Using Self-Determination Theory to Examine Musical Participation and Well-Being

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

Keywords: musical participation, well-being, Self-Determination Theory, psychological needs, autonomous motivation

INTRODUCTION

There is a growing interest in researching the possible relationship between music and well-being (Clift et al., 2008; Skingley et al., 2011; MacDonald et al., 2012; MacDonald, 2013). However, research on the subject faces a number of challenges. One, in particular, concerns the challenge of producing systematic, empirical evidence to support claims that are sometimes taken to be self-evident (Skingley et al., 2011). Relatedly, much of the relevant work can be challenged on the grounds of a lack of theoretical grounding (Clift and Hancox, 2010). Recently, researchers (e.g., Küpers et al., 2014; Evans, 2015; Krause and Davidson, 2018) have suggested the utility of Self-Determination Theory as a framework to consider musical participation and well-being.
Self-Determination Theory has been applied to a wide range of social psychological behaviors, spanning health, education, and social relationships, and is supported by a growing body of research (Evans, 2015). Indeed, Self-Determination Theory has been used to explain a range of behaviors that involve motivation over extended periods of time (e.g., Georgiadis et al., 2006; Reinboth and Duda, 2006; Sheldon and Krieger, 2007; Alivernini and Lucidi, 2011; Jang et al., 2012). Therefore, the present research examined perceived well-being associated with active musical participation using Self-Determination Theory as a theoretical framework.

Self-Determination Theory

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

Basic psychological needs theory states that people strive to satisfy three innate needs, namely competence, relatedness, and autonomy (Ryan and Deci, 2002; Hagger et al., 2006). Competence refers to the need to be effective in one's efforts; relatedness concerns being connected socially, and integrated into a social group; and autonomy concerns the need to feel that one's pursuits are self-governed and self-endorsed (Ryan and Deci, 2002). Deci and Ryan assert that needs for competence, relatedness, and autonomy are universal – they are essential, regardless of culture and life domain (Deci and Ryan, 1985b, 2000; Ryan and Deci, 2002). Both internal, personal factors and the social environment influence the degree to which the three needs are met (Ryan and Deci, 2000; Quested et al., 2018). Meeting these needs leads to personal growth, vitality, and well-being (Deci and Ryan, 2000; Ryan and Deci, 2002).

Organismic integration theory (Deci and Ryan, 1985a, 1991; Ryan and Deci, 2000) differentiates types of motivation (Ryan and Connell, 1989; McLachlan et al., 2011). It places particular emphasis on the quality of motivation, rather than merely the quantity (Niven and Markland, 2016). Six different types of motivation exist, and are often conceptualized as lying on a continuum (Gagné and Deci, 2005; McLachlan et al., 2011; Wilson et al., 2012; MacIntyre et al., 2018). Intrinsic motivation lies at the internal end of this continuum, and represents self-determined, internalized motivation. External motivation lies at the other end of the continuum, and refers to motivation that is characterized by engagement for reasons completely external to oneself. Three additional types of extrinsic behavioral regulation which differ in terms of the degree to which the motivation is internalized are positioned between these two poles. The three different types of external motivation are termed integrated, identified, and introjected (McLachlan et al., 2011). Integrated regulation is the most autonomous form of extrinsic regulation, followed by identified, and introjected (the least autonomous form of extrinsic motivation). Integrated regulation concerns behavior that is fully assimilated and consistent with one's self; identified regulation refers to behavior based on attaining “personally valued outcomes rather than for enjoyment or interest”; and introjected regulation concerns enhancing self-worth by avoiding negative affective states, such as shame and guilt (McLachlan et al., 2011, p. 724; Wilson et al., 2012). Amotivation refers to the absence of clear motivation or intentions (Markland and Tobin, 2004; McLachlan et al., 2011). The theory recognizes that people's actions within a given domain are simultaneously the product of several different motivations along the continuum; these can be accounted for by calculating a relative autonomy index (RAI). This index score, for which a higher score indicates greater autonomy, serves as an aggregate representation of how intrinsically or extrinsically motivated someone is Seymour and Peterman (2018). Organismic integration theory states that the fulfillment of psychological needs will lead to internalized motivation (Gagné and Deci, 2005).

The fulfillment of the basic psychological needs is fostered in environments that are autonomy-supportive and hindered in environments that are controlling (Bonneville-Roussy et al., 2013). Clear evidence of this comes from previous education research using Self-Determination Theory. Studies have found that students are more engaged and persistent in autonomy supportive activities and environments (e.g., Reeve et al., 2004; Hagger et al., 2015). In contrast, students suffer in environments in which teachers are more controlling (e.g., Soenens et al., 2012; Bonneville-Roussy et al., 2013). In short, in educational settings, autonomy support is associated with students having more self-determined forms of motivation and higher perceptions of competence (e.g., Williams and Deci, 1998) as well as higher levels of enjoyment, engagement, performance, and persistence (e.g., Black and Deci, 2000; Vansteenkiste et al., 2004; Chatzisarantis and Hagger, 2009; Niemiec and Ryan, 2009; Jang et al., 2010; Bonneville-Roussy et al., 2013; Oga-Baldwin et al., 2017; Ulstad et al., 2018).

Another claim of Self-Determination Theory is that satisfaction of needs is associated with well-being (Deci and Ryan, 2000; Milyavskaya and Koestner, 2011; Lombas and Esteban, 2018). Research has shown this in work settings (e.g., Ildiri et al., 1993; Deci et al., 2001; Baard et al., 2004; Van den Broeck et al., 2016) and healthcare settings, such as aged-care,
where an autonomy-supportive environment has been associated with better well-being (Deci and Ryan, 1987; Ferrand et al., 2014). Research also links satisfying needs to perceived well-being with regard to leisure pursuits (Coleman and Iso-Ahola, 1993), including predominantly exercise (e.g., Chatzisarantis and Hagger, 2009; Lovell et al., 2016; Niven and Markland, 2016; Sebire et al., 2016), but also other pursuits such as community gardening (e.g., Quested et al., 2018) and relationship functioning (e.g., Patrick et al., 2007). As Coleman and Iso-Ahola (1993) found, leisure activities which promote fulfilling participants’ basic needs, therefore, promote self-determination and are beneficial to well-being (see also Deci and Ryan, 2000; Ferrand et al., 2014). Indeed, Kuykendall et al. (2015) recent meta-analysis provided strong evidence that leisure engagement is consistently associated with subjective well-being as well as evidence that leisure satisfaction mediates the relationship between leisure engagement and well-being. It is therefore surprising that little research has considered musical participation and well-being using self-determination theory as a theoretical framework, given the prevalence of music participation as a leisure time activity (Laukka, 2007).

Self-Determination Theory in Music Research

Self-determination theory has recently been used in work concerning both music education and music therapy (Douglas, 2011; Evans and Bonneville-Roussy, 2016; Lee et al., 2016; Valenzuela et al., 2018). However, as Evans (2015, p. 7) referenced in his conceptual overview concerning how self-determination theory might be used to consider motivation in music education, there have only been “a small number of studies.” In particular, music education researchers have focused on practice, both at the university and conservatoire level (Evans and Bonneville-Roussy, 2016; Valenzuela et al., 2018) and middle-school level (Schatt, 2018). Findings indicate that the fulfillment of psychological needs and autonomous motivation were associated with practicing more frequently and a higher quality of practice (Evans and Bonneville-Roussy, 2016). However, Schatt’s (2018) findings indicated differences by instrument and grade level with regard to levels of self-determination to practice, suggesting that personal and contextual factors pertaining to the musical activity can influence one’s motivation. Moreover, feelings of autonomy and competence are linked to intrinsic motivation and the experience of flow (Valenzuela et al., 2018) in practice; and autonomy support is also related to passion and persistence in music education (Bonneville-Roussy et al., 2017). Additional work has considered musical play at recess (Countryman, 2014) and singing games in and out of the classroom (Roberts, 2018), providing further support for applying self-determination theory to understand musical behaviors.

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

Further, importantly, research findings support positive associations between feelings of subjective well-being and the three psychological needs in the context of musical participation (Creech et al., 2013b). In Creech et al.’s (2013b, p. 40) study, “subjective well-being was found to be underpinned by a sense of purpose, feeling in control and autonomous, and receiving affirmation through positive social relationships that accord individuals with respect and status.” Autonomous motivation was also related to coping strategies by university music students (Bonneville-Roussy et al., 2017).

Present Research

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

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

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

MATERIALS AND METHODS

Sample

An online questionnaire was completed by a sample of 192 Australian residents. Data were collected as a part of a larger study considering musical engagement (see also Krause et al., unpublished); the present research employed only those data concerning individuals who indicated that they were actively participating in a musical activity at the time of completing the questionnaire, participants were asked to report on their primary musical activity (e.g., the one concerning which most time is spent) and were asked to rate the importance of music in their life (e.g., Douglas, 2011; Evans et al., 2013; Niven and Markland, 2016). Following accepted practice, some of the item wording was amended to address musical participation specifically (e.g., 'I am able to meet the requirements of my music activity’s program,' 'My relationships with the people I participate with are close'). Responses were made on a five-point scale (1 = not true for me; 2 = partly true for me; 3 = sometimes true for me; 4 = very true for me; 5 = extremely true for me). Following Vlachopoulos et al.’s (2010) subscale coding, items were averaged in order to compute three scores (one for each of Autonomy, Competency and Relatedness) per participant. The BPNES has demonstrated good reliability and validity (e.g., Vlachopoulos et al., 2010; Lovell et al., 2016; Arrogi et al., 2017). Cronbach’s alpha values were 0.804, 0.855, and 0.831, for autonomy, competency, and relatedness, respectively.

An amended version of the BREQ-2 (Behavioural Regulation in Exercise Questionnaire-2, Markland and Tobin, 2004) which included questions concerning the integrated regulation form (Wilson et al., 2006; McLachlan et al., 2011) was used to measure the quality of each participant’s motivation with regard to their musical activity. Again, in the interest of domain specificity (as previously done, e.g., Niven and Markland, 2016; Teques et al., 2017), amendments to this established, exercise-focused measure were made such that re-phrased items addressed participating in a musical activity specifically. Individuals were asked to respond to the set of 37 items (e.g., 'I think it is important to make the effort to participate regularly,' 'I will feel guilty if I do not participate in my musical activity') using a five-point scale (0 = not true for me; 1 = only sometimes true for me; 2 = partly true for me; 3 = very true for me; 4 = extremely true for me). Previous research has demonstrated the reliability of this measure (Markland and Tobin, 2004; Lovell et al., 2016; Ntoumanis et al., 2017). Cronbach’s alpha values for the different forms of regulation were as follows: 0.905 for amotivation, 0.821 for external regulation, 0.650 for introjected regulation, 0.775 for identified regulation, 0.854 for integrated regulation, and 0.809 for intrinsic regulation.

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

Participants were asked to complete a Basic Psychological Needs measure concerning music participation. In particular, it was important to address basic psychological needs pertaining to music participation rather than in general. Many self-determination scales have been developed with regard to the context of exercise given the prominence of the theory’s application to this domain (Ryan and Deci, 2007; Hagger and Chatzisarantis, 2008; Wilson et al., 2008); however, music-focused self-determination scales are scarce. Therefore, an amended version of the Basic Psychological Needs in Exercise Scale (BPNES; Vlachopoulos et al., 2010) was used. Previous research that has employed the BPNES in a variety of domains (e.g., Douglas, 2011; Evans et al., 2013; Niven and Markland, 2016).
TABLE 1 | Results of the first step of the GLMM analyses concerning well-being score.

| Variable                                           | F     | DF   | DF_error | p     | \( \eta^2 \) |
|----------------------------------------------------|-------|------|----------|-------|--------------|
| **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      | <0.001| 0.084       |
| Music importance rating (1–7)                      | 31.808| 1    | 188      | <0.001| 0.145       |
| Activity type                                       | 0.981 | 2    | 188      | 0.377 | 0.010       |
| Length of time participating                       | 8.873 | 1    | 186      | 0.033 | 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      | <0.001| 0.065       |
| Autonomy score                                      | 52.448| 1    | 189      | <0.001| 0.217       |
| Competency score                                   | 84.585| 1    | 187      | <0.001| 0.311       |
| Relatedness score                                  | 36.224| 1    | 187      | <0.001| 0.162       |
| Relative autonomy index score                       | 160.531| 1    | 173      | <0.001| 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      | <0.001| 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      | <0.001| 0.163       |
| Competency score                                   | 46.159| 1    | 187      | <0.001| 0.198       |
| Relatedness score                                  | 18.942| 1    | 187      | <0.001| 0.092       |
| Relative autonomy index score                       | 61.847| 1    | 173      | <0.001| 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                                                | 19.965| 1    | 190      | <0.001| 0.095       |
| Music importance rating (1–7)                      | 17.985| 1    | 188      | <0.001| 0.087       |
| Activity type                                       | 0.400 | 2    | 188      | 0.671 | 0.004       |
| Length of time participating                       | 7.914 | 1    | 186      | 0.035 | 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      | <0.001| 0.171       |
| Competency score                                   | 61.492| 1    | 187      | <0.001| 0.247       |
| Relatedness score                                  | 18.888| 1    | 187      | <0.001| 0.092       |
| Relative autonomy index score                       | 90.985| 1    | 173      | <0.001| 0.345       |
| **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      | <0.001| 0.105       |
| Activity type                                       | 5.868 | 2    | 188      | 0.033 | 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      | <0.001| 0.135       |

(Continued)

for each participant. To create the RAI score in the present study, the formula employed was: RAI = 3 × Intrinsic + 2 × Integrated + Identified – Introjected – 2 × External – 3 × Amotivation (Vallerand et al., 2008; Wilson et al., 2012). The participant’s single RAI score was used in subsequent analyses.

Lastly, participants completed Krause et al.’s (2018) measure of the social-psychological well-being benefits of musical participation. Participants responded to the 36 items (e.g., ‘It adds purpose/meaning to my life,’ ‘It does not help me to think about who I am’) using a seven-point scale (1 = Disagree completely, 7 = Agree completely). The total score (for which the 19 negative items were reverse-coded) and five sub-scale scores (addressing the dimensions of mood and coping, esteem and worth, socialization, cognition, and self-actualization respectively) were calculated by averaging the participants’ responses as per Krause et al.’s (2018) sub-scale coding. Cronbach’s alpha values were as follows: 0.951 for the total score, 0.903 for mood and coping,
0.900 for esteem and worth, 0.851 for socializing, 0.771 for cognitive, and 0.747 for self-actualization.

RESULTS AND DISCUSSION

A two-step generalized linear mixed model (GLMM) analysis procedure was used, implemented through SPSS’s (Version 24) GENLINMIXED procedure. In the first step, each of the predictor variables was entered separately with the well-being score as the criterion variable (see Table 1 for the results of the step 1 analyses). The predictor variables were: demographic variables (age, gender, music importance rating, university degree), activity parameters (participation type, length of participation, frequency of participation, location, number of other participants), psychological needs scores (autonomy, competency, relatedness), and RAI score. At step two, the predictor variables that demonstrated a significant relationship with the criterion variable ($\alpha < 0.05$) were entered together in a single GLMM analysis ($\alpha < 0.008$).

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

As evident in Tables 2–7 and summarized in Figure 1, the individual models displayed similar patterns of results across the set of analyses. In particular, with regard to gender, the results indicate that females reported experiencing greater perceived well-being benefits on five of the six measures than males (all except for the mood and coping subscale score). The music importance rating was positively associated with the total well-being score and socializing subscale score. Indeed, the evidence for positive associations between musical participation and perceived social well-being is growing (e.g., von Lob et al., 2010; Jutras, 2011; Rohwer and Rohwer, 2012; Creech et al., 2013b; McQueen et al., 2013; Krause et al., 2018).

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

**TABLE 2** | Total well-being score model.

| Variable | F     | p     | Beta  | t     | 95% CI | $\eta^2$ |
|----------|-------|-------|-------|-------|--------|----------|
| Gender   | 17.098| < 0.001| 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 | 0.006 | 1.375 | −0.002 | 0.011    | 0.013    |
| Music importance rating (1–7) | 4.183 | 0.043 | 0.154 | 2.045 | 0.006  | 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 | < 0.001 | 0.086 | 9.171 | 0.067  | 0.104    | 0.364    |

Full model: $F(11,147) = 32.798$, $p < 0.001$, $\eta^2 = 0.711$. Degrees of freedom = 1, 147 for each variable. CI, confidence interval.

**TABLE 3** | Mood and coping well-being score model.

| Variable | F     | p     | Beta  | t     | 95% CI | $\eta^2$ |
|----------|-------|-------|-------|-------|--------|----------|
| 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 | < 0.001 | 0.083 | 5.212 | 0.051  | 0.114    | 0.155    |

Full model: $F(10,148) = 13.379$, $p < 0.001$, $\eta^2 = 0.475$. Degrees of freedom = 1, 148 for each variable. CI, confidence interval.
TABLE 4 | Esteem and worth well-being score model.

| Variable                          | $F$   | $p$   | Beta  | $t$    | 95% CI  | $\eta^2$ |
|----------------------------------|-------|-------|-------|--------|---------|----------|
| 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| 1.603 | 0.239 | 0.057 | 1.262  | -0.032  | 0.017    | 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  | 0.196    | 0.004    |
| Relative autonomy index score    | 44.319| < 0.001| 0.109 | 6.657  | 0.077   | 0.142    | 0.232    |

Full model: $F(11,147) = 12.054, p < 0.001, \eta^2 = 0.474$. Degrees of freedom = 1, 147 for each variable. CI, confidence interval.

TABLE 5 | Socializing well-being score model.

| Variable                          | $F$   | $p$   | Beta  | $t$    | 95% CI  | $\eta^2$ |
|----------------------------------|-------|-------|-------|--------|---------|----------|
| Gender                           | 19.001| < 0.001| 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  | 0.025   | 0.506    | 0.038    |
| Activity type                    | 1.142 | 0.322 | -0.172| -1.218, $p = 0.225$ | -0.451  | 0.107    | 0.010    |
| Instrument – Sing                | 0.006 | 0.944, $p = 0.965$ | -0.277  | 0.289    | 0.000    |
| Instrument – Facilitate          | 0.178 | 1.348, $p = 0.180$ | -0.083  | 0.439    | 0.012    |
| Sing – Facilitate                | 0.340 | -2.222, $p = 0.028$ | -0.642  | -0.038   | 0.032    |
| Location type                    | 2.881 | 0.059 | -0.126| -0.725, $p = 0.469$ | -0.469  | 0.217    | 0.004    |
| Domestic setting – Community venue | 0.214 | 1.532, $p = 0.128$ | -0.062  | 0.490    | 0.016    |
| Domestic – Educational establishment |     |     |       |        |         |          |
| Community venue – Educational establishment | 0.124 | 0.291 | 0.054 | 1.060  | -0.047  | 0.154    | 0.008    |
| Number of other participants (grouping) | 0.578 | 0.448 | 0.103 | 0.760  | -0.164  | 0.370    | 0.004    |
| Autonomy score                   | 0.363 | 0.548 | 0.080 | 0.602  | -0.138  | 0.256    | 0.002    |
| Competency score                 | 23.557| < 0.001| 0.487 | 4.854  | 0.289   | 0.686    | 0.138    |
| Relatedness score                | 0.079 | 0.779 | 0.004 | 0.281  | -0.023  | 0.031    | 0.001    |

Full model: $F(12,147) = 18.307, p < 0.001, \eta^2 = 0.599$. 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                          | $F$   | $p$   | Beta  | $t$    | 95% CI  | $\eta^2$ |
|----------------------------------|-------|-------|-------|--------|---------|----------|
| Gender                           | 19.749| < 0.001| 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 | 0.080 | 0.602  | -0.136  | 0.256    | 0.002    |
| Length of time participating     | 0.021 | 0.884 | -0.001| -0.146 | -0.016  | 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| < 0.001| 0.100 | 7.445  | 0.074   | 0.127    | 0.272    |

Full model: $F(10,148) = 20.583, p < 0.001, \eta^2 = 0.582$. Degrees of freedom = 1, 148 for each variable. CI, confidence interval.
As seen in Figure 1, with regard to the three basic psychological needs, competency (defined as the need to be effective in one’s efforts) was positively associated with the total, esteem and self-worth, and cognitive well-being sub-scale scores. Relatedness (the need to be socially connected) was positively associated with the total and socializing well-being sub-scale score. These findings demonstrate logical associations between those two types of psychological needs and the well-being types: while obviously not indicative of a causal effect, these findings indicate, within the context of specifically musical participation, a relationship between feeling related to other people and experiencing social well-being benefits, as has been reported in much research (e.g., von Lob et al., 2010; Jutras, 2011; Rohwer and Rohwer, 2012; Creech et al., 2013b; McQueen et al., 2013; Krause et al., 2018); and the positive relationship between competency and various aspects of both social and cognitive well-being supports prior research that also demonstrates links between musical participation and cognitive well-being (e.g., Gick, 2011; Kokotsaki and Hallam, 2011; Creech et al., 2013a). Indeed, relatedness was particularly important in Quested et al.’s (2018) community gardening investigation, as well as Sebire et al.’s (2016) dance research. Autonomy (the need to feel that one’s activities are self-endorsed and volitional) did not demonstrate any significant associations with well-being: the absence of significant findings concerning autonomy per se is interesting, given that previous research findings have linked autonomy to motivation and engagement (e.g., Williams and Deci, 1998; Reeve et al., 2004; Valenzuela et al., 2018), as well as well-being (e.g., Ilardi et al., 1993).

Additionally, in the full models (Tables 2–7), the specific nature of musical participation (i.e., instrument versus singing versus facilitation) was not associated with well-being. It is also slightly surprising, but nonetheless encouraging, that well-being correlates of musical participation were not related to length of time and frequency of participating when considering overt measures of competence, relatedness, and autonomy as well. The lack of any such associations can be interpreted positively: experiencing well-being benefits in the context

| Variable | F | p | Beta | t | 95% CI | η² |
|----------|---|---|------|---|--------|----|
| 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 | 0.857 | -0.422 | 0.351 | 0.000 |
| | | | Domestic – Educational establishment | -0.119 | -0.552 | 0.582 | -0.545 | 0.307 | 0.002 |
| | | | Community venue – Educational establishment | -0.084 | -0.495 | 0.621 | -0.418 | 0.250 | 0.002 |
| Number of other participants (grouping) | 0.002 | 0.966 | | | | | |
| Autonomy score | 1.427 | 0.234 | -0.171 | -1.196 | -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 | < 0.001 | 0.097 | 4.574 | 0.055 | 0.139 | 0.126 |

Full model: F(12, 145) = 11.897, p < 0.001, ηp² = 0.496. Degrees of freedom = 12, 145 for each variable; except for Location type, where Degrees of freedom = 2, 145. CI, confidence interval.
of musical participation does not appear to hinge on the particulars of the musical activity itself. Rather, people can select musical activities aligned with their personal preferences and which fit within their lifestyles without implications for their probability of experiencing greater well-being. Of course, it would not be fruitful to simply force people to participate in musical activities (e.g., at school, via private lessons, or in community spaces) without striving to also increase feelings of competence, relatedness, and autonomy. Our results suggest that self-determination is considerably more important than simple attendance. Similarly, the only demographic variable related to well-being was gender, so that age and education level are also unrelated to the relationship between musical participation and well-being. Thus, these findings have broad implications for music educators, community musicians, music therapists, and others who are involved in facilitating participation opportunities.

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

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

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

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

In summary, the present study used Self-Determination Theory to examine musical participation and well-being. The pattern of results reiterates the positive associations between musical participation and benefits to one’s emotional and social well-being; and makes clear that that feeling competent, a sense of relatedness to others, and autonomous motivation should be prioritized in music making opportunities. The findings indicate that Self-Determination Theory (including the mini theories of Basic Psychological Needs and Organismic Integration Theory in particular) offers a useful theoretical framework to understanding musical participation with regard to well-being.

DATA AVAILABILITY

The datasets for this study will not be made publicly available because the ethics permissions require that the data be kept and destroyed.

ETHICS STATEMENT

This project received ethical approval from Curtin University.

AUTHOR CONTRIBUTIONS

AK, JD, and AN jointly developed the conceptual and methodological approach and co-wrote the discussion. AK oversaw the ethics, participant recruitment, data collection, and developed the literature review and sketched the shape of the final article. AK and AN undertook the data analysis.

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REFERENCES

Aliverini, F., and Lucidi, F. (2011). Relationship between social context, self-efficacy, motivation, academic achievement, and intention to drop out of high school: a longitudinal study. J. Educ. Res. 104, 241–252. doi: 10.1080/00220971003723626

Arrogi, A., Schotte, A., Bogaerts, A., Roen, F., and Segers, J. (2017). Short- and long-term effectiveness of a three-month individualized need-supportive physical activity counseling intervention at the workplace. BMC Public Health 17:52. doi: 10.1186/s12889-016-3965-1

Baard, P. P., Deci, E. L., and Ryan, R. M. (2004). Intrinsic need satisfaction: a motivational basis of performance and well-being in two work settings. J. Appl. Soc. Psychol. 34, 2043–2068. doi: 10.1111/j.1559-1816.2004.tb02690.x

Black, A. E., and Deci, E. L. (2000). The effects of instructors’ autonomy support and students’ autonomous motivation on learning organic chemistry: a self-determination theory perspective. Sci. Educ. 84, 740–756. doi: 10.1002/1096-237X(2000111844-740-AID-SCEA-3.0.CO;2-3

Bonnieville-Roussy, A., Evans, P., Verner-Filion, J., Vallerand, R. J., and Bouffard, T. (2017). Motivation and coping with the stress of assessment: gender differences in outcomes for university students. Contemp. Educ. Psychol. 48, 28–42. doi: 10.1016/j.cedpsych.2016.08.003

Bonnieville-Roussy, A., Vallerand, R. J., and Bouffard, T. (2013). The roles of autonomy support and harmonious and obsessive passions in educational persistence. Learn. Individ. Diff. 24, 22–31. doi: 10.1016/j.lindif.2012.12.015

Chatzisarantis, N. L. D., and Hagger, M. S. (2009). Effects of an intervention based on self-determination theory on self-reported leisure-time physical activity participation. Psychol. Health 24, 29–48. doi: 10.1080/0887440701809533

Clift, S., and Hancock, G. (2010). The significance of choral singing for sustaining psychological wellbeing: Findings from a survey of choristers in England. Australia and Germany. Music Perform. Res. 3, 79–96.

Clift, S., Hancock, G., Staricoff, R., and Whitmore, C. (2008). Singing and Health: Summary of A Systematic Mapping and Review of Non-Clinical Research. Canterbury: Canterbury Christ Church University.

Coleman, D., and Iso-Ahola, S. E. (1993). Leisure and health: The role of social support and self-determination. J. Leis. Res. 25, 111–128. doi: 10.1080/00222216.1993.11969913

Corenblum, B., and Marshall, E. (1998). The band played on: predicting students’ intentions to continue studying music in high school. Psychology Music. 26, 331–362. doi: 10.1080/0305735615591844

Deci, E. L., and Ryan, R. M. (2008). Facilitating optimal motivation and psychological well-being across life’s domains. Can. Psychol. 49, 14–23. doi: 10.1037/0708-5591.49.1.14

Deci, E. L., Ryan, R. M., Gagné, M., Leone, D. R., Usunov, J., and Kornazheva, B. P. (2000). Need satisfaction, motivation, and well-being in the work organizations of a former eastern bloc country. Pers. Soc. Psychol. Bull. 27, 930–942. doi: 10.1177/0146167201278002

Delano, A., and Royse, D. (1987). Factors influencing the decision of college freshmen to participate or not to participate in Kent state university music ensembles. Contrib. Music Educ. 14, 9–18.

Douglas, K. A. (2011). A Descriptive Analysis of The Psychological Needs of Adults Participating in Music Ensembles: A Survey of the New Horizons International Music Association Ensemble Participants (Doctoral Dissertation). Greensboro: The University of North Carolina.

Evans, P. (2015). Self-determination theory: An approach to motivation in music education. Music School. 19, 65–83. doi: 10.1029/146167205279905

Evans, P., and Bonnieville-Roussy, A. (2016). Self-determined motivation for practice in university music students. Psychol. Music 44, 1095–1110. doi: 10.1177/0305735615610926

Evans, P., McPherson, G. E., and Davidson, J. W. (2013). The role of psychological needs in cementing music and music learning activities. Psychol. Music 41, 600–619. doi: 10.1177/0305736214471376

Ferrand, C., Martinet, G., and Durmaz, N. (2014). Psychological need satisfaction and well-being in adults aged 80 years and older living in residential homes: using a self-determination theory perspective. J. Aging Stud. 30, 104–111. doi: 10.1016/j.jaging.2014.04.004

Freer, E., and Evans, P. (2018). Psychological needs satisfaction and value in students’ intentions to study music in high school. Psychol. Music. 46, 881–895. doi: 10.1080/0305735617731613

Gagné, M., and Deci, E. L. (2005). Self-determination theory and work motivation. J. Occup. Behav. 26, 331–362. doi: 10.1002/job.322

Georgiadis, M. M., Biddle, S. J. H., and Stavrou, N. A. (2006). Motivation for weight-loss diets: a clustering, longitudinal field study using self-esteem and self-determination theory perspectives. Health Educ. J. 65, 53–72. doi: 10.1177/0178969606066067

Gick, M. L. (1911). Singing, health and well being: a health psychologist’s review. Psychomusicology. 21, 176–207. doi: 10.1037/h0094011

Groarke, J. M., and Hogan, M. J. (2016). Enhancing wellbeing: an emerging model of the adaptive functions of music listening. Psychol. Music. 44, 769–791. doi: 10.1080/0305735615591844

Hagger, M. S., and Chatzisarantis, N. L. D. (2008). Self-determination theory and the psychology of exercise. Int. Rev. Sport Exerc. Psychol. 1, 79–103. doi: 10.1080/1759490701827437

Hagger, M. S., Chatzisarantis, N. L. D., and Harris, J. (2006). From psychological need satisfaction to intentional behavior: testing a motivational sequence in two behavioral contexts. PSPB 32, 131–148. doi: 10.1177/0146167205279905

Hagger, M. S., Sultan, S., Hardcastle, S. J., and Chatzisarantis, N. L. D. (2015). Perceived autonomy support and autonomous motivation toward mathematics activities in educational and out-of-school contexts is related to mathematics homework behavior and attainment. Contemp. Educ. Psychol. 41, 111–123. doi: 10.1016/j.cedpsych.2014.12.002

Ilardi, B. C., Leone, D., Kasser, T., and Ryan, R. M. (1993). Employee and supervisor ratings of motivation: main effects and discrepancies associated with job satisfaction and adjustment in a factory setting. J. Appl. Psychol. 78, 1789–1805. doi: 10.1177/0021904593078011

Jang, H., Kim, E. J., and Reeve, J. (2012). Longitudinal test self-determination theory's motivation mediation model in a naturally occurring classroom context. J. Educ. Psychol. 104, 1175–1188. doi: 10.1037/a0028089

Jang, H., Reeve, J., and Deci, E. L. (2010). Engaging students in learning activities: It is not autonomy support or structure, but autonomy support and structure. J. Educ. Psychol. 102, 588–600. doi: 10.1037/a0019682

Jutras, P. J. (2011). The benefits of new horizons band participation as self-reported by selected new horizons band members. Bull. Council Res. Music Educ. 187, 65–84.

Kokotsaki, D., and Hallam, S. (2011). The perceived benefits of participative music making for non-music university students: a comparison with music students. Music Educ. Res. 13, 149–172. doi: 10.1080/14613808.2011.577768

Krause, A. E., and Davidson, J. W. (2018). Effective educational strategies to promote lifelong musical investment: perceptions of educators. Front. Psychol. 9:1977. doi: 10.3389/fpsyg.2018.01977

Krause, A. E., Davidson, J. W., and North, A. C. (2018). Musical activity and well-being: a new quantitative measurement instrument. Music Perc. 35, 454–474. doi: 10.1177/015255/mp.2018.35.4.454
Vlachopoulos, S. P., Ntoumanis, N., and Smith, A. L. (2010). The basic psychological needs in exercise scale: translation and evidence for cross-cultural validity. *Int. J. Sport Exer. Psychol.* 8, 394–412. doi: 10.1080/1612197X.2010.9671960

von Lob, G., Camic, P., and Clift, S. (2010). The use of singing in a group as a response to adverse life events. *Int. J. Ment. Health Prom.* 12, 45–53. doi: 10.1080/14623730.2010.9721818

Williams, G. C., and Deci, E. L. (1998). The importance of supporting autonomy in medical education. *Ann. Inter. Med.* 129, 303–308. doi: 10.7326/0003-4819-129-4-199808150-00007

Wilson, P. M., Mack, D. E., and Grattan, K. P. (2008). Understanding motivation for exercise: a self-determination theory perspective. *Can. Psychol.* 49, 250–256. doi: 10.1037/a0012762

Wilson, P. M., Rodgers, W. M., Loitz, C. C., and Scime, G. (2006). It’s who i am really! the importance of integrated regulation in exercise contexts. *J. Appl. Biobehav. Res.* 11, 79–104. doi: 10.1111/j.1751-9861.2006.tb00021.x

Wilson, P. M., Sabiston, C. M., Mack, D. E., and Blanchard, C. M. (2012). On the nature and function of scoring protocols used in exercise motivation research: an empirical study of the behavioral regulation in exercise questionnaire. *Psychol. Sport Exer.* 13, 614–622. doi: 10.1016/j.psychsport.2012.03.009

**Conflict of Interest Statement:** The authors declare that the research was conducted in the absence of any commercial or financial relationships that could be construed as a potential conflict of interest.

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