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14 Using self-determination theory to examine musical participation and well-being

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32

Abstract

33
34 A recent surge of research has begun to examine music participation and well-being;
35 however, a particular challenge with this work concerns theorizing around the associated
36 well-being benefits of musical participation. Thus, the current research used Self-
37 Determination Theory to consider the potential associations between basic psychological
38 needs (competence, relatedness, and autonomy), self-determined autonomous motivation, and
39 the perceived benefits to well-being controlling for demographic variables and the musical
40 activity parameters. A sample of 192 Australian residents (17-85, $M_{age} = 36.95$), who were
41 currently participating in a musical activity at the time, completed an online questionnaire.
42 Results indicated that females were more likely to perceive benefits to their well-being; and
43 that how important an individual considers music in their life was positively related to
44 perceived well-being. Importantly, the analyses also revealed that the basic needs of
45 competency and relatedness were related to overall perceived well-being as well as
46 specifically social, cognitive, and esteem dimensions of well-being. Autonomous motivation
47 demonstrated significant associations with both an overall well-being score as well as four of
48 five specific well-being subscales measured. Collectively, the findings indicate that Self-
49 Determination Theory offers a useful theoretical framework to understanding the relationship
50 between musical participation and well-being. Further, the pattern of findings reiterates the
51 positive associations between musical participation and one's psychosocial well-being, with
52 broad implications for people involved in the facilitation of musical activity.

53
54 **Keywords:** musical participation, well-being, Self-Determination Theory, psychological
55 needs, autonomous motivation
56

57 **Using self-determination theory to examine musical participation** 58 **and well-being**

59
60 There is a growing interest in researching the possible relationship between music and well-
61 being (Clift, Hancox, Staricoff, & Whitmore, 2008; MacDonald, 2013; MacDonald, Kreutz,
62 & Mitchell, 2012; Skingley, Bungay, & Clift, 2011). However, research on the subject faces
63 a number of challenges. One, in particular, concerns the challenge of producing systematic,
64 empirical evidence to support claims that are sometimes taken to be self-evident (Skingley et
65 al., 2011). Relatedly, much of the relevant work can be challenged on the grounds of a lack of
66 theoretical grounding (Clift & Hancox, 2010). Recently, researchers (e.g., Evans, 2015;
67 Krause & Davidson, 2018; Küpers, van Dijk, McPherson, & van Geert, 2014) have suggested
68 the utility of Self-Determination Theory as a framework to consider musical participation and
69 well-being. Self-Determination Theory has been applied to a wide range of social
70 psychological behaviours, spanning health, education, and social relationships, and is
71 supported by a growing body of research (Evans, 2015). Indeed, Self-Determination Theory
72 has been used to explain a range of behaviours that involve motivation over extended periods
73 of time (e.g., Alivernini & Lucidi, 2011; Georgiadis, Biddle, & Stavrou, 2006; Jang, Kim, &
74 Reeve, 2012; Reinboth & Duda, 2006; Sheldon & Krieger, 2007). Therefore, the present
75 research examined perceived well-being associated with active musical participation using
76 Self-Determination Theory as a theoretical framework.

77 78 **Self-Determination Theory**

79 Self-Determination Theory is concerned with human motivation, development, and wellness:
80 it outlines how the concept of motivation relates to individuals' affect, behaviour, and well-
81 being (Deci & Ryan, 2000, 2008). Self-Determination Theory is a macro theory,
82 encompassing several mini-theories. Two of these theories, Basic Psychological Needs and
83 Organismic Integration Theory, are particularly relevant to musical participation and its
84 perceived well-being benefits. Self-Determination Theory argues that internal, external, and
85 contextual factors, combine to influence the fulfilment of needs by either increasing or
86 decreasing one's motivation to participate (Ryan & Deci, 2000). In this way, Self-
87 Determination Theory can be used to understand how engagement, such as musical
88 participation, can be fostered. Importantly, motivation, an important element to starting and
89 continuing in musical activities (McPherson & O'Neill, 2016; O'Neill & McPherson, 2002),
90 is central to Self-Determination Theory, and both Basic Psychological Needs and Organismic
91 Integration Theory in particular. In this context we note that participation in music, for the
92 majority, takes place during leisure time and/or on an elective basis: given that Self-
93 Determination Theory has been used to study ongoing engagement with other leisure and
94 elective activities, it is a suitable candidate for explaining ongoing engagement with music.

95
96 Basic psychological needs theory states that people strive to satisfy three innate needs,
97 namely competence, relatedness, and autonomy (Hagger, Chatzisarantis, & Harris, 2006;
98 Ryan & Deci, 2002). Competence refers to the need to be effective in one's efforts;
99 relatedness concerns being connected socially, and integrated into a social group; and
100 autonomy concerns the need to feel that one's pursuits are self-governed and self-endorsed
101 (Ryan & Deci, 2002). Deci and Ryan assert that needs for competence, relatedness, and
102 autonomy are universal – they are essential, regardless of culture and life domain (Deci &
103 Ryan, 1985a, 2000; Ryan & Deci, 2002). Both internal, personal factors and the social
104 environment influence the degree to which the three needs are met (Quested, Thøgersen-
105 Ntoumani, Uren, Hardcastle, & Ryan, 2018; Ryan & Deci, 2000). Meeting these needs leads
106 to personal growth, vitality, and well-being (Deci & Ryan, 2000; Ryan & Deci, 2002).

107

108 Organismic integration theory (Deci & Ryan, 1985b, 1991; Ryan & Deci, 2000) differentiates
109 types of motivation (McLachlan, Spray, & Hagger, 2011; Ryan & Connell, 1989). It places
110 particular emphasis on the quality of motivation, rather than merely the quantity (Niven &
111 Markland, 2016). Six different types of motivation exist, and are often conceptualised as
112 lying on a continuum (Gagné & Deci, 2005; MacIntyre, Schnare, & Ross, 2018; McLachlan
113 et al., 2011; Wilson, Sabiston, Mack, & Blanchard, 2012). Intrinsic motivation lies at the
114 internal end of this continuum, and represents self-determined, internalized motivation.
115 External motivation lies at the other end of the continuum, and refers to motivation that is
116 characterized by engagement for reasons completely external to oneself. Three additional
117 types of extrinsic behavioural regulation which differ in terms of the degree to which the
118 motivation is internalized are positioned between these two poles. The three different types of
119 external motivation are termed integrated, identified, and introjected (McLachlan et al.,
120 2011). Integrated regulation is the most autonomous form of extrinsic regulation, followed by
121 identified, and introjected (the least autonomous form of extrinsic motivation). Integrated
122 regulation concerns behaviour that is fully assimilated and consistent with one's self;
123 identified regulation refers to behaviour based on attaining "personally valued outcomes
124 rather than for enjoyment or interest"; and introjected regulation concerns enhancing self-
125 worth by avoiding negative affective states, such as shame and guilt (McLachlan et al., 2011,
126 p. 724; Wilson et al., 2012). Amotivation refers to the absence of clear motivation or
127 intentions (Markland & Tobin, 2004; McLachlan et al., 2011). The theory recognizes that
128 people's actions within a given domain are simultaneously the product of several different
129 motivations along the continuum; these can be accounted for by calculating a relative
130 autonomy index. This index score, for which a higher score indicates greater autonomy,
131 serves as an aggregate representation of how intrinsically or extrinsically motivated someone
132 is (Seymour & Peterman, 2018). Organismic integration theory states that the fulfillment of
133 psychological needs will lead to internalized motivation (Gagné & Deci, 2005).

134
135 The fulfillment of the basic psychological needs is fostered in environments that are
136 autonomy-supportive and hindered in environments that are controlling (Bonneville-Roussy,
137 Vallerand, & Bouffard, 2013). Clear evidence of this comes from previous education research
138 using Self-Determination Theory. Studies have found that students are more engaged and
139 persistent in autonomy supportive activities and environments (e.g., Hagger, Sultan,
140 Hardcastle, & Chatzisarantis, 2015; Reeve, Jang, Carrell, Jeon, & Barch, 2004). In contrast,
141 students suffer in environments in which teachers are more controlling (e.g., Bonneville-
142 Roussy et al., 2013; Soenens, Sierens, Vansteenkiste, Dochy, & Goossens, 2012). In short, in
143 educational settings, autonomy support is associated with students having more self-
144 determined forms of motivation and higher perceptions of competence (e.g., Williams &
145 Deci, 1998) as well as higher levels of enjoyment, engagement, performance, and persistence
146 (e.g., Black & Deci, 2000; Bonneville-Roussy et al., 2013; Chatzisarantis & Hagger, 2009;
147 Jang, Reeve, & Deci, 2010; Niemiec & Ryan, 2009; Oga-Baldwin, Nakata, Parker, & Ryan,
148 2017; Ulstad, Halvari, & Deci, 2018; Vansteenkiste, Simons, Lens, Sheldon, & Deci, 2004).

149
150 Another claim of Self-Determination Theory is that satisfaction of needs is associated with
151 well-being (Deci & Ryan, 2000; Lombas & Esteban, 2018; Milyavskaya & Koestner, 2011).
152 Research has shown this in work settings (e.g., Baard, Deci, & Ryan, 2004; Deci et al., 2001;
153 Iardi, Leone, Kasser, & Ryan, 1993; Van den Broeck, Ferris, Chang, & Rosen, 2016) and
154 healthcare settings, such as aged-care, where an autonomy-supportive environment has been
155 associated with better well-being (Deci & Ryan, 1987; Ferrand, Martinent, & Durmaz, 2014).
156 Research also links satisfying needs to perceived well-being with regard to leisure pursuits
157 (Coleman & Iso-Ahola, 1993), including predominantly exercise (e.g., Chatzisarantis &
158 Hagger, 2009; Lovell, Gordon, Mueller, Mulgrew, & Sharman, 2016; Niven & Markland,
159 2016; Sebire et al., 2016), but also other pursuits such as community gardening (e.g., Quested

160 et al., 2018) and relationship functioning (e.g., Patrick, Canevello, Knee, & Lonsbary, 2007).
161 As Coleman and Iso-Ahola (1993) found, leisure activities which promote fulfilling
162 participants' basic needs, therefore, promote self-determination and are beneficial to well-
163 being (see also Deci & Ryan, 2000; Ferrand et al., 2014). Indeed, Kuykendall, Tay, and Ng's
164 (2015) recent meta-analysis provided strong evidence that leisure engagement is consistently
165 associated with subjective well-being as well as evidence that leisure satisfaction mediates
166 the relationship between leisure engagement and well-being. It is therefore surprising that
167 little research has considered musical participation and well-being using self-determination
168 theory as a theoretical framework, given the prevalence of music participation as a leisure
169 time activity (Laukka, 2007).

170

171 **Self-determination theory in music research**

172 Self-determination theory has recently been used in work concerning both music education
173 and music therapy (Douglas, 2011; Evans & Bonneville-Roussy, 2016; Lee, Davidson, &
174 McFerran, 2016; Valenzuela, Codina, & Pestana, 2018). However, as Evans (2015, p. 7)
175 referenced in his conceptual overview concerning how self-determination theory might be
176 used to consider motivation in music education, there have only been "a small number of
177 studies". In particular, music education researchers have focused on practice, both at the
178 university and conservatoire level (Evans & Bonneville-Roussy, 2016; Valenzuela et al.,
179 2018) and middle-school level (Schatt, 2018). Findings indicate that the fulfillment of
180 psychological needs and autonomous motivation were associated with practicing more
181 frequently and a higher quality of practice (Evans & Bonneville-Roussy, 2016). However,
182 Schatt's (2018) findings indicated differences by instrument and grade level with regard to
183 levels of self-determination to practice, suggesting that personal and contextual factors
184 pertaining to the musical activity can influence one's motivation. Moreover, feelings of
185 autonomy and competence are linked to intrinsic motivation and the experience of flow
186 (Valenzuela et al., 2018) in practice; and autonomy support is also related to passion and
187 persistence in music education (Bonneville-Roussy et al., 2013). Additional work has
188 considered musical play at recess (Countryman, 2014) and singing games in and out of the
189 classroom (Roberts, 2018), providing further support for applying self-determination theory
190 to understand musical behaviours.

191

192 Given that motivation, broadly, has been recognized as an important feature with regard to
193 both starting and continuing to participate in musical activities (McPherson & O'Neill, 2016;
194 O'Neill & McPherson, 2002), researchers have also used basic psychological needs to
195 consider who plays versus ceases playing (Evans, McPherson, & Davidson, 2013; Freer &
196 Evans, 2018). Evidence suggests that when the three basic psychological needs are met,
197 people are more likely to continue participating in musical activities (Evans, et al 2013;
198 Douglas, 2011). Findings concerning community band participation pointed to associations
199 with autonomy and competence, specifically (Douglas, 2011). Indeed, students are more
200 likely to continue participating in music as an elective subject when their psychological needs
201 are met (Freer & Evans, 2018).

202

203 Further, importantly, research findings support positive associations between feelings of
204 subjective well-being and the three psychological needs in the context of musical
205 participation (Creech, Hallam, Varvarigou, McQueen, & Gaunt, 2013). In Creech et al.'s
206 (2013, p. 40) study, "subjective well-being was found to be underpinned by a sense of
207 purpose, feeling in control and autonomous, and receiving affirmation through positive social
208 relationships that accord individuals with respect and status". Autonomous motivation was
209 also related to coping strategies by university music students (Bonneville-Roussy, Evans,
210 Verner-Filion, Vallerand, & Bouffard, 2017).

211

212 **Present research**

213 The current study aimed to examine musical participation and well-being relative to self-
214 determination theory. In doing so, it addressed particular limitations of past research in this
215 area. Firstly, while researchers, such as Evans (2015), have provided conceptual overviews
216 applying self-determination theory to musical behaviours, “there is the need to test the ideas
217 empirically” (MacIntyre et al., 2018, p. 702). Moreover, while limited prior research has
218 considered self-determination theory and motivation within a musical context, very little of
219 this work has considered the associated well-being benefits that might follow. Although the
220 previous research on well-being and musical participation has demonstrated many perceived
221 well-being benefits, Krause, Davidson, and North’s (2018) recent review highlighted the
222 need to systematically and comprehensively consider these. In response to identifying a small
223 number of broad categories to which these benefits align (such as social, emotional, and
224 cognitive), Krause et al’s measure was designed to measure perceived well-being holistically
225 and employed in the present study.

226
227 Secondly, much of the previous work has been limited in scope and/or size by focusing on a
228 particular, specific well-being benefit or a tightly-defined sample of participants (Krause et
229 al., 2018). Therefore, the present study considered adult musical participation more broadly.
230 It was not limited to only formal music education settings or to university and conservatory
231 students; rather in spirit of life-long engagement, the present study considers musical
232 participation in various contexts among a community sample. In turn, the present analyses
233 included demographic variables and the context of the musical activity as potential covariates
234 within the analyses.

235
236 Consequently, the present study aimed to identify associations between psychological needs,
237 motivation, and well-being in the context of musical participation. In line with past research,
238 it was hypothesized that the three basic psychological needs outlined by self-determination
239 theory (autonomy, competence, and relatedness) would be positively associated with
240 perceived well-being. It was also hypothesized that relative autonomy index scores would be
241 positively associated with perceived well-being.

242 **Method**

243 **Sample**

244 An online questionnaire was completed by a sample of 192 Australian residents. Data were
245 collected as a part of a larger study considering musical engagement (see also [reference
246 removed to facilitate blind review]); the present research employed only those data
247 concerning individuals who indicated that they were actively participating in a musical
248 activity at the time, such that those individuals who had ceased participating or had never
249 participated in a musical activity are excluded from the present study’s analyses. The present
250 research looks specifically at the variables concerning self-determination theory and
251 perceived well-being, which are not reported in [reference removed to facilitate blind
252 review].
253

254
255 The sample was largely female (63.5% female, 34.9% male, 1.6% declined to respond). Ages
256 ranged from 17-85 ($M = 36.95$, $Mdn = 28.50$, $SD = 19.28$); and 52.10% of the sample
257 reported having a university qualification. Regarding the participants’ primary musical
258 activity, 49.7% reported that they played an instrument, 35.1% sung, and 15.2% indicated
259 they were a facilitator (i.e., leading the activity for other people).

260
261 Participation in the study was voluntary. Recruitment included the use of online tools,
262 including University student research participation programs, dedicated online study

263 websites, social media postings, and the first author's/project's website. Those individuals
264 who participated via a student research participation scheme received course credit.

265

266 **Design and procedure**

267 All participants completed an online questionnaire (using Qualtrics); they were provided with
268 information and consented to participate prior to accessing the questionnaire. Individuals
269 completed the questionnaire as a series of webpages and were thanked and debriefed upon
270 completion.

271

272 Individuals stated their age, gender, and country of residence, and were asked to rate the
273 importance of music in their life using a seven-point scale (1 = *not at all important*, 7 =
274 *extremely important*). A direct question asked if the participants were currently participating
275 in a musical activity, had previously participated in a musical activity but were no longer
276 currently participating in a musical activity, or had never participated in a musical activity.
277 After indicating that they were actively participating in a musical activity at the time of
278 completing the questionnaire, participants were asked a series of questions about their current
279 musical participation. In recognition that some individuals may be participating in more than
280 one musical activity, participants were asked to report on their primary activity (e.g., the one
281 concerning which most time is spent) and asked to indicate whether their involvement would
282 be classified as mainly singing, playing an instrument, or facilitating (i.e., leading others in)
283 the activity. Individuals also reported the length of time they had been participating in this
284 particular activity (in years), rated their frequency of involvement using a five-point scale
285 (where 1 = *daily*, 2 = *2-3 times per week*, 3 = *weekly*, 4 = *fortnightly*, 5 = *monthly*), and
286 indicated where the activity took place (by selecting either a domestic setting, community
287 setting, or educational setting). They also estimated the number of other people with whom
288 they regularly participate. While this response was open-ended, the responses were coded as
289 (where 1 = 0, 2 = 1-5, 3 = 6-15, 4 = 16-35, 5 = 36-75, and 6 = 76 or more people).

290

291 Participants were asked to complete a Basic Psychological Needs measure concerning music
292 participation. In particular, it was important to address basic psychological needs pertaining
293 to music participation rather than in general. Many self-determination scales have been
294 developed with regard to the context of exercise given the prominence of the theory's
295 application to this domain (Hagger & Chatzisarantis, 2008; Ryan & Deci, 2007; Wilson,
296 Mack, & Grattan, 2008); however, music-focused Self-determination scales are scarce.
297 Therefore, an amended version of the Basic Psychological Needs in Exercise Scale (BPNES;
298 Vlachopoulos, Ntoumanis, & Smith, 2010) was used. Previous research that has employed
299 the BPNES in a variety of domains (e.g., Douglas, 2011; Evans et al., 2013; Niven &
300 Markland, 2016). Following accepted practice, some of the item wording was amended to
301 address musical participation specifically (e.g., 'I am able to meet the requirements of my
302 music activity's program', 'My relationships with the people I participate with are close').
303 Responses were made on a five-point scale (1 = *I don't agree at all*; 5 = *I completely agree*).
304 Following Vlachopoulos et al.'s (2010) subscale coding, items were averaged in order to
305 compute three scores (one for each of Autonomy, Competency and Relatedness) per
306 participant. The BPNES has demonstrated good reliability and validity (e.g., Arroggi, Schotte,
307 Bogaerts, Boen, & Seghers, 2017; Lovell et al., 2016; Vlachopoulos et al., 2010). Cronbach's
308 alpha values were .804, .855, and .831, for autonomy, competency, and relatedness,
309 respectively.

310

311 An amended version of the BREQ-2 (Behavioural Regulation in Exercise Questionnaire-2,
312 Markland & Tobin, 2004) which included questions concerning the integrated regulation
313 form (McLachlan et al., 2011; Wilson, Rodgers, Loitz, & Scime, 2006) was used to measure
314 the quality of each participant's motivation with regard to their musical activity. Again, in the

315 interest of domain specificity (as previously done, e.g., Niven & Markland, 2016; Teques,
316 Calmeiro, Silva, & Borrego, 2017), amendments to this established, exercise-focused
317 measure were made such that re-phrased items addressed participating in a musical activity
318 specifically. Individuals were asked to respond to the set of 37 items (e.g., ‘I think it is
319 important to make the effort to participate regularly’, ‘I will feel guilty if I do not participate
320 in my musical activity’) using a five-point scale (0 = *not true for me*; 4 = *very true for me*).
321 Previous research has demonstrated the reliability of this measure (Lovell et al., 2016;
322 Markland & Tobin, 2004; Ntoumanis, Thøgersen-Ntoumani, Quested, & Hancox, 2017).
323 Cronbach’s alpha values for the different forms of regulation were as follows: .905 for
324 amotivation, .821 for external regulation, .650 for introjected regulation, .775 for identified
325 regulation, .854 for integrated regulation, and .809 for intrinsic regulation. Adopting the
326 approach used in previous research (e.g., Evans & Bonneville-Roussy, 2016; Niemiec et al.,
327 2006; Ryan & Connell, 1989; Wilson et al., 2012), a relative autonomy index (RAI) score
328 was computed for each participant. To create the RAI score in the present study, the formula
329 employed was: $RAI = 3 \times \text{Intrinsic} + 2 \times \text{Integrated} + \text{Identified} - \text{Introjected} - 2 \times \text{External} -$
330 $3 \times \text{Amotivation}$ (Vallerand, Pelletier, & Koestner, 2008; Wilson et al., 2012). The
331 participant’s single RAI score was used in subsequent analyses.

332

333 Lastly, participants completed Krause, Davidson, and North’s (2018) measure of the social-
334 psychological well-being benefits of musical participation. Participants responded to the 36
335 items (e.g., ‘It adds purpose/meaning to my life’, ‘It does not help me to think about who I
336 am) using a seven-point scale (1 = *Disagree completely*, 7 = *Agree completely*). The total
337 score (for which the 19 negative items were reverse-coded) and five sub-scale scores
338 (addressing the dimensions of mood and coping, esteem and worth, socialization, cognition,
339 and self-actualization respectively) were calculated by averaging the participants’ responses
340 as per Krause et. al’s (2018) sub-scale coding. Cronbach’s alpha values were as follows: .951
341 for the total score, .903 for mood and coping, .900 for esteem and worth, .851 for socializing,
342 .771 for cognitive, and .747 for self-actualization.

343

344

Results and discussion

345 A two-step Generalized Linear Mixed Model (GLMM) analysis procedure was used,
346 implemented through SPSS’s (Version 24) GENLIMMIXED procedure. In the first step, each
347 of the predictor variables was entered separately with the well-being score as the criterion
348 variable (see Table 1 for the results of the step 1 analyses). The predictor variables were:
349 demographic variables (age, gender, music importance rating, university degree), activity
350 parameters (participation type, length of participation, frequency of participation, location,
351 number of other participants), psychological needs scores (autonomy, competency,
352 relatedness), and RAI score. At step two, the predictor variables that demonstrated a
353 significant relationship with the criterion variable ($\alpha < .05$) were entered together in a single
354 GLMM analysis ($\alpha < .008$).

355

356 This process was repeated in order to conduct six separate analyses, in which each of the total
357 well-being score and five well-being subscale scores served as the respective dependent
358 variable. Tables 2-7 detail the results of these analyses.

359

360 - Tables 1-7 about here -

361

362 As evident in Tables 2-7 and summarized in Figure 1, the individual models displayed similar
363 patterns of results across the set of analyses. In particular, with regard to gender, the results
364 indicate that females reported experiencing greater perceived well-being benefits on five of
365 the six measures than males (all except for the mood and coping sub-scale score). The music
366 importance rating was positively associated with the total well-being score and socializing

367 sub-scale score. Indeed, the evidence for positive associations between musical participation
368 and perceived social well-being is growing (e.g., Creech, Hallam, Varvarigou, et al., 2013;
369 Jutras, 2011; Krause et al., 2018; McQueen, Hallam, Creech, & Varvarigou, 2013; Rohwer &
370 Rohwer, 2012; von Lob, Camic, & Clift, 2010).

371
372 The RAI score demonstrated a significant, positive association in five of the six analyses (all
373 except for the socializing well-being score). More simply, greater well-being was associated
374 with internalized motivation to participate in music (see Figure 1). Indeed, when the RAI
375 score demonstrated a significant association, it accounted for the largest percentage of
376 variance in each analysis, suggesting the particular importance of self-regulated motivation.
377 The strong, positive associations between internalized motivation and perceived well-being
378 support Self-Determination Theory's links between autonomous motivation and well-being
379 (e.g., Deci & Ryan, 2000).

380
381 As seen in Figure 1, with regard to the three basic psychological needs, competency (defined
382 as the need to be effective in one's efforts) was positively associated with the total, esteem
383 and self-worth, and cognitive well-being sub-scale scores. Relatedness (the need to be
384 socially connected) was positively associated with the total and socialising well-being sub-
385 scale score. These findings demonstrate logical associations between those two types of
386 psychological needs and the well-being types: while obviously not indicative of a causal
387 effect, these findings indicate, within the context of specifically musical participation, a
388 relationship between feeling related to other people and experiencing social well-being
389 benefits, as has been reported in much research (e.g., Creech, Hallam, Varvarigou, et al.,
390 2013; Jutras, 2011; Krause et al., 2018; McQueen et al., 2013; Rohwer & Rohwer, 2012; von
391 Lob et al., 2010); and the positive relationship between competency and various aspects of
392 both social and cognitive well-being supports prior research that also demonstrates links
393 between musical participation and cognitive well-being (e.g., Creech, Hallam, Gaunt, et al.,
394 2013; Gick, 2011; Kokotsaki & Hallam, 2011). Indeed, relatedness was particularly
395 important in Quested et al.'s (2018) community gardening investigation, as well as Sebire et
396 al.'s (2016) dance research. Autonomy (the need to feel that one's activities are self-endorsed
397 and volitional) did not demonstrate any significant associations with well-being: the absence
398 of significant findings concerning autonomy per se is interesting, given that previous research
399 findings have linked autonomy to motivation and engagement (e.g., Reeve et al., 2004;
400 Valenzuela et al., 2018; Williams & Deci, 1998), as well as well-being (e.g., Ilardi et al.,
401 1993).

402
403 Additionally, in the full models (Tables 2-7), the specific nature of musical participation (i.e.,
404 instrument versus singing versus facilitation) was not associated with well-being. It is also
405 slightly surprising, but nonetheless encouraging, that well-being correlates of musical
406 participation were not related to length of time and frequency of participating when
407 considering overt measures of competence, relatedness, and autonomy as well. The lack of
408 any such associations can be interpreted positively: experiencing well-being benefits in the
409 context of musical participation does not appear to hinge on the particulars of the musical
410 activity itself. Rather, people can select musical activities aligned with their personal
411 preferences and which fit within their lifestyles without implications for their probability of
412 experiencing greater well-being. Of course, it would not be fruitful to simply force people to
413 participate in musical activities (e.g., at school, via private lessons, or in community spaces)
414 without striving to also increase feelings of competence, relatedness, and autonomy. Our
415 results suggest that self-determination is considerably more important than simple attendance.
416 Similarly, the only demographic variable related to well-being was gender, so that age and
417 education level are also unrelated to the relationship between musical participation and well-
418 being. Thus, these findings have broad implications for music educators, community

419 musicians, music therapists, and others who are involved in facilitating participation
420 opportunities.

421
422 In particular, rather than the activity itself or individual differences (such as age and
423 education level), the present findings suggest that it is competence, relatedness, and
424 autonomy (expressed in terms of the RAI) that predict well-being in the context of musical
425 participation, as predicted by self-determination theory. Indeed, the present findings (as
426 summarized in Figure 1) suggest that musical participation opportunities should be
427 interesting, challenging, and offered in contexts that support autonomous motivation. Clearly
428 then, the challenge for music educators, community musicians, and music therapists that
429 arises from these results concerns specifically how they might foster self-perceptions of
430 competence, relatedness, and autonomy via a number of specific and more general
431 approaches to musical participation.

432
433 Some of the arguments here also suggest interesting directions for future research. The role of
434 the facilitator (i.e., the person who leads the activity) was not examined here, which is
435 particularly unfortunate given that he/she may have an important role to play in shaping
436 competence, relatedness, and autonomy. In the context of specifically musical participation,
437 and particularly music education, the role of the facilitator is clearly crucial (e.g., Corenblum
438 & Marshall, 1998; Delano & Royse, 1987; Evans et al., 2013). There exists, of course, an
439 extensive literature from outside music that specifically addresses the form that these
440 approaches might take (e.g., Gagné & Deci, 2005; Hagger et al., 2015; Jang et al., 2010).
441 Facilitators can draw on the findings indicating how, in educational settings, autonomy
442 supportive teachers positively influence students' psychological needs, motivation, and
443 engagement (e.g., Hagger et al., 2015; Jang et al., 2010; Niemiec & Ryan, 2009). Specific to
444 music education, Evans (2015) offered suggestions as to pedagogical strategies to promote
445 the fulfillment of the psychological needs. It will be important for future research to
446 empirically consider which particular pedagogical techniques are perceived by students as
447 needs-supporting and needs-thwarting.

448
449 Further, longitudinal research could also consider these ideas with emphasis on continuation
450 versus cessation of participation. For example, such work might consider associations
451 between the fulfillment of psychological needs and the issues surrounding continued
452 participation, such as potential barriers. It may be that musical participation occupies varying
453 levels of importance at different points in someone's life. Participation must 'fit' within a
454 person's lifestyle: examining the issues related to age and life-stage may illuminate how
455 some people are able to prioritize/continue/cease their musical participation.

456
457 Additionally, while Self-Determination Theory has been applied to many phenomena
458 involving motivation across multiple domains, its application to musical behaviours is
459 nascent. Thus, the present research makes a novel contribution to knowledge by providing
460 empirical evidence that supports the application of Self-Determination Theory to explain
461 musical participation. However, the exploratory nature of this research should be noted.
462 Thus, additional research is needed to refine its application as well as further explore
463 particular aspects of well-being. For instance, future research could consider specifically
464 eudemonic well-being with regard to the motivations and functions of continued participation
465 (Groarke & Hogan, 2016).

466
467 In summary, the present study used Self-Determination Theory to examine musical
468 participation and well-being. The pattern of results reiterates the positive associations
469 between musical participation and benefits to one's emotional and social well-being; and
470 makes clear that that feeling competent, a sense of relatedness to others, and autonomous

471 motivation should be prioritized in music making opportunities. The findings indicate that
472 Self-Determination Theory (including the mini theories of Basic Psychological Needs and
473 Organismic Integration Theory in particular) offers a useful theoretical framework to
474 understanding musical participation with regard to well-being.

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Author contributions

The funding for this work was obtained by JD. AK, JD, and AN jointly developed the conceptual and methodological approach. AK oversaw the ethics, participant recruitment, and data collection. AK developed the literature review and sketched the shape of the final article. AK and AN undertook the data analysis; AK, AN, and JD co-wrote the discussion.

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Table 1.
Results of the First Step of The GLMM Analyses Concerning Well-Being Score.

Variable	<i>F</i>	<i>DF</i>	<i>DF</i> _{error}	<i>p</i>	η_p^2
Total well-being score					
Gender	11.025	1	187	0.001	0.056
University degree	7.042	1	189	0.009	0.036
Age	17.504	1	190	< .001	0.084
Music importance rating (1-7)	31.808	1	188	< .001	0.145
Activity type	0.981	2	188	0.377	0.010
Length of time participating	8.873	1	186	0.003	0.046
Frequency of participation rating	5.350	1	190	0.022	0.027
Location type	2.285	2	188	0.105	0.024
Number of other participants (grouping)	12.890	1	186	< .001	0.065
Autonomy score	52.448	1	189	< .001	0.217
Competency score	84.585	1	187	< .001	0.311
Relatedness score	36.224	1	187	< .001	0.162
Relative autonomy index score	160.531	1	173	< .001	0.481
Mood and coping well-being score					
Gender	5.839	1	187	0.017	0.030
University degree	0.738	1	189	0.391	0.004
Age	6.295	1	190	0.013	0.032
Music importance rating (1-7)	25.988	1	188	< .001	0.121
Activity type	0.862	2	188	0.424	0.009
Length of time participating	6.419	1	186	0.012	0.033
Frequency of participation rating	8.894	1	190	0.003	0.045
Location type	0.074	2	188	0.929	0.001
Number of other participants (grouping)	4.190	1	186	0.042	0.022
Autonomy score	36.935	1	189	< .001	0.163
Competency score	46.159	1	187	< .001	0.198
Relatedness score	18.942	1	187	< .001	0.092
Relative autonomy index score	61.847	1	173	< .001	0.263
Esteem and worth well-being score					
Gender	6.284	1	187	0.013	0.033
University degree	10.900	1	189	0.001	0.055
Age	19.955	1	190	< .001	0.095
Music importance rating (1-7)	17.985	1	188	< .001	0.087
Activity type	0.400	2	188	0.671	0.004
Length of time participating	7.914	1	186	0.005	0.041
Frequency of participation rating	5.435	1	190	0.021	0.028
Location type	1.912	2	188	0.151	0.020
Number of other participants (grouping)	6.531	1	186	0.011	0.034
Autonomy score	39.117	1	189	< .001	0.171

Competency score	61.492	1	187	< .001	0.247
Relatedness score	18.888	1	187	< .001	0.092
Relative autonomy index score	90.985	1	173	< .001	0.345
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Socializing well-being score					
Gender	12.223	1	187	0.001	0.061
University degree	1.552	1	189	0.214	0.008
Age	9.442	1	190	0.002	0.047
Music importance rating (1-7)	22.109	1	188	< .001	0.105
Activity type	5.868	2	188	0.003	0.059
Length of time participating	3.037	1	186	0.083	0.016
Frequency of participation rating	0.191	1	190	0.662	0.001
Location type	14.692	2	188	< .001	0.135
Number of other participants (grouping)	40.123	1	186	< .001	0.177
Autonomy score	27.146	1	189	< .001	0.126
Competency score	46.532	1	187	< .001	0.199
Relatedness score	79.911	1	187	< .001	0.299
Relative autonomy index score	9.118	1	173	0.003	0.050
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Cognitive well-being score					
Gender	10.332	1	187	0.002	0.052
University degree	6.200	1	189	0.014	0.032
Age	12.256	1	190	0.001	0.061
Music importance rating (1-7)	19.086	1	188	< .001	0.092
Activity type	0.254	2	188	0.776	0.003
Length of time participating	6.709	1	186	0.010	0.035
Frequency of participation rating	1.291	1	190	0.257	0.007
Location type	1.853	2	188	0.160	0.019
Number of other participants (grouping)	5.523	1	186	0.020	0.029
Autonomy score	32.452	1	189	< .001	0.147
Competency score	60.820	1	187	< .001	0.245
Relatedness score	20.376	1	187	< .001	0.098
Relative autonomy index score	106.864	1	173	< .001	0.382
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Self-actualization well-being score					
Gender	5.891	1	187	0.016	0.031
University degree	12.113	1	189	0.001	0.060
Age	13.781	1	190	< .001	0.068
Music importance rating (1-7)	18.295	1	188	< .001	0.089
Activity type	0.122	2	188	0.885	0.001
Length of time participating	4.733	1	186	0.031	0.025
Frequency of participation rating	1.575	1	190	0.211	0.008
Location type	3.698	2	188	0.027	0.038
Number of other participants (grouping)	10.735	1	186	0.001	0.055
Autonomy score	31.551	1	189	< .001	0.143

Competency score	48.503	1	187	< .001	0.206
Relatedness score	15.762	1	187	< .001	0.078
Relative autonomy index score	64.889	1	173	< .001	0.273

Note. DF = Degrees of Freedom.

Table 2.

Total well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2
Gender	17.098	< .001	0.412	4.266	0.215	0.609	0.110
University degree	1.834	0.178	0.140	1.354	-0.064	0.344	0.012
Age	1.891	0.171	0.005	1.375	-0.002	0.011	0.013
Music importance rating (1-7)	4.183	0.043	0.154	2.045	0.005	0.302	0.028
Length of time participating	1.584	0.210	-0.004	-1.259	-0.011	0.002	0.011
Frequency of participation rating	2.058	0.153	0.048	1.435	-0.018	0.114	0.014
Number of other participants (grouping)	0.082	0.775	-0.008	-0.287	-0.064	0.048	0.001
Autonomy score	1.529	0.218	0.252	2.736	0.070	0.434	0.048
Competency score	7.484	0.007	0.252	2.736	0.070	0.434	0.048
Relatedness score	4.791	0.030	0.131	2.189	0.013	0.249	0.032
Relative autonomy index score	84.114	< .001	0.086	9.171	0.067	0.104	0.364

Note. Full model: $F(11, 147) = 32.798$, $p < .001$, $\eta^2 = .711$. Degrees of freedom = 1, 147 for each variable. CI = Confidence interval.

Table 3.

Mood and coping well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2
Gender	3.871	0.051	0.255	1.968	-0.001	0.511	0.026
Age	0.248	0.619	-0.002	-0.498	-0.009	0.006	0.002
Music importance rating (1-7)	0.218	0.641	0.047	0.467	-0.151	0.245	0.001
Length of time participating	0.109	0.742	-0.001	-0.330	-0.010	0.007	0.001
Frequency of participation rating	0.067	0.797	0.013	0.258	-0.086	0.112	0.000
Number of other participants (grouping)	0.081	0.776	-0.011	-0.285	-0.086	0.064	0.001
Autonomy score	0.097	0.755	0.038	0.312	-0.202	0.277	0.001

Competency score	3.407	0.067	0.208	1.846	-0.015	0.430	0.023
Relatedness score	0.851	0.358	0.063	0.922	-0.072	0.198	0.006
Relative autonomy index score	27.165	< .001	0.083	5.212	0.051	0.114	0.155

Note. Full model: $F(10, 148) = 13.379$, $p < .001$, $\eta^2 = .475$. Degrees of freedom = 1, 148 for each variable. CI = Confidence interval.

Table 4.

Esteem and worth well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2
Gender	8.941	0.003	0.397	2.990	0.135	0.660	0.057
University degree	0.337	0.563	0.074	0.580	-0.177	0.324	0.002
Age	2.140	0.146	0.006	1.463	-0.002	0.014	0.014
Music importance rating (1-7)	3.003	0.085	0.214	1.733	-0.030	0.458	0.020
Length of time participating	2.022	0.157	-0.006	-1.422	-0.015	0.002	0.014
Frequency of participation rating	1.593	0.209	0.057	1.262	-0.032	0.147	0.011
Number of other participants (grouping)	0.881	0.350	-0.039	-0.938	-0.121	0.043	0.006
Autonomy score	2.001	0.159	-0.179	-1.414	-0.429	0.071	0.013
Competency score	4.550	0.035	0.248	2.133	0.018	0.478	0.030
Relatedness score	0.604	0.438	0.055	0.777	-0.085	0.195	0.004
Relative autonomy index score	44.319	< .001	0.109	6.657	0.077	0.142	0.232

Note. Full model: $F(11, 147) = 12.054$, $p < .001$, $\eta^2 = .474$. Degrees of freedom = 1, 147 for each variable. CI = Confidence interval.

Table 5.

Socializing well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2
Gender	19.001	< .001	0.559	4.359	0.305	0.812	0.114
Age	0.710	0.401	0.003	0.843	-0.004	0.011	0.005

Music importance rating (1-7)	5.827	0.017		0.278	2.414	0.050	0.506	0.038
Activity type	1.142	0.322	Instrument -- Sing	-0.172	-1.218, p = .225	-0.451	0.107	0.010
			Instrument -- Facilitate	0.006	0.044, p = .965	-0.277	0.289	0.000
			Sing -- Facilitate	0.178	1.348, p = .180	-0.083	0.439	0.012
Location type	2.881	0.059	Domestic setting -- Community venue	-0.340	-2.222, p = .028	-0.642	-0.038	0.032
			Domestic -- Educational establishment	-0.126	-0.725, p = .469	-0.469	0.217	0.004
			Community venue -- Educational establishment	0.214	1.532, p = .128	-0.062	0.490	0.016
Number of other participants (grouping)	1.124	0.291		0.054	1.060	-0.047	0.154	0.008
Autonomy score	0.578	0.448		0.103	0.760	-0.164	0.370	0.004
Competency score	0.363	0.548		0.080	0.602	-0.183	0.344	0.002
Relatedness score	23.557	< .001		0.487	4.854	0.289	0.686	0.138
Relative autonomy index score	0.079	0.779		0.004	0.281	-0.023	0.031	0.001

Note. Full model: $F(12, 147) = 18.307, p < .001, \eta^2 = .599$. Degrees of freedom = 1, 147 for each variable; except for Activity type and Location type, where Degrees of freedom = 2, 147. CI = Confidence interval.

Table 6.

Cognitive well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2
Gender	19.749	< .001	0.585	4.444	0.325	0.845	0.118
University degree	0.479	0.490	0.108	0.692	-0.200	0.415	0.003
Age	1.081	0.300	0.005	1.040	-0.005	0.016	0.007
Music importance rating (1-7)	0.363	0.548	0.060	0.602	-0.136	0.256	0.002
Length of time participating	0.021	0.884	-0.001	-0.146	-0.010	0.009	0.000
Number of other participants (grouping)	2.037	0.156	-0.061	-1.427	-0.409	0.088	0.014
Autonomy score	1.624	0.205	-0.160	-1.274	-0.409	0.088	0.011
Competency score	5.692	0.018	0.284	2.386	0.049	0.519	0.037
Relatedness score	2.906	0.090	0.147	1.705	-0.023	0.317	0.019

Relative autonomy index score 55.428 < .001 0.100 7.445 0.074 0.127 0.272

Note. Full model: $F(10, 148) = 20.583, p < .001, \eta^2 = .582$. Degrees of freedom = 1, 148 for each variable. CI = Confidence interval.

Table 7.

Self-actualization well-being score model.

Variable	<i>F</i>	<i>p</i>	Beta	<i>t</i>	95% CI		η^2	
Gender	6.645	0.011	0.414	2.578	0.097	0.731	0.044	
University degree	0.382	0.537	-0.101	-0.618	-0.424	0.222	0.003	
Age	0.509	0.477	0.003	0.714	-0.006	0.012	0.004	
Music importance rating (1-7)	1.271	0.261	0.159	1.127	-0.120	0.438	0.009	
Length of time participating	1.939	0.166	-0.008	-1.392	-0.018	0.003	0.013	
Location type	0.184	0.832	Domestic setting -- Community venue	-0.035	-0.180, $p = .857$	-0.422	0.351	0.000
			Domestic -- Educational establishment	-0.119	-0.552, $p = .582$	-0.545	0.307	0.002
			Community venue -- Educational establishment	-0.084	-0.495, $p = .621$	-0.418	0.250	0.002
Number of other participants (grouping)	0.002	0.966	-0.002	-0.043	-0.117	0.112	0.000	
Autonomy score	1.427	0.234	-0.171	-1.195	-0.453	0.112	0.010	
Competency score	2.143	0.145	0.234	1.464	-0.082	0.550	0.015	
Relatedness score	1.169	0.281	0.116	1.081	-0.096	0.329	0.008	
Relative autonomy index score	20.921	< .001	0.097	4.574	0.055	0.139	0.126	

Note. Full model: $F(12, 145) = 11.897, p < .001, \eta^2 = .496$. Degrees of freedom = 12, 145 for each variable; except for Location type, where Degrees of freedom = 2, 145. CI = Confidence interval.

Figure 1.
Summary of Study Findings

		Well-being					
		Total	Mood and coping	Esteem and worth	Socializing	Cognitive	Self-actualization
Individual difference variables	Gender Music importance	Females>Males Positive		Females>Males	Females>Males Positive	Females>Males	Females>Males
Self-Determination Theory variables	Competency Relatedness Relative autonomy index	Positive Positive Positive		Positive Positive	Positive	Positive Positive	Positive Positive