

The role of personality and self-efficacy in music students' health-promoting behaviours

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Abstract

Evidence of the high prevalence of physical and psychological problems among professional and student classical musicians has led to investigations of music students' health-promoting behaviours. These have indicated lower levels of engagement in health-promoting behaviours among music students compared to non-music students and resulted in the recent introduction of health education courses in a number of tertiary music education institutions.

Investigations of health-promoting behaviours in a wide range of contexts have shown that personality and general self-efficacy are significantly associated with health-promoting behaviours. Although previous studies of music students' health-promoting behaviours provide evidence of positive associations between general self-efficacy and health-promoting behaviours, the contribution of personality to health-promoting behaviours and the influence of general self-efficacy on the associations between personality and music students' health-promoting behaviours have not yet been investigated. The current study examined associations between the personality, general self-efficacy and health-promoting behaviours of 154 undergraduate music students. Hierarchical regression analyses showed that Conscientiousness was the most consistent significant predictor of health-promoting behaviours. Conscientiousness, Extraversion and Neuroticism were found to predict general self-efficacy. Mediation analyses were carried out and showed that general self-efficacy mediated the associations between both Conscientiousness and Neuroticism, and health-promoting behaviours. The implications of the findings for future health education courses are discussed.

Keywords

Musicians, music students, health-promoting behaviours, Big Five, general self-efficacy

Investigations of the physiological and psychological risks associated with the lives of professional classical musicians have been well covered in the literature (Ackermann et al., 2014; Kenny et al., 2014; Kok et al., 2016; Vaag et al., 2016), and reveal a high prevalence of performance-related musculoskeletal disorders (Gasenzer et al., 2017; Kaufman-Cohen & Ratzon, 2011, Leaver et al., 2011; Stanhope et al., 2019) and music performance anxiety (MPA; Cohen & Bodner, 2019a; Fishbein et al., 1988; Kenny et al., 2014, 2018). Of even more concern is the evidence that many younger musicians, including music students, also suffer from pain and performance-related musculoskeletal disorders (Ackerman & Driscoll, 2013; Ballenberger et al., 2018; Ginsborg et al., 2009; Panebianco, 2017; Spahn et al., 2017) and MPA (Biasutti & Concina, 2014; Cohen & Bodner, 2019b; Papageorgi et al., 2013; Osborne & McPherson, 2018). The high prevalence of these physiological and psychological risks to health and wellbeing among musicians has led to investigations of health-promoting behaviours among music students (Araújo et al., 2017; Ballenberger et al., 2018; Ginsborg et al., 2009; Matei et al., 2018; Panebianco-Warrens et al., 2015; Spahn et al., 2004). These investigations have resulted in the introduction of courses on health-promoting behaviours and psychological skills in a number of tertiary music institutions (e.g., Matei et al., 2018; Zander et al., 2010), based on the notion that the university can provide a useful context for promoting the adoption of behaviours that support health and wellbeing (Dooris et al., 2010).

Health-promoting Behaviours

Health-promoting behaviours can be conceptualised “as a multidimensional pattern of self-initiated actions and perceptions that serve to maintain or enhance the level of wellness, self-actualization and fulfilment of the individual” (Walker et al., 1995, p. 2). Research has shown that music students are less likely to engage in health-promoting behaviours than other student populations (Araújo et al., 2017; Ginsborg et al., 2009; Spahn et al., 2004), scoring lower than average on measures of physical activity and stress management, and lowest of all

on measures of health responsibility (Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco et al., 2015). These findings are especially troubling, given that musicians need to be equipped, like athletes (Clark & Williamon, 2011; Hoffman & Hanrahan, 2012), with strategies for performing at their best under pressure (Osborne et al., 2014), and for taking their own responsibility for maintaining physical fitness so that they can perform optimally (Chan et al., 2013; Williamon & Thompson, 2006). From published studies of health-promoting behaviours in a variety of contexts with participants including athletes (Allen & Laborde, 2014; Pisarek et al., 2011), military personnel (Booth-Kewley & Vickers, 1994) and older populations (Ebstrup et al., 2013; Lockenhoff et al., 2011), there is evidence that both personality traits (Intiful et al., 2019; Joyner & Loprinzi, 2018; Lipowski & Bieleninik, 2014) and self-efficacy (see Leganger et al., 2000, and Richardson et al., 2012, for reviews) are significant predictors of health-promoting behaviours. Although positive associations between music students' health-promoting behaviours and general self-efficacy have been demonstrated (Araújo et al., 2017; Ginsborg et al., 2009, Kreutz et al., 2008; Matei et al., 2018; Panebianco et al., 2015), the contribution of personality to music students' engagement in health-promoting behaviours has not yet been examined. Information as to its contribution would be useful, both for understanding music students' health-promoting behaviours better, and for targeting students with particular personality traits who could benefit, especially, from interventions designed to facilitate certain health-promoting behaviours.

Self-efficacy

Self-efficacy is defined as “the belief in one’s capabilities to organise and execute the courses of action required to produce given attainments” (Bandura, 1997, p.3). Self-efficacy is understood to be positively associated with performance, as it motivates and maintains the behaviours that lead to success (Bandura, 1997; Jinks & Lorschach, 2003). Positive

associations have been found between self-efficacy and performance in a range of domains, including work (Burns & Christiansen, 2011; Judge et al., 2007), academic performance (Caprara et al., 2011; Fosse et al., 2015; Richardson et al., 2012), athletic performance (Besharat & Pourbohloul, 2011; Feltz & Lirgg, 2001) and health behaviours (Bandura, 2004; Leganger et al., 2000; Schwarzer & Fuchs, 1996). Self-efficacy is generally understood as being task- or domain-specific (Leganger et al., 2000; Zimmerman, 2000). A general sense of self-efficacy has also been proposed, however, “[reflecting] a generalization across various domains of functioning in which people judge how efficacious they are” (Luszczynska et al., 2005, p.440). This has been found to correlate positively with behaviour-specific self-efficacy beliefs (Luszczynska et al., 2005) and is argued to be useful for explaining a broad range of human behaviours, particularly when focusing on multiple behaviours simultaneously (Luszczynska et al., 2004).

In research with music students, positive associations have been found between music-specific self-efficacy and both performing (González et al., 2018; McPherson & McCormick, 2006; Ritchie & Williamon, 2011) and practising music (Mornell et al., 2018; Ritchie & Williamon, 2011). Negative associations have been found between both music-specific and general self-efficacy, and MPA (Gonzalez et al., 2018; Orejudo et al., 2018). Positive associations have also been found between general self-efficacy and music students’ engagement in health-promoting behaviours (Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco-Warren et al., 2015).

Personality

Personality traits encompass enduring individual differences between tendencies to show consistent patterns of thoughts, feelings and actions (McCrae et al., 2000). The five-factor model of personality (McCrae & Costa, 1999) describes five basic building blocks of personality that are thought to cause the expression of more specific sub-traits. Each factor

represents a continuum and individuals can fall anywhere on the continuum for each factor. The five factors, known as the Big Five, are Openness to experience (creative, spontaneous versus routine, practical), Conscientiousness (self-disciplined, careful versus impulsive, disorganised), Extraversion (sociable, outgoing versus reserved, thoughtful), Agreeableness (kind, cooperative versus suspicious, uncooperative), and Neuroticism (anxious, emotionally unstable versus calm, confident). Personality effects are thought to be “ubiquitous, influencing each of us all the time” (Ozer & Benet-Martínez, 2006, p.17), and have been examined in a wide variety of contexts, including academic achievement (Vedel & Poropat, 2017), significant life outcomes including career choice, divorce and mortality (Roberts et al., 2007), and engagement in a range of mental and physical health behaviours (see Strickhouser et al., 2017 and Wilson & Dishman, 2015 for reviews). Conscientiousness, Agreeableness and Openness have been shown to be positively associated with academic achievement (Capara et al., 2011; Vedel & Poropat, 2017), while Conscientiousness and Extraversion have been shown to be associated with many different health behaviours, particularly physical activity (Joyner & Loprinzi, 2018; Raynor & Levine 2009; Wilson & Dishman, 2015). Associations between Neuroticism and health behaviours have been found in some studies (Ebstrup et al, 2011, 2013; Lucas, 2018; Merrit & Tharp, 2013) but not others (Bogg & Roberts, 2013; Joyner & Loprinzi, 2018; Raynor & Levine 2009).

Published studies of personality among musicians have mainly examined the differences between the personality types of musicians and non-musicians (Butkovic & Rancic, 2017; Vaag et al., 2017), and associations between personality types and instrument played (Langendörfer, 2008). These studies have consistently found that musicians exhibit higher levels of Openness than non-musicians, but not necessarily Conscientiousness, Extraversion, Agreeableness or Neuroticism. Investigations of the associations between personality type and instrument played have also produced mixed findings, with some

evidence that bowed string players tend to score higher for Conscientiousness and Neuroticism, and lower on Extraversion, than woodwind and brass players (Bogunović, 2012; Langendörfer, 2008; Vaag et al, 2017). The lack of clear findings may be explained by the wide variety of tools used and the small and heterogenous samples of musicians of different ages and levels of expertise in the studies (Vaag et al., 2017). Although associations between measures of musicians' personality and variables such as MPA, perfectionism, coping mechanisms and flow (Butkovic et al., 2015; Heller et al., 2015; Langendörfer et al., 2006; Sadler & Miller, 2010) have been identified, associations between musicians' personality and health-promoting behaviours have not been investigated to date.

Associations Between Personality, Self-efficacy, and Health-promoting Behaviours

Whereas personality traits describe a person's inherent character and potential (McCrae & Costa, 1999), self-efficacy beliefs describe the way the person regulates their behaviour when interacting with the environment (Bandura, 1997), and it has been suggested that self-efficacy beliefs influence the way the person expresses their inherent personality traits as behaviour (Fosse et al., 2015; Judge & Ilies, 2002; Judge et al., 2007). There is evidence from studies of academic achievement (Caprara et al., 2011; Giunta et al., 2013; Fosse et al., 2015), work performance (Burns & Christiansen, 2011), wellbeing (Strobel et al., 2011), and health-promoting behaviours (Ebstrup et al., 2013; Lockenhoff et al., 2011; Merritt & Tharp, 2013) that self-efficacy has a mediating effect on personality. Specifically, in these studies, self-efficacy consistently mediated the association between Conscientiousness and relevant, domain-related variables. An investigation of the associations between music students' personality and health-promoting behaviours, focusing on the mediating role of general self-efficacy (Figure 1), could be useful for devising interventions designed to adopt and maintain behaviours to improve their health.

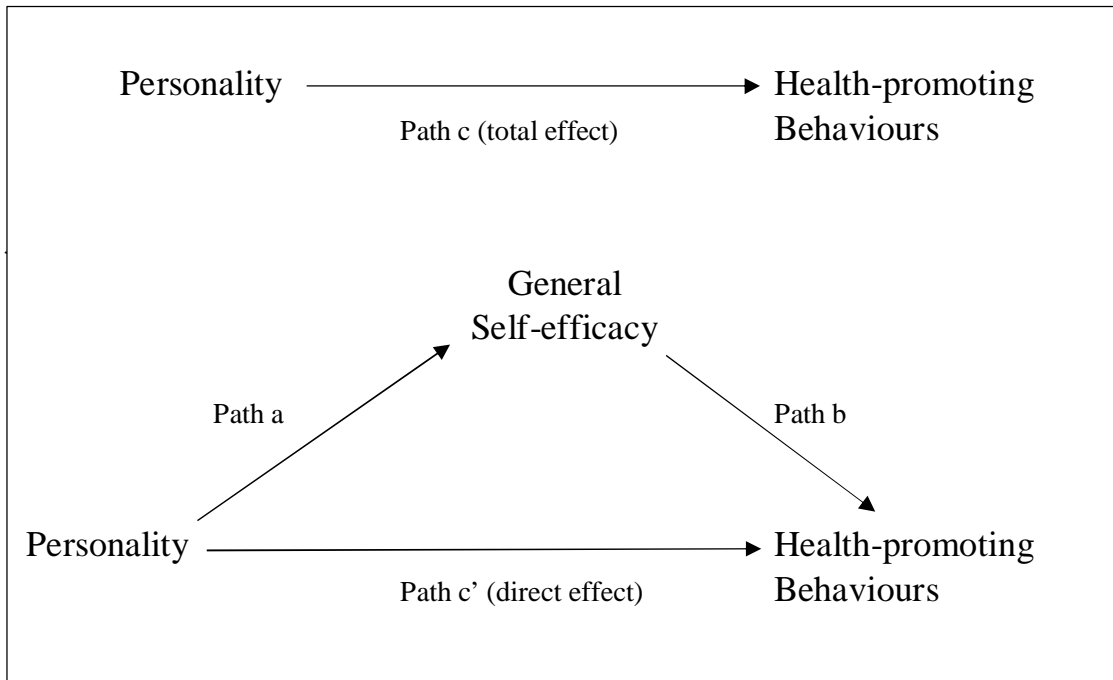


Figure 1. Mediation model for the associations between personality, general self-efficacy and health-promoting behaviours.

The Current Study

Given the high prevalence of physical and psychological problems among professional and student musicians, and evidence of music students' low levels of engagement in health-promoting behaviours, the current study aimed to investigate the associations between music students' personality and health-promoting behaviours, and examine the contribution of self-efficacy to this association. Such an investigation had not previously been undertaken, and the findings could be useful when devising interventions designed to encourage individuals to adopt behaviours that facilitate psychological and physiological health. The research questions to be investigated were:

- 1) What are the associations between personality and health-promoting behaviours in music students?
- 2) To what extent does self-efficacy mediate the associations between personality and health-promoting behaviours?

Method

Respondents

Respondents were 155 undergraduate music students, comprising 49 (31.6%) males and 106 (68.4%) females, aged 18–29 years, mean age 20.00 years ($SD=2.04$), recruited through university music department noticeboards and websites in South Africa. They studied at six universities in South Africa: 99 (63.9%) at the University of Pretoria, 23 (14.8%) at the University of Cape Town, 24 (15.5%) at the University of Stellenbosch, three (1.9%) at the University of the Free State, three (1.9%) at Rhodes University, one (0.6%) at the University of the Witwatersrand and two (1.3%) at unspecified institutions. Forty-seven were singers (30.3%), 42 were piano and keyboard players (27.1%), 25 were bowed and plucked string players (16.1%), 35 were woodwind and brass players (22.6%), and six were percussion or drum players (3.9%).

Measures

Health-Promoting Lifestyle Profile II

Health-promoting behaviours were measured using the *Health-Promoting Lifestyle Profile II* (HPLP II; Walker et al., 1995) because it is the most commonly used measure of health-promoting behaviours in investigations of music students (Araújo et al., 2017; Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco-Warrens et al., 2015). It is a 52-item questionnaire comprising six subscales, with items measured on a four-point Likert-type scale from 1 (*never*) to 4 (*routinely*). In addition to an overall score it also provides scores for each of the subscales: Health Responsibility (accepting responsibility for one's own health and seeking professional assistance when necessary); Physical Activity (engaging in regular exercise patterns); Nutrition (establishing meal patterns and food choices); Spiritual Growth (self-actualization and fulfilment); Interpersonal Relations (maintaining relationships involving a sense of intimacy and closeness), and Stress Management (recognizing the sources of stress and taking actions to control it).

Generalized Self-Efficacy Scale

The Generalized Self-Efficacy Scale (GSE; Schwarzer & Jerusalem, 1995) was used to explore the role of self-efficacy in engagement with each of the health-promoting behaviours represented by the six subscales of the HPLP II. It has been found to be a valid measure of general self-efficacy in a wide range of domains and countries, assessing self-efficacy across domains of functioning when focusing on multiple behaviours simultaneously (Luszczynska et al., 2005). It is also the measure used most often in published studies of music students' health-promoting behaviours (Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco-Warrens et al., 2015). It comprises 10 items measuring the respondent's self-appraisal of their ability to cope with a situation or solve a problem. Each item is rated on a four-point Likert-type scale from 1 (*not at all true*) to 4 (*exactly true*).

Big Five Inventory

The 10-item Big Five Inventory (BFI-10; Rammstedt & John, 2007) measures the five broad dimensions of personality: Openness, Conscientiousness, Extraversion, Agreeableness, and Neuroticism, and is a shortened version of the BFI-44. Two items with opposing descriptors are provided for each of the five dimensions of personality, to which responses are made using a five-point Likert scale from 1 (*strongly disagree*) to 5 (*strongly agree*). It has been shown to have good internal consistency, reliability, convergent and discriminant validity (Hahn et al., 2012; Rammstedt & John, 2007).

Finally, demographic information representing participants' age, sex, university and instrument played was also gathered.

Procedure

Ethical approval was obtained from each university's research ethics committee. Data were collected over a period of approximately 12 months and included paper questionnaires and an online Google Docs version of the questionnaire for institutions in distant provinces and respondents who were not present when it was administered in paper form. All potential respondents were provided with a comprehensive information sheet explaining the purpose of the study. Volunteers signed informed consent forms in accordance with the ethical guidelines and requirements of the research ethics committee of each university. Respondents who completed the questionnaire online were given an assurance on the first screen that the questionnaire was anonymous, and asked to tick a declaration of informed consent before proceeding to the questionnaire itself.

Data Analyses

The Statistical Package for the Social Sciences (SPSS 25) was used. A series of *t*-tests found no evidence of differences in any of the measures between students who completed the questionnaire in paper or online format. One respondent was excluded from the analysis as

their age (29) was greater than 3 SDs from the mean, so the final sample consisted of 154 students, 48 (31.1%) males and 106 (68.8%) females, with a mean age of 19.90 years ($SD=1.38$). Tests for normality of distribution showed that mean scores for the Big Five measures and for the HPLP II subscales Health Responsibility, Spiritual Growth and Interpersonal Relationships showed significant deviations from normality (Shapiro-Wilk $p < .05$), so Spearman's Rho inter-correlations were calculated. There were so few respondents from the University of the Free State, Rhodes University, and University of the Witwatersrand that, together with those who had not specified their educational institution, these groups were collapsed into the category "Uother". A series of hierarchical regression analyses was carried out to examine the contribution of background variables, personality and general self-efficacy to health-promoting behaviours, and Hayes PROCESS macro (Hayes, 2013) was used to investigate mediation effects. All assumptions for regression analysis (independence of variables, normality of residuals, homoscedasticity, and multicollinearity (ranging from VIF 1.08 to 2.15) were met.

Results

Preliminary Analyses

Descriptive statistics, Cronbach's alphas and ANOVAS for the effect of sex and instrument on health-promoting behaviours are presented in Table 1. The total score for HPLP II yielded a Cronbach's alpha of .90, and the subscales yielded alphas ranging from .56 for Nutrition to .83 for Health Responsibility. When the item "Eat 3–5 servings of bread, cereal, rice, pasta each day" was removed from Nutrition, the alpha for this subscale improved to an acceptable .64 (Taber, 2018). This item was subsequently excluded from all analyses. The grand mean of the HPLP II was 2.57 ($SD=0.38$), indicating an overall adherence to health-promoting behaviours falling between *occasional* and *frequent*. The means for Health Responsibility, Physical Activity and Stress Management were below the grand mean, and the means for

Table 1. Cronbach's alphas, means, *SDs* and ANOVAs for sex and instrument (*N*=154).

	Cronbach's alphas	Global mean <i>N</i> = 154		Male <i>n</i> = 48		Female <i>n</i> = 106		Keyboards <i>n</i> = 42		Strings <i>n</i> = 25		Wind/brass <i>n</i> = 35		Percussion <i>n</i> = 5		Voice <i>n</i> = 47		ANOVA sex	ANOVA instr
	<i>N</i> =154	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>M</i>	(<i>SD</i>)	<i>F</i> (1,152)	<i>F</i> (4,149)
HBmn ^a	.90	2.57	(0.37)	2.49	(0.38)	2.60	(0.37)	2.52	(0.41)	2.55	(0.32)	2.53	(0.37)	2.52	(0.16)	2.67	(0.39)	3.53	1.17
HR ^b	.83	2.04	(0.61)	1.88	(0.57)	2.11	(0.62)	1.89	(0.61)	1.99	(0.47)	1.95	(0.59)	2.07	(0.54)	2.26	(0.67)	4.53*	2.38*
PA ^c	.78	2.36	(0.62)	2.30	(0.65)	2.38	(0.61)	2.35	(0.71)	2.33	(0.50)	2.29	(0.59)	2.33	(0.69)	2.43	(0.62)	0.60	0.29
N ^d	.64	2.61	(0.52)	2.50	(0.56)	2.66	(0.50)	2.60	(0.54)	2.53	(0.37)	2.58	(0.60)	2.60	(0.61)	2.70	(0.52)	3.22	0.57
SM ^e	.62	2.43	(0.49)	2.45	(0.54)	2.42	(0.47)	2.40	(0.54)	2.42	(0.50)	2.39	(0.46)	2.40	(0.36)	2.48	(0.49)	0.16	0.24
SG ^f	.81	3.04	(0.51)	2.93	(0.53)	3.08	(0.50)	3.05	(0.51)	3.04	(0.50)	2.99	(0.50)	2.73	(0.37)	3.09	(0.55)	2.76	0.64
IR ^g	.79	3.01	(0.53)	2.93	(0.53)	3.05	(0.53)	2.89	(0.53)	3.06	(0.54)	3.02	(0.51)	3.03	(0.53)	3.08	(0.54)	1.53	0.78
GSE ^h	.85	3.75	(0.56)	3.78	(0.60)	3.74	(0.55)	3.72	(0.58)	3.74	(0.62)	3.83	(0.55)	3.32	(0.31)	3.77	(0.54)	0.14	0.93
Open ⁱ		3.89	(0.88)	3.83	(0.83)	3.92	(0.91)	3.85	(0.91)	3.74	(0.91)	4.11	(0.84)	4.20	(0.45)	3.81	(0.90)	0.60	1.02
Conc ^j		3.46	(0.88)	3.30	(0.89)	3.54	(0.88)	3.65	(0.78)	3.42	(0.92)	3.51	(1.05)	2.90	(0.65)	3.34	(0.82)	2.37	1.28
Ext ^k		3.18	(1.08)	3.05	(0.85)	3.23	(1.17)	3.01	(1.10)	3.10	(0.91)	2.97	(1.10)	3.00	(0.61)	3.53	(1.12)	ⁿ 122.53	1.95
Agr ^l		3.67	(0.81)	3.56	(0.76)	3.72	(0.82)	3.57	(0.89)	3.46	(0.88)	3.70	(0.82)	3.60	(0.42)	3.86	(0.68)	1.29	1.28
Neur ^m		3.30	(0.92)	2.90	(0.92)	3.48	(0.86)	3.50	(0.68)	3.38	(1.05)	3.00	(1.00)	3.50	(0.79)	3.27	(0.94)	14.45**	1.59

Notes:

^a mean total health-promoting behaviours; ^b Health Responsibility; ^c Physical Activity; ^d Nutrition; ^e Stress Management; ^f Spiritual Growth; ^g Interpersonal Relations;

^h General Self-Efficacy; ⁱ Openness; ^j Conscientiousness; ^k Extroversion; ^l Agreeableness; ^m Neuroticism.

ⁿ Levene's homogeneity of variance violated, therefore Welch's test for Robust Equality of Means used.

p* < .05; *p* < .01

Nutrition, Spiritual Growth and Interpersonal Relationships were higher, as reported previously (Araújo et al., 2017; Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco-Warrens et al., 2015). Preliminary ANOVAs showed an effect of sex only on Health Responsibility, such that women scored higher than men, $F(1,152) = 4.53, p < .05$, partial eta squared = .03. There was no evidence of an effect of instrument played on health-promoting behaviours, other than Health Responsibility; post-hoc tests showed that voice students ($M = 2.26, SD = 0.67$) scored significantly higher than piano and keyboard students ($M = 1.89, SD = 0.61, p < .05; F(4,149) = 2.38, p < .05$, partial eta squared = .06). The GSE yielded a Cronbach's alpha of .85 and mean scores were very similar those of music students reported previously (Ginsborg et al., 2009; Panebianco-Warrens et al., 2015). There was no main effect of sex or instrument played on self-efficacy. A one-way ANOVA revealed an effect of sex on Neuroticism, $F(1,152) = 14.45, p < .001$, partial eta squared = .09, such that women scored higher than men. There was no main effect of instrument played on personality.

Associations Between the Study Variables

Inter-correlations using Spearman's Rho correlations (Table 2), showed evidence of strong positive correlations between mean total health-promoting behaviours with all health-promoting behaviour subscales (ranging from .60 to .74, $p < .001$), and moderate positive correlations between general self-efficacy and the health-promoting behaviour subscales (ranging from .22 to .53, $p < .01$). There were moderate correlations between Conscientiousness and total mean health-promoting behaviours, Health Responsibility, Nutrition, and Spiritual Growth; between Extraversion and total mean health-promoting behaviours, Health Responsibility, Spiritual Growth, and Interpersonal Relationships; and between Agreeableness and both Spiritual Growth and Interpersonal Relationships. There

Table 2. Inter-correlations between study variables ($N = 154$).

Variable	HBmn	HR	PA	N	SM	SG	IR	GSE	Open	Conc	Ext	Agr	Neur	Sex	Age
HBmn ^a	1.00														
HR ^b	.74**	1.00													
PA ^c	.65**	.41**	1.00												
N ^d	.60**	.33**	.55**	1.00											
SM ^e	.64**	.38**	.24**	.18*	1.00										
SG ^f	.66**	.34**	.19*	.17*	.59**	1.00									
IR ^g	.63**	.43**	.14	.19*	.40**	.52**	1.00								
GSE ^h	.52**	.37**	.22**	.28**	.30**	.53**	.37**	1.00							
Open ⁱ	-.05	-.01	-.03	.10	-.10	-.07	.04	-.08	1.00						
Conc ^j	.27**	.17*	.15	.30**	.14	.29**	.08	.33**	.00	1.00					
Ext ^k	.27**	.24**	.05	-.03	.07	.33**	.38**	.16*	-.03	-.06	1.00				
Agr ^l	.12	.02	-.07	.01	.16	.20*	.24**	.04	.12	.01	.05	1.00			
Neur ^l	-.17*	-.02	-.07	-.02	-.18*	-.21**	-.13	-.34**	.09	.00	-.07	-.06	1.00		
Sex ⁿ	.13	.17*	.08	.15	-.05	.12	.11	.00	.04	.12	.09	.12	.29**	1.00	
Age ^o	-.06	-.05	-.07	-.03	-.11	-.06	.03	.04	-.07	.05	-.04	-.03	-.11	.00	1.00

Notes:

^a mean total health-promoting behaviours; ^b Health Responsibility; ^c Physical Activity; ^d Nutrition; ^e Stress Management; ^f Spiritual Growth;^g Interpersonal Relations; ^h General Self-Efficacy; ⁱ Openness; ^j Conscientiousness; ^k Extroversion; ^l Agreeableness; ^m Neuroticism; ^o age.Spearman coefficients are presented for continuous variables, and point-biserial coefficients are presented for sexⁿ, coded 0 = male, 1 = female;* $p < .05$; ** $p < .01$

were weak negative correlations between Neuroticism and total mean health-promoting behaviours, Stress management, and Spiritual growth. There were no correlations between Openness and any of the health-promoting behaviours.

In order to explore the contribution of the Big Five and general self-efficacy to health-promoting behaviours, a series of hierarchical regression analyses was carried out (Table 3). Background variables (sex, age, instrument and university) were entered in Block 1: sex was entered as a dichotomous variable (female = 1), age was entered as a continuous variable, instrument was recoded into the dummy variables Strings, Woodwind and Brass, Percussion and Drums, and Voice, with Piano/Keyboards as the reference category, and university was recoded into the dummy variables University of Pretoria (UP), Stellenbosch University (US), and Uoother (Universities of Rhodes, University of the Free State, University of the Witwatersrand and unspecified), with University of Cape Town (UCT) as the reference category. In Block 2, the contribution of the Big Five personality traits to health-promoting behaviours were entered, and the contribution of general self-efficacy to music students' health-promoting behaviours was investigated by entering the general self-efficacy scores in Block 3.

Results showed a significant contribution of background variables to the variance in mean total health-promoting behaviours, Health Responsibility and Nutrition, $\Delta R^2 = .14, .21$ and $.12$ respectively, p (F change) $< .05$. Sex was found to make a significant contribution to the variance in these measures, while respondents at the University of Cape Town reported higher mean health-promoting behaviours, Health Responsibility and Nutrition than respondents at the Universities of Pretoria and Stellenbosch. Respondents at the University of Cape Town reported higher Physical Activity and Interpersonal Relationships than those at the University of Pretoria. In the second step of the model, personality was found to make a

Table 3. Regression analyses for health-promoting behaviours.

Steps β	HBmn ^a			HR ^b			PA ^c			N ^d			SM ^e			SG ^f			IR ^g		
	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3	1	2	3
<u>Background</u>																					
Sex	.18*	.14	.13	.18*	.13	.12	.08	.09	.08	.17*	.13	.12	-.05	-.04	-.05	.17	.15	.13	.14	.10	.08
Age	.00	-.04	-.06	-.02	-.04	-.05	.03	.00	-.01	-.04	-.07	-.08	-.05	-.08	-.10	.01	-.04	-.06	.06	.06	.04
INST ⁿ :																					
string	.07	.09	.07	.10	.11	.10	.02	.02	.02	-.01	.02	.01	.02	.03	.01	.01	.03	.01	.14	.14	.13
wind/brass	-.02	-.04	-.03	.01	.02	.03	-.06	-.06	-.06	-.04	-.05	-.05	-.03	-.05	-.05	-.06	-.09	-.08	.09	.06	.06
perc/drums	.02	.07	.11	.08	.11	.13	-.01	.03	.04	.03	.07	.09	.00	.04	.07	-.10	-.04	.00	.05	.06	.09
voice	.17	.13	.13	.26**	.26**	.25**	.06	.09	.08	.09	.15	.15	.08	.02	.02	.01	-.07	-.07	.16	.04	.03
UNI ^o :																					
UP ^p	-.43**	-.38**	-.27**	-.49**	-.47**	-.39**	-.28*	-.25*	-.24	-.42**	-.37**	-.32**	-.11	-.08	.00	-.08	-.02	.09	-.26*	-.24*	-.16
US ^q	-.34**	-.36**	-.22*	-.37**	-.39**	-.29**	-.22*	-.22*	-.17	-.27*	-.34**	-.24*	-.11	-.11	-.01	-.19	-.20*	-.05	-.17	-.19	-.08
Uother ^r	-.13	-.17*	-.15	-.25**	-.28**	-.26**	-.08	-.08	-.07	-.16	-.17	-.16	-.10	-.11	-.09	.13	.09	.12	-.04	-.10	-.08
<u>Big 5</u>																					
Open ⁱ		.00	.01		.02	.02		-.01	-.01		.11	.12		-.12	-.11		-.08	-.07		.03	.04
Consc ^j		.31**	.17*		.21**	.11		.17*	.12		.31**	.25**		.16	.06		.31**	.16*		.10	-.02
Ext ^k		.22**	.16*		.19*	.14		.01	-.02		-.05	-.08		.09	.05		.29**	.23**		.39**	.34**
Agr ^l		.11	.13		-.02	-.01		-.06	-.05		-.02	-.02		.20*	.21**		.18*	.20**		.25**	.26**
Neur ^m		-.11	.02		.03	.12		-.08	-.04		-.03	.03		-.16	-.07		-.19	-.05		-.07	.03
GSE ^h			.41**			.30**			.14			.19*			.29**			.44**			.34**
ΔR^2	.14**	.16**	.11**	.21**	.07*	.06**	.05	.04	.01	.12*	.10**	.02*	.02	.11**	.06**	.08	.25**	.13**	.07	.22**	.07**
R² TOTAL			.41			.34			.10			.24			.19			.46			.36

Notes:

^a mean total health-promoting behaviours; ^b Health Responsibility; ^c Physical Activity; ^d Nutrition; ^e Stress Management; ^f Spiritual Growth; ^g Interpersonal Relations;

^h General Self-Efficacy; ⁱ Openness; ^j Conscientiousness; ^k Extroversion; ^l Agreeableness; ^m Neuroticism.

ⁿ Reference category: piano/keyboards

^o University, reference category: University of Cape Town; ^p University of Pretoria; ^q University of Stellenbosch; ^r other Universities.

* $p < .05$; ** $p < .01$

significant contribution to the variance in mean total health-promoting behaviours $\Delta R^2 = .16$, $p (F \text{ change}) < .001$, Health Responsibility $\Delta R^2 = .07$, $p (F \text{ change}) < .05$, Nutrition $\Delta R^2 = .10$, $p (F \text{ change}) < .01$, Stress Management $\Delta R^2 = .11$, $p (F \text{ change}) < .01$, Spiritual Growth $\Delta R^2 = .25$, $p (F \text{ change}) < .001$, and Interpersonal Relationships $\Delta R^2 = .16$, $p (F \text{ change}) < .001$. Conscientiousness made a significant contribution to total mean health-promoting behaviours, Health responsibility, Physical activity, Nutrition, Spiritual Growth and Interpersonal Relationships; Extraversion was found to make a significant contribution to total mean health-promoting behaviours, Health Responsibility, Spiritual Growth and Interpersonal Relationships; Agreeableness made a significant contribution to Stress Management, Spiritual Growth and Interpersonal Relationships. Neither Openness nor Neuroticism made significant contributions to any of the health-promoting behaviours. The addition of general self-efficacy in the third step made a significant contribution to the variance in total health-promoting behaviours of $\Delta R^2 = .11$, $p (F \text{ change}) < .001$, Health Responsibility $\Delta R^2 = .06$, $p (F \text{ change}) < .01$, Stress Management $\Delta R^2 = .06$, $p (F \text{ change}) < .01$, Spiritual Growth $\Delta R^2 = .13$, $p (F \text{ change}) < .001$, and Interpersonal Relationships $\Delta R^2 = .07$, $p (F \text{ change}) < .001$. The full model was able to account for 41% of the variance in total health-promoting behaviours, 34% of the variance in Health Responsibility, 10% for Physical Activity, 24% for Nutrition, 19% for Stress Management, 46% for Spiritual Growth, and 36% for Interpersonal Relationships.

Mediating Role of General Self-efficacy

Examination of the contribution of personality to health-promoting behaviours in Steps 2 and 3 of the regression model (Table 3) revealed that when general self-efficacy was introduced into the model, the size and significance of the coefficients for Conscientiousness and Extraversion decreased, suggesting that general self-efficacy was mediating the

Table 4. Regression analysis for predictors of general self-efficacy.

Variables	step 1 β	step 2 β
<i>Background variables</i>		
Sex	.01	.04
Age	.13	.06
INSTRUMENT ^a		
String	.04	.05
woodwind & brass	.03	-.01
percussion/drums	-.17*	-.09
voice	.04	.01
UNIVERSITY ^b		
UP ^c	-.34**	-.25
US ^d	-.34**	-.33
Uother ^e	-.05	-.06
<i>Big 5</i>		
Openness		-.02
Conscientiousness		.34**
Extroversion		.15*
Agreeableness		-.04
Neuroticism		-.31**
ΔR^2	.12*	.22**
R^2 for total model		.34

Notes:

^a Reference category: piano/keyboards^b Reference category: University of Cape Town, ^c University of Pretoria; ^d University of Stellenbosch; ^e other Universities* $p < .05$; ** $p < .01$

relationship between personality and health-promoting behaviours (Baron & Kenny, 1986). In order to investigate this, a second regression analysis was carried out to examine the contribution of background variables and personality to general self-efficacy (Path *a* in Figure 1). Background variables were entered in the first step of the model and personality in the second step (Table 4). Background variables were found to make a significant contribution to the variance in general self-efficacy $\Delta R^2 = .12$, p (F change) $< .05$, with respondents at the University of Cape Town reporting significantly higher general self-efficacy than respondents at the University of Pretoria and the University of Stellenbosch. Personality was found to make a significant contribution to the variance in general self-efficacy $\Delta R^2 = .22$, p (F change) $< .01$, with Conscientiousness, Extraversion and Neuroticism making significant contributions (Path *a*), and the total model accounting for 34% of the variance in general self-efficacy, $R^2 = .34$, $F(14,139) = 5.19$, $p < .001$.

The possible mediating effect of general self-efficacy on the associations between Conscientiousness, Extraversion, Neuroticism, and health-promoting behaviours was then investigated using the PROCESS macro (Hayes, 2013) and the bootstrapping method in which samples are repeatedly drawn from the original sample in order to create an empirical approximation of the sampling distribution of the indirect effect. As shown in Table 5, general self-efficacy mediated the influence of Conscientiousness on total mean health-promoting behaviours, Health Responsibility, Physical Activity, Nutrition, and Spiritual Growth; it also mediated the influence of Neuroticism on Stress Management and Spiritual Growth. There was a significant indirect effect (Path *ab*) of Conscientiousness on Stress Management and Interpersonal Relationships, and of Neuroticism on total mean health-promoting behaviours, Health Responsibility, Physical Activity, Nutrition and Interpersonal Relationships through general self-efficacy. The confidence intervals for Extraversion

Table 5. Mediating role of general self-efficacy.

Health behaviours	Big Five	Path a	Path b	Total effect (c)	Direct effect (c')	Indirect effect (ab)	CI 95%	mediation
HBm ^a	Con ^h	.22***	.32***	.12***	.05	.07	.03, .11	yes
	Ext ⁱ	.09*	.33***	.09**	.06*	.03	-.00, .06	no
	Neur ^j	-.23***	.36***	-.06	.02	-.08	-.13, -.04	indirect effect
HR ^b	Con	.22***	.37***	.12*	.04	.08	.04, .13	yes
	Ext	.09*	.37***	.12**	.09*	.03	-.00, .07	no
	Neur	-.23***	.48***	.00	.10	-.10	-.17, -.05	indirect effect
PA ^c	Con	.22***	.21*	.12*	.07	.05	.01, .10	yes
	Ext	.09*	.26**	.02	-.01	.02	-.00, .05	no
	Neur	-.23***	.26**	-.05	.01	-.06	-.11, -.02	indirect effect
Nut ^d	Con	.22***	.18*	.18***	.14**	.04	.01, .08	yes
	Ext	.09*	.28***	-.02	-.04	.02	-.00, .05	no
	Neur	-.23***	.30***	-.01	.06	-.07	-.12, -.03	indirect effect
SM ^e	Con	.22***	.28***	.07	.01	.06	.02, .12	indirect effect
	Ext	.09*	.28***	.06	.03	.03	-.00, .05	no
	Neur	-.23***	.26***	-.10*	-.04	-.06	-.10, -.02	yes
SG ^f	Con	.22***	.46***	.17***	.07	.10	.05, .16	yes
	Ext	.09*	.46***	.15***	.11**	.04	-.00, .08	no
	Neur	-.23***	.49***	-.12*	-.00	-.12	-.17, -.06	yes
IR ^g	Con	.22***	.38***	.05	-.03	.08	.04, .14	indirect effect
	Ext	.09*	.31***	.19***	.17***	.03	-.00, .06	no
	Neur	-.23***	.36***	-.08	.00	-.08	-.13, -.04	indirect effect

Notes:

^a mean total health-promoting behaviours; ^b Health Responsibility; ^c Physical Activity; ^d Nutrition; ^e Stress Management;^f Spiritual Growth; ^g Interpersonal Relations; ^h Conscientiousness; ⁱ Extroversion; ^j Neuroticism.

crossed zero, so general self-efficacy was not found to be a significant mediator of the association between Extraversion and health-promoting behaviours.

Discussion

The current study aimed to investigate the associations between music students' personality and health-promoting behaviours, and to examine the contribution of general self-efficacy to these associations. Personality was found to make a significant contribution to the variance in health-promoting behaviours, with Conscientiousness as the most consistent significant predictor of health-promoting behaviours. General self-efficacy was found to be significantly associated with all health-promoting behaviours, and with Conscientiousness, Extraversion and Neuroticism. Mediation analyses were carried out to investigate the mediation effect of general self-efficacy on the association between personality and health-promoting behaviours. They showed a significant effect of general self-efficacy on the association between both Conscientiousness and Neuroticism and health-promoting behaviours, but no significant effect of general self-efficacy on the associations between Extraversion and health-promoting behaviours.

Health-promoting Behaviours and Personality

Mean values for total health-promoting behaviours and health-promoting behaviour subscales in the current study confirmed the findings of previous studies of music students: the grand mean for total health-promoting behaviours fell between *occasional* and *frequent*; means of the Health Responsibility, Physical Activity, and Stress Management subscales fell below this grand mean; and means of the Nutrition, Spiritual Growth, and Interpersonal Relationships subscales were higher (Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018, Panebianco-Warrens et al., 2015). The low values found for the Health Responsibility, Physical Activity, and Stress Management subscales are of particular concern given that

musicians need to be on top form in order, physically, to carry out the complex motor skills involved in playing optimally, and mentally robust in order to cope with the stresses that are an integral part of performing in front of others (Williamon, 2004). The finding that women's mean scores for Health Responsibility and Nutrition were higher than those of men also confirms previous findings (Kreutz et al., 2008; Panebianco-Warrens et al., 2015) and supports studies showing that women believe significantly more strongly than men in the importance of nutrition (Wardle et al., 2004) and take more responsibility than men do for their health (Deeks et al., 2009). The finding that voice students' mean scores for Health Responsibility were higher than those of students who play instruments also confirms previous findings (Araújo et al., 2017) and can be explained by voice students' awareness that their body *is* their instrument, and that they therefore need to be responsible for its health. The low Cronbach's alpha for the Nutrition subscale, and its improvement when the item "Eat 3–5 servings of bread, cereal, rice, pasta each day" was removed might be due to confusion as to what counts as a "serving" of carbohydrate, and whether a low or high carbohydrate diet is recommended (National Health Service UK, 2019). Researchers using the HPLP II questionnaire in future should consider revising this item, so as to avoid potential confusion.

Mean scores for Openness were higher than those for the other personality factors, and higher than those obtained from German 18-29-year-olds ($M= 3.50$, $SD .85$; Rammstedt, 2007), according to population norms. These findings support existing evidence of an association between musicianship and Openness (Butkovic & Rancic, 2017; Greenberg et al., 2015; Rose et al., 2019; Vaag et al., 2017). Women's higher scores for Neuroticism confirm the results of studies carried out in 22 countries with participants in a range of age groups (Mac Giolla & Kajonius, 2019), corresponding with higher levels of MPA (Kenny et al., 2014; Papageorgi et al., 2013), and a greater prevalence of anxiety disorders among women

in the general population (McLean et al., 2011). No significant associations were found between personality and instrument played, in contrast to the findings of Langendörfer (2008) and Vaag et al. (2017). Both involved the participation of adult professional musicians, while respondents in the current study were music students who might not yet have invested sufficient time in forming a relationship with their instrument for significant associations between personality type and instrument to emerge (Simoens & Tervaniemi, 2013).

In this first investigation of the role of personality in music students' health-promoting behaviours, personality was found to significantly predict health-promoting behaviours, with Conscientiousness the most consistent significant predictor of mean total health-promoting behaviours, Health Responsibility, Nutrition, Physical Activity, and Spiritual Growth. In other research, Conscientiousness has been found to be a significant positive predictor of a diverse range of health-promoting behaviours in a variety of different populations (Friedman & Kern, 2014; Lodi-Smith et al., 2010; Strickhouser et al., 2017), including physical and mental health and wellbeing (Ebstrup et al., 2011; 2013; Lockenhoff et al., 2011; Pisarek et al., 2011; Strobel et al., 2011), nutrition (Bogg & Roberts, 2013; Intiful et al., 2019; Raynor & Levine, 2009), and physical activity (Allen & Laborde, 2014; Joyner & Lop, 2018; Raynor & Levine, 2009; Rhodes & Boudreau, 2017). In the current study, Extraversion was a significant positive predictor of mean total health-promoting behaviours, Health Responsibility, Spiritual Growth and Interpersonal Relationships, supporting previously reported associations between Extraversion and physical activity (Allen & Laborde, 2014; Ebstrup et al., 2013; Lockenhoff et al., 2011; Rhodes & Boudreau, 2017; Wilson & Dishman, 2015), and mental health and wellbeing (Albuquerque et al., 2012; Lucas, 2018; Ozer & Benet-Martínez, 2006; Strobel et al., 2011). The finding that Agreeableness was a significant positive predictor of Stress Management, Spiritual growth and Interpersonal Relationships supports previously reported positive associations between

Agreeableness and life satisfaction and wellbeing (Strickhouser et al., 2017; Strobel et al., 2011), and a negative association between Agreeableness and stress (Ebstrup et al., 2011). Previous studies have explored potential associations between Openness and health-promoting behaviours but found none (see Strickhouser et al., 2017 for overview); likewise, no significant associations were found in the current study between Openness and health-promoting behaviours.

Existing evidence of associations between Neuroticism and health-promoting behaviours is inconsistent. Whereas some studies provide evidence of significant associations between Neuroticism and a variety of health behaviours (see Strickhouser et al., 2017), both physical (Allen & Laborde, 2014; Ebstrup et al., 2011; 2013; Lockenhoff et al., 2011) and mental (Lucas, 2018; Ozer & Benet-Martinez, 2006; Pisarek et al., 2011), other studies found no such evidence (Raynor & Levine, 2009; Rhodes & Boudreau, 2017). In the current study, a weak negative correlation between Neuroticism and Stress Management was found, reflecting the positive association between Neuroticism and MPA identified by Smith and Rickart (2004) and Thomas and Nettlebeck (2014). When the contribution of background variables and general self-efficacy were controlled for in the regression analyses, however, Neuroticism was not found to predict Stress Management; similarly, Langendörfer et al. (2006), had not found Neuroticism to predict MPA. It is possible that the role of self-efficacy may be able to account for these inconsistent findings.

Associations Between Personality, General Self-efficacy, and Health-promoting Behaviours

The finding that general self-efficacy was significantly predicted by Conscientiousness, Extraversion and Neuroticism is similar to those of previous studies in a variety of domains (Brown & Cinamon, 2016; Judge & Ilies, 2002; Marcionetti & Rossier, 2016), and the positive moderate-to-strong associations between general self-efficacy and music students' health-promoting behaviours also confirm previous findings (Ginsborg et al.,

2008; Kreutz et al., 2008; Panebianco-Warrens et al., 2015). The finding that general self-efficacy mediated associations between both Conscientiousness and Neuroticism and music students' health-promoting behaviours also reflected existing findings: general self-efficacy has been found to be a significant mediator of associations between both Conscientiousness and Neuroticism and a wide range of outcome variables, including physical and mental health behaviours (Ebstrup et al., 2011, 2013; Lockenhoff et al., 2011; Strobel et al., 2011), sports performance (Merrit & Tharp, 2013; Zhang et al., 2019), and academic performance (Caprara et al., 2011). One explanation for the inconsistently reported associations between Neuroticism and health-promoting behaviours and MPA (e.g., Langendörfer et al., 2006), mentioned above, is that Neuroticism may have an *indirect* effect on health behaviours, through self-efficacy (Path *ab* in Figure 1). A second explanation is that other variables, not included in these analyses, affect health-promoting behaviours. To test these explanations, it is recommended that future studies of the associations between personality, self-efficacy, and health-promoting behaviours take a structural equation modelling (SEM) approach and use a larger sample of respondents. This would enable additional variables such as self-regulation and hours of practice, not included in the current study, to be taken into account. Such an approach might also explain a greater amount of variance in some of the health-promoting behaviours, such as Physical Activity; in the current study, the full model could only account for 10% of the variance.

Given the high prevalence of physiological and psychological problems among professional and student performing musicians (Ackerman et al., 2014; Ginsborg et al., 2009; Kenny et al., 2014), it has been recommended that music students should learn about health-promoting behaviours and be encouraged to adopt them (Araujo et al., 2017; Spahn et al., 2017). Nevertheless, one rigorously designed study evaluating such a course, using a variety of pre/post-test measures, found no evidence of improvements in music students' reported

health-promoting behaviours after six months or a year, although their perceived knowledge of the topics included in the course had increased (Matei et al., 2018). Similarly, a longitudinal multicentre study of music students' health status and preventative health behaviours showed that, even though they had taken health education courses as an integral part of their studies (Spahn et al., 2017), many students still did not engage in health-promoting behaviours. Health promotion has been defined as a process that encourages "people to increase control over, and to improve their health" (Rootman et al., 2001, p. 13). According to Social Cognitive Theory, "self-efficacy beliefs operate together with goals, outcome expectations, and perceived environmental impediments and facilitators in the regulation of human motivation, behaviour, and well-being" (Bandura, 2004). Thus it may be that music students need help to increase their belief in their own capacity for organising and executing the courses of action that are required (Bandura, 1997) if they are to improve and maintain their use of health-promoting behaviours. Studies of health-promoting interventions in a variety of fields (Ebstrup et al., 2011; Schopp et al., 2015; Strathdee et al., 2009) have shown that improving general self-efficacy can increase health-promoting behaviours. The findings of the current study suggest that interventions designed to teach techniques for raising general self-efficacy could be a powerful tool for improving music students' adoption of health-promoting behaviours.

General rather than task- or domain-specific self-efficacy was measured in the current study for the purposes of examining it in relation to a range of health-promoting behaviours (Luszczynska et al., 2005), and comparing new findings with those of previous studies of music students' health-promoting behaviours (Ginsborg et al., 2009; Kreutz et al., 2008; Matei et al., 2018; Panebianco et al., 2015). Luszczynska et al. (2005) have shown positive correlations between measures of task- and domain-specific self-efficacy and general self-efficacy. On the one hand, a finer-grained understanding of the associations between

personality, self-efficacy and health-promoting behaviours could have been derived from an analysis of correlations between domain-specific measures of self-efficacy and each of the six health-promoting behaviours included in the HPLP II. On the other hand, however, this would have had the disadvantage of increasing the length of the questionnaire to such an extent that respondents might have experienced participant fatigue.

Previous research on the occupational health problems of South African undergraduate students has indicated that their health-promoting behaviours, and in particular the health-promoting behaviours of music students (Panebianco-Warrens et al., 2015; Panebianco 2017), are comparable with those identified in international studies (Ajidahun & Phillips 2013; Barnes et al., 2011). Performing artists in South Africa lack awareness of medical issues (Devroop, 2014), and Rennie-Salonen and De Villiers (2016) argue that tertiary training for performance in South Africa should include Performing Arts Medicine. The finding in the current study that respondents at the University of Cape Town scored higher for health-promoting behaviours and general self-efficacy than respondents at other universities, particularly the University of Pretoria, was unexpected, and might be explained by a combination of ethnic, cultural, and geo-physical factors. South Africa has a diverse ethnic population, and a multilingual language policy stating that everyone has the right to receive education in the official language(s) of their choice, provided there is a demand and it is economically justifiable (Mutasa, 2015). The University of Cape Town is generally regarded as a pioneering multi-cultural university; it was one of the first to designate English as the primary language of instruction. By comparison, the two primary official languages of instruction at the more traditional University of Pretoria and the University of Stellenbosch were still Afrikaans and English until very recently (Mutasa, 2015). It may also be that the proximity of the University of Cape Town campus to the sea and to nature encourages students to engage in physical activity to a greater extent than at the other universities, which

are further inland. Perhaps cultural and ethnic differences in the student population contributed to the differences between levels of health-promoting behaviours reported by respondents at the University of Cape Town and the other universities. Future investigations of students at South African universities should include the collection of data on ethnicity, so that this potential source of variance can be examined. Other limitations of the study include its correlational nature, making it difficult to draw firm conclusions about directions of causality, and the relatively small size of sample, although it was comparable to those used in previous studies of music students' health-promoting behaviours (Matei et al., 2018; Panebianco-Warrens et al., 2015).

To conclude, the current study aimed to carry out a first investigation of the associations between music students' Big Five personality traits, general self-efficacy and reported health-promoting behaviours. It found that Conscientiousness was the most consistent significant predictor of health-promoting behaviours, and that general self-efficacy was a significant mediator of the associations between both Conscientiousness and Neuroticism and health-promoting behaviours, suggesting that interventions designed to teach techniques for raising general self-efficacy could be a powerful tool for improving music students' adoption of health-promoting behaviours. Further investigations should therefore be carried out to examine the effectiveness of methods for increasing general as well as domain-specific self-efficacy as an integral part of courses aimed to promote tertiary music students' health-promoting behaviours. Such courses could support future generations of classical musicians by encouraging them to adopt behaviours that will allow them to lead physically and psychologically robust lives as active, healthy performing musicians.

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