence exerted
22
23 by recordings on practising habits. Across the survey clear differences in the frequency of
24
25 use and level of reliance on recordings were observed between students and professionals,
26
27 with students showing greater preference for these resources which could be attributed to
28
29 different strengths and weaknesses at these different levels of expertise.
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36 Students were more likely to use recordings prompted by time constraints, the
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38 demands of the performance situation and curiosity to explore other interpretations (Q 15).
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40 These results suggest that recordings function as mediating agents in planning and time
41
42 management and self-help seeking by exploring other stylistic options for performance.
43
44 Students were more dependent on their teachers' recommendations (Q 15) and also
45
46 seemed to be more influenced by the performers' reputation when choosing recordings (Q
47
48 26). These findings are compatible with the fact that adult mediation and guidance is more
49
50 prominent in student learners, even advanced ones who may still rely on their teachers'
51
52 input. Students were more reliant on recordings in the early stages of practising (Qs 17, 18
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3 and 23) and were more likely to change a greater number of interpretative features as a
4
5 direct result of listening to recordings (Qs 19 and 21). Although self-regulation starts before
6
7 the learning activity proper (e.g., Zimmerman, 2000), students use these resources more
8
9 than professionals for reasons that include goal-setting (e.g., content learning, improving
10
11 sight-reading) and strategic planning (e.g., overcoming time constraints), possibly because
12
13 students are less experienced than professionals in their knowledge of repertoire.
14
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17 Recordings were found to exert a more positive type of influence on students' practising
18
19 and performing habits, especially in the development of a distinct style (Q 28). According to
20
21 respondents' comments, the search for originality and novelty did not appear to be
22
23 compromised by listening to others' interpretations from recordings, which is broadly
24
25 compatible with reports from other studies (e.g., Hallam, 1995; Lisboa et al., 2005). Many
26
27 students in this survey reported using a more critical ear as they have matured in their
28
29 musical training.
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34 The results of this survey indicate that listening to recordings in preparation for
35
36 performance is an activity that is used to regulate various aspects of musical learning and
37
38 performance, especially among students, such as what interpretative elements to listen for
39
40 and at which stages of practice to engage with these resources. While recordings are used
41
42 for general music instruction, such as learning repertoire or becoming better acquainted
43
44 with new styles, they also appear to function as interventions that influence self-regulation
45
46 including overcoming time constraints, exercising critical acuity or enhancing confidence in
47
48 one's interpretative choices. These findings offer implications for music education. The
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50 active encouragement of listening critically to appropriate recordings of a piece in
51
52 preparation for performance could be beneficial for expanding advanced music students'
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3 stylistic knowledge, facilitating the attainment of practical goals in performance and
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5 contributing towards the development of a distinct musical style. Many higher education
6
7 institutions offer courses in performance practice that explore the legacy of recordings,
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9 pointing to a wider recognition of the influence of recordings on perceptions of originality
10
11 and creativity in music performance. If creative ideas that influence musicians' work emerge
12
13 from a variety of sources and listening is integral to how musicians choose, respond,
14
15 evaluate and perform repertoire, then the role of listening to recordings as a creative
16
17 resource for performance calls for further systematic investigation. More research is
18
19 desirable to enable us to understand more fully how these learning recourses fit within
20
21 existing sociocultural theories of learning and how they can be implemented as
22
23 interventions to enhance self-regulation in advanced musicians.
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29 The present study is not without limitations. The structured online survey was aimed
30
31 at charting musicians' attitudes, but observation of actual behaviours concerning how
32
33 musicians use recordings during practice sessions warrants more research. Although the
34
35 online survey might seem to treat listening to recordings as somewhat distinct from
36
37 practising sessions, following and observing musicians during rehearsal would be a more
38
39 naturalistic procedure for elucidating the array of learning possibilities that exist, such as
40
41 playing along with the recording, listening and imitating a recording or interacting with
42
43 different technological media when listening to recordings. Various questions of process still
44
45 remain to be unpacked, such as differences between students and professionals in how the
46
47 context of listening (type of technology, format of recording, or social environment for
48
49 learning) influences responsiveness to interpretative features harnessed from recordings
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51 and their integration during practising. Other questions of interest include the use of
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3 recordings as aural scores, especially for improvisatory music genres such as jazz, and the
4
5 role of recording and evaluating oneself during practising. Although the focus of this survey
6
7 was on classical musicians, the different uses of recordings between classical, popular or
8
9 folk music performers also merits closer attention, especially given the different functions of
10
11 written and audible documents in these traditions respectively.
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17 Ethical approval

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19 This study was granted ethical approval by the Conservatoires UK Research Ethics
20
21 Committee. Informed consent was obtained from all participants, as outlined in the survey
22
23 introduction, and no payment was given in exchange for participation.
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29 Conflict of interest statement

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31 The authors declare that the research was conducted in the absence of any commercial or
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33 financial relationship that could be construed as a potential conflict of interest.
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Table 1. Comparison of practising, performing, teaching and listening habits for students and professionals (Questions 8–13).

Questions 8 – 13	Students (n = 147)			Professionals (n = 57)			Mann-Whitney		Cohen's <i>d</i> (effect size)
	Median	Mean	SD	Median	Mean	SD	<i>U</i>	<i>p</i> (2-tailed)	
Practising	10	13.81	10.36	7	8.35	6.93	2754.50	.0005	0.57
Performing	2	4.21	5.46	1	4.38	6.33	3607.00	NS	-0.03
Teaching	1	3.08	5.19	10	13.42	9.94	1348.00	.0005	-1.51
Actively listening to recs.	2	3.99	5.04	1	2.05	2.18	2853.50	.0005	0.44
Casually listening to recs.	7	11.11	12.18	5	6.54	5.85	3174.50	.007	0.42
Attending live performances	2	2.21	1.96	1	1.46	1.75	2886.50	.0005	0.40

Table 2. Descriptive statistics and significance tests for Questions 14, 15 and 24.

Questions 14, 15 and 24	Wilcoxon signed rank test (hypothesized mid-point = 3)										Mann-Whitney		Cohen's <i>d</i> (effect size)
	students (n = 147)					professionals (n = 57)					<i>U</i>	<i>p</i> (2-tailed)	
	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>			
Question 14													
Do you listen to recs.?	4.00	4.12	0.91	- 8.97	.0005	4.00	3.68	1.04	- 4.00	.0005	3157.00	.004	0.46
Question 15													
Type of repertoire	4.00	3.56	1.27	- 4.41	.0005	4.00	3.61	1.35	- 2.92	.003	NS		- 0.04
Time available	4.00	3.86	1.24	- 6.56	.0005	3.00	3.25	1.41	NS		3103.00	.003	0.48
Demands of performance	4.00	3.59	1.20	- 5.03	.0005	3.00	3.00	1.48	NS		3243.50	.01	0.46
Teacher's instructions	4.00	3.50	1.16	- 4.67	.0005	2.00	2.25	1.42	- 3.77	.0005	2137.50	.0005	1.01
Others' recommendations	3.00	3.24	1.12	- 2.34	.019	3.00	2.60	1.24	- 2.59	.009	2955.00	.001	0.56
Curiosity	4.00	4.01	0.95	- 8.37	.0005	4.00	3.61	1.16	- 3.48	.001	3382.50	.025	0.39
Performers' reputations	4.00	3.61	1.23	- 5.10	.0005	4.00	3.56	1.30	- 2.85	.004	NS		0.04
Availability of recs.	4.00	3.71	1.23	- 5.85	.0005	4.00	3.60	1.35	- 3.00	.003	NS		0.09
Affordability of recs.	3.00	2.99	1.48	NS		2.00	2.67	1.48	NS		NS		0.22
Question 24													
Are recs. useful?	4.00	4.12	0.73	- 9.71	.0005	4.00	3.81	0.97	- 4.71	.0005	3480.00	.044	0.39

Table 3. Descriptive statistics and significance tests for Questions 17, 18 and 19.

Questions 17, 18 and 19	Wilcoxon signed rank test (hypothesized mid-point = 3)										Mann-Whitney		Cohen's <i>d</i> (effect size)
	Students (n = 147)					Professionals (n = 57)					U	p (2-tailed)	
	Median	Mean	SD	z	p	Median	Mean	SD	z	p			
Question 17													
Before starting to practise	4.00	3.66	1.05	- 6.37	.0005	3.00	3.05	1.14	NS		2934.50	.001	0.56
Early during practising	4.00	3.54	1.03	- 5.52	.0005	3.00	3.14	1.19	NS		3345.50	.019	0.37
Later during practising	4.00	3.50	1.07	- 5.13	.0005	3.00	3.32	1.10	- 2.01	.045	NS		0.17
After producing polished perf.	2.00	2.43	1.16	- 5.27	.0005	2.00	2.47	1.15	- 3.12	.002	NS		- 0.04
Question 18													
Before starting to practise	3.00	3.19	1.38	NS		3.00	3.00	1.78	NS		NS		0.13
Early during practising	4.00	3.73	1.36	- 5.68	.0005	4.00	3.49	1.79	NS		NS		0.16
Later during practising	4.00	3.80	1.50	- 5.35	.0005	5.00	4.10	1.37	- 4.63	.0005	NS		- 0.21
After producing polished perf.	2.00	2.41	1.72	- 4.25	.0005	3.00	3.09	1.75	NS		3138.50	.013	- 0.40
Question 19													
General technique	4.00	3.52	1.18	- 4.66	.0005	4.00	3.40	1.35	NS		NS		0.10
General interpretation	4.00	4.26	0.83	- 9.63	.0005	4.00	3.98	1.13	- 4.60	.0005	NS		0.30
General expression	5.00	4.44	0.71	- 10.32	.0005	4.00	3.95	1.16	- 4.61	.0005	3259.00	.007	0.57
Sound	4.00	4.01	0.96	- 8.59	.0005	4.00	3.81	1.23	- 4.00	.0005	NS		0.20
Texture	4.00	3.84	0.98	- 7.86	.0005	4.00	3.95	1.03	- 4.91	.0005	NS		- 0.11
Mood	4.00	4.06	0.95	- 8.70	.0005	4.00	3.82	1.17	- 4.23	.0005	NS		0.23
Dynamics	4.00	4.18	0.88	- 9.26	.0005	4.00	3.96	1.03	- 4.82	.0005	NS		0.24
Large-scale tempo	4.00	3.87	0.95	- 7.94	.0005	4.00	3.91	1.12	- 4.41	.0005	NS		- 0.04
Small-scale tempo	4.00	3.72	0.94	- 7.25	.0005	4.00	3.77	1.20	- 3.91	.0005	NS		- 0.05
Articulation/phrasing	4.00	4.13	0.87	- 9.24	.0005	4.00	3.98	1.16	- 4.58	.0005	NS		0.15
Rhythm	4.00	3.95	1.06	- 7.93	.0005	4.00	4.05	1.11	- 4.92	.0005	NS		- 0.09

Table 4. Descriptive statistics and significance tests for Questions 21 and 23.

Questions 21 and 23	Wilcoxon signed rank test (hypothesized mid-point = 3)										Mann-Whitney		Cohen's <i>d</i> (effect size)
	Students (<i>n</i> = 147)					Professionals (<i>n</i> = 57)					<i>U</i>	<i>p</i> (2-tailed)	
	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>			
Question 21													
Change general technique	3.00	2.73	0.90	-3.44	.001	3.00	2.53	0.98	-3.38	0.001	NS		0.23
Change general interpretation	3.00	3.37	0.81	-4.96	.0005	3.00	2.96	0.80	NS		3103.50	.002	0.50
Change general expression	3.00	3.41	0.83	-5.38	.0005	3.00	2.84	0.80	NS		2656.00	.0005	0.70
Change sound	3.00	3.16	0.98	NS		3.00	2.75	0.89	-2.03	0.042	3204.50	.006	0.43
Change texture	3.00	3.16	1.00	NS		3.00	3.00	0.91	NS		NS		0.16
Change mood	3.00	3.30	1.00	-3.35	.001	3.00	2.79	0.80	-1.98	0.048	2914.00	.0005	0.54
Change dynamics	4.00	3.59	0.91	-6.44	.0005	3.00	3.02	0.90	NS		2819.00	.0005	0.63
Change large-scale tempo	3.00	3.20	0.94	-2.56	.01	3.00	2.98	0.77	NS		NS		0.25
Change small-scale tempo	3.00	3.21	0.83	-2.98	.003	3.00	2.96	0.89	NS		NS		0.29
Change articulation/phrasing	4.00	3.50	0.90	-5.75	.0005	3.00	3.05	0.93	NS		3141.50	.003	0.49
Change rhythm	3.00	3.31	0.98	-3.67	.0005	3.00	2.84	0.94	NS		3105.50	.003	0.49
Question 23													
Before starting to practise	3.00	2.94	1.07	NS		2.00	2.42	1.12	-3.49	0.0005	3090.00	.003	0.48
Early during practising	4.00	3.37	0.91	-4.43	.0005	3.00	2.98	1.03	NS		3263.50	.009	0.41
Later during practising	3.00	3.20	0.97	-2.39	.017	3.00	3.00	0.98	NS		NS		0.20
After producing polished perf.	2.00	2.31	1.04	-6.46	.0005	2.00	2.19	0.95	-4.73	0.0005	NS		0.12

Table 5. Descriptive statistics and significance tests for Question 26.

Question 26	Wilcoxon signed rank test (hypothesized mid-point = 3)										Mann-Whitney		Cohen's <i>d</i> (effect size)
	Students (n = 147)					Professionals (n = 57)					U	p (2-tailed)	
	Median	Mean	SD	z	p	Median	Mean	SD	z	p			
Search online	3.00	2.71	1.18	-2.97	.003	2.00	2.33	1.24	-3.74	.0005	3441.50	.042	0.31
Ask others	3.00	3.20	0.96	-2.38	.017	3.00	2.56	1.12	-2.86	.004	2849.50	.0005	0.63
Choose without much thought	3.00	2.75	1.05	-2.99	.003	3.00	2.65	1.06	-2.63	.009	NS		0.09
Record shop	2.00	2.02	0.94	-8.58	.0005	2.00	2.09	1.12	-4.96	.0005	NS		-0.07
Browse/download online	4.00	3.19	1.15	NS		4.00	3.30	1.21	NS		NS		-0.09
Record label	2.00	1.88	0.99	-8.89	.0005	2.00	1.89	1.03	-5.53	.0005	NS		-0.01
Year of recording	2.00	2.34	1.10	-6.37	.0005	2.00	2.26	1.03	-4.33	.0005	NS		0.07
Price of recording	3.00	2.50	1.16	-4.79	.0005	3.00	2.65	1.20	-2.37	.018	NS		-0.12
Online download speed	1.00	1.61	0.89	-9.87	.0005	1.00	1.63	0.96	-5.99	.0005	NS		-0.02
Cover of recording	1.00	1.72	0.95	-9.37	.0005	1.00	1.46	0.73	-6.54	.0005	NS		0.30
Liner notes	1.00	1.80	0.99	-9.18	.0005	1.00	1.58	0.86	-6.28	.0005	NS		0.23
Listen to many different recs.	4.00	3.61	0.98	-6.29	.0005	3.00	3.30	1.21	NS		NS		0.30
Listen to few contrasting recs.	3.00	2.97	1.00	NS		3.00	2.63	1.01	-2.66	.008	3477.00	.048	0.33
Performers I know	4.00	3.59	0.87	-6.66	.0005	3.00	3.18	0.95	NS		3180.50	.004	0.46
Acclaimed performers	4.00	3.74	0.87	-7.69	.0005	3.00	3.40	0.94	-2.91	.004	3244.00	.007	0.38
Performers strongly associated with that repertoire	4.00	3.73	0.90	-7.46	.0005	4.00	3.54	0.93	-3.73	.0005	NS		0.20
New performers	3.00	3.03	0.91	NS		3.00	3.07	0.84	NS		NS		-0.05
Performers of my generation	3.00	2.86	0.91	NS		3.00	2.61	0.88	-3.00	.003	NS		0.28
Historical recordings	3.00	3.00	1.04	NS		3.00	2.82	1.04	NS		NS		0.17

Table 6. Descriptive statistics and significance tests for Question 28.

Question 28	Wilcoxon signed rank test (hypothesized mid-point = 4)										Mann-Whitney		Cohen's <i>d</i> (effect size)
	students (n = 147)					professionals (n = 57)					<i>U</i>	<i>p</i> (2-tailed)	
	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>	Median	Mean	<i>SD</i>	<i>z</i>	<i>p</i>			
Produce note-perfect performances	4.00	4.38	1.36	-3.25	.001	4.00	4.39	1.41	NS		NS	0.00	
Re-invent my style	5.00	5.13	1.07	-8.65	.0005	5.00	4.86	1.30	-4.05	.0005	NS	0.24	
Comply with current styles	5.00	4.67	1.13	-6.07	.0005	5.00	4.72	1.46	-3.26	.001	NS	-0.04	
Comply with past styles	4.00	4.48	1.18	-4.50	.0005	4.00	4.32	1.28	NS		NS	0.13	
To be acutely aware of what sells	4.00	3.63	1.32	-3.32	.001	4.00	3.33	1.47	-2.96	.003	NS	0.22	
Become more competitive	4.00	3.86	1.50	NS		4.00	3.26	1.47	-3.41	.001	3241.50	.009	0.40
Change my artistic image	4.00	3.86	1.21	NS		4.00	3.23	1.48	-3.55	.0005	3122.00	.003	0.49
Develop my own distinct style	5.00	5.18	1.26	-8.15	.0005	5.00	4.67	1.57	-2.72	.007	3434.50	.04	0.38
Do things differently from what my teachers have taught me	4.00	4.27	1.21	-2.66	.008	4.00	3.96	1.45	NS		NS	0.23	

Appendix

Directions: This survey is intended to find out how musicians use recordings during practising and learning. Answer each question based on your own experiences. All information you provide will be held in the strictest confidence and will be used for research purposes only.

1. **What is your age?**
2. **What is your sex?** Male Female
3. **What is your nationality?**
4. **What is your current status?**
 - Undergraduate student
 - Postgraduate student
 - Professional musician
 - Other (specify)
5. **If applicable, please state your current educational institution.**
6. **What is your main area of specialism?**
 - Keyboard
 - Strings
 - Woodwind
 - Brass
 - Percussion
 - Vocal studies
 - Conducting
 - Composition
 - Other (specify)
7. **Do you have a specialism in historical performance practice?** Yes No
8. **How many hours do you currently practise on average per week (for a typical non-holiday week)?**
9. **How many hours do you currently devote to performing activities on average per week (e.g. recitals, master-classes, etc.)?**
10. **How many hours do you currently devote to teaching activities on average per week?**
11. **How many hours do you *actively* listen to recordings on average per week (i.e. listening to recordings carefully or purposefully)?**
12. **How many hours do you listen *casually* to recordings on average per week (i.e. listening to recordings in the background while doing other things)?**
13. **How many hours do you attend live musical performances on average per week?**
14. **When preparing a piece for performance, do you listen to recordings of that piece?**

	Never					Always
	1	2	3	4	5	
15. **Which of the following affect(s) whether you listen to recordings of the piece you are learning?**

	Not at all important					Extremely important
Type of repertoire	1	2	3	4	5	
Time available to learn a piece	1	2	3	4	5	
Demands of performance situation	1	2	3	4	5	

Teacher's instructions	1	2	3	4	5
Other persons' recommendations	1	2	3	4	5
Curiosity to explore other interpretations	1	2	3	4	5
Names/reputations of performers who have recorded this repertoire	1	2	3	4	5
Access to and availability of recordings	1	2	3	4	5
Affordability of recordings	1	2	3	4	5

16. What else affects whether you listen to recordings of the piece you are learning?

17. At what stage(s) in your learning/practising are you likely to listen to recordings of that piece?

	Never				Always
Before starting to learn/practise	1	2	3	4	5
Early on during the learning/practising process	1	2	3	4	5
Later in the learning/practising process but before giving a polished performance	1	2	3	4	5
Only after producing a polished performance	1	2	3	4	5

18. If you listen to recordings during learning/practising a piece for performance, to what extent is your listening casual or attentive across the stages of learning?

	Never				Always
Before starting to learn/practise	1	2	3	4	5
Early on during the learning/practising process	1	2	3	4	5
Later in the learning/practising process but before giving a polished performance	1	2	3	4	5
Only after producing a polished performance	1	2	3	4	5

19. How important are the following features when listening to a recording while learning/practising the same piece for performance?

	Not at all important				Extremely important
General instrumental and/or physical technique (e.g. coordination, facility of playing, assuredness, etc.)	1	2	3	4	5
General interpretation (e.g. stylistic awareness, accuracy, musical coherence, etc.)	1	2	3	4	5

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General expression (e.g. emotional character, musical communication, etc.)	1	2	3	4	5
Sound quality (e.g. performer's tonal colour, projection, etc.)	1	2	3	4	5
Musical texture (e.g. voicing, balance of musical parts, etc.)	1	2	3	4	5
The mood(s) created by the performance in the recording	1	2	3	4	5
Dynamic shaping (e.g. to create climaxes, contrast, etc.)	1	2	3	4	5
The large-scale tempo in the piece (e.g. musical momentum across phrases or larger sections)	1	2	3	4	5
The small-scale tempo at specific places in the piece (e.g. local use of rubato for expressivity)	1	2	3	4	5
Articulation and phrasing	1	2	3	4	5
Rhythmic detail	1	2	3	4	5

20. What else is important when listening to recordings while learning/practising the same piece for performance?

21. What aspects of performance are you likely to change as a direct result of listening to recordings?

	Never				Always
General instrumental and/or physical technique (e.g. coordination, facility of playing, assuredness, etc.)	1	2	3	4	5
General interpretation (e.g. stylistic awareness, accuracy, musical coherence, etc.)	1	2	3	4	5
General expression (e.g. emotional character, musical communication, etc.)	1	2	3	4	5
Sound quality (e.g. performer's tonal colour, projection, etc.)	1	2	3	4	5
Musical texture (e.g. voicing, balance of musical parts, etc.)	1	2	3	4	5
The mood(s) created by the performance in the recording	1	2	3	4	5
Dynamic shaping (e.g. to create climaxes, contrast, etc.)	1	2	3	4	5

The large-scale tempo in the piece (e.g. musical momentum across phrases or larger sections)	1	2	3	4	5
The small-scale tempo at specific places in the piece (e.g. local use of rubato for expressivity)	1	2	3	4	5
Articulation and phrasing	1	2	3	4	5
Rhythmic detail	1	2	3	4	5

22. What else are you likely to change as a direct result of listening to recordings when learning/practising the same piece for performance?

23. If listening to recordings encourages you to change aspects of your interpretation, at what stage(s) in the learning/practising process is that likely to happen?

	Never				Always
Before starting to learn/practise	1	2	3	4	5
Early on during the learning/practising process	1	2	3	4	5
Later in the learning/practising process but before giving a polished performance	1	2	3	4	5
Only after producing a polished performance	1	2	3	4	5

24. Do recordings provide a useful learning resource for you?

Never					Always
1	2	3	4	5	

25. Has your use of recordings as learning resources for performance changed over time (e.g. over the course of your musical studies and/or professional career)?

26. How do you choose which recording(s) to listen to as a learning resource?

	Never				Always
I search online (discographies, record catalogues, record reviews, etc.)	1	2	3	4	5
I ask others for their suggestions (e.g. teachers, friends, etc.)	1	2	3	4	5
I choose without giving it too much thought	1	2	3	4	5
I look around in a record shop and choose from what is available	1	2	3	4	5
I browse and buy/download online	1	2	3	4	5

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My choice is influenced by the record label	1	2	3	4	5
My choice is influenced by the year of recording	1	2	3	4	5
My choice is influenced by the price of recording	1	2	3	4	5
My choice is influenced by the online download speed	1	2	3	4	5
My choice is influenced by the cover of the recording	1	2	3	4	5
My choice is influenced by the liner notes inside the recording	1	2	3	4	5
I listen to as many different recordings of the piece as I can	1	2	3	4	5
I listen to just a few contrasting recordings (e.g. by year or performer)	1	2	3	4	5
I listen to performers I already know	1	2	3	4	5
I listen to performers of an acclaimed reputation	1	2	3	4	5
I listen to performers whose names are strongly associated with that repertoire	1	2	3	4	5
I listen to new performers/recording artists	1	2	3	4	5
I listen to performers of my own generation	1	2	3	4	5
I listen to historical recordings (e.g. from the early twentieth century)	1	2	3	4	5

27. What else affects how you choose which recordings to listen to as learning resources?

28. How does the availability of recordings influence the way you practise and perform, and what type of influence would you designate to each item from the list below? (Where a negative influence is detrimental to the way you practise and/or perform and a positive influence enhances the way you practise and/or perform)

	Negative influence					Positive influence	
	1	2	3	4	5	6	7
To produce note-perfect performances							
To re-invent my performance style	1	2	3	4	5	6	7

To comply with current performing styles and practices	1	2	3	4	5	6	7
To comply with past performing styles (e.g. from historical recordings)	1	2	3	4	5	6	7
To be acutely aware of what sells	1	2	3	4	5	6	7
To become more competitive	1	2	3	4	5	6	7
To change my artistic image	1	2	3	4	5	6	7
To develop my own distinct style	1	2	3	4	5	6	7
To do things differently from what my teacher(s) have taught me	1	2	3	4	5	6	7

29. Does the availability of recordings influence how you practise and/or perform in any other way(s)?

30. Has the influence of recordings changed for you over time, and in what ways?

31. Is there anything else you would like to add about recordings and your listening/practising habits, or about this survey?