

Openness to World Music Predicts Adaptation to a New Culture among Student Sojourners

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ABSTRACT: Student sojourners temporarily live in a foreign country to pursue higher education. Research has shown that student sojourners' openness to new experience and cultural values predict their adaptation to the host culture. However, it is unclear whether music – a major medium of cultural communication – also plays a role in adaptation to a host culture. This study examined whether student sojourners' *world music open-earedness* (a willingness to explore, listen to, tolerate, and learn about music from diverse cultures) and *functions of music in intercultural settings* (the psychosocial reasons people engage with music) predict psychological and sociocultural adaptation. Seventy-six student sojourners in Australia reported their musical inclinations and adaptation to Australian society. *World music open-earedness* was significantly correlated with psychological and sociocultural adaptation. However, multiple regression modelling revealed that after statistically controlling for personal characteristics (e.g., age, musical training), personality traits (e.g., openness), and acculturation strategies, psychological adaptation was predicted by the music functions 'arousal and activation' and 'self-reflection', whereas sociocultural adaptation was predicted by *world music open-earedness* and the music function 'arousal and activation'. Mechanisms that account for these associations and implications for identifying at-risk international students are discussed.

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STUDENT sojourners are people who temporarily live in a foreign country to pursue higher education (Anderson & Guan, 2017). Student sojourners comprised 22.2% of the migrant arrivals in Australia in 2020 (Australian Bureau of Statistics, 2021), and this number is expected to grow over the next few decades as restrictions from the COVID-19 pandemic begin to ease. Compared to immigrants with permanent residence status, student sojourners often only live in their host country for the duration of their studies. This relatively short period of time may reduce their motivation to actively participate in their new social and cultural environment or to develop close relationships with local people (Berry et al., 2011). Research suggests that student sojourners in Australia often have depressive symptoms, acculturative stress, and difficulty adjusting to the host country (Schofield et al., 2016; Smith & Khawaja, 2011). Therefore, it is important to identify factors that are related to student sojourners' well-being and positive adjustment to their new environment. To this end, the current study examines whether student sojourners' musical inclinations can predict their psychological and sociocultural adaptation to Australian society. Two specific musical inclinations are



investigated: 1) world music open-earedness; and 2) functions of music in intercultural settings. We discuss these two musical inclinations in more detail after briefly reviewing the concepts of psychological and sociocultural adaptation.

Psychological and Sociocultural Adaptation

Adaptation is defined as “the long-term ways in which people rearrange their lives and settle down to a more-or-less satisfactory existence” (Berry, 2006, p. 52). Its nature is highly variable, ranging from positive outcomes such as life satisfaction, to negative outcomes such as depression. Psychological adaptation and sociocultural adaptation are two constructs of adaptation that are most relevant in a cross-cultural context. Positive psychological adaptation is characterised by overall life satisfaction and psychological well-being in response to cross-cultural transitions (Berry et al., 2011; Zhang et al., 2010). It can be predicted by one’s age, gender, education, cultural values, personality, self-efficacy, acculturation strategies, and social support (Berry, 2006; Ozer, 2015). Sociocultural adaptation refers to one’s ability to acquire and perform effective social skills in the host culture (Wang & Mallinckrodt, 2006). Sojourners’ confidence in using a second language, willingness to communicate with host nationals, cultural intelligence, cultural distance, and length of residence in the host culture can all have an impact on sociocultural adaptation (Berry et al., 2011; Masgoret & Ward, 2006). It is yet to be determined whether cross-cultural musical inclinations such as world-music open-earedness may also have an impact on psychological and sociocultural adaptation.

World Music Open-Earedness

The concept of open-earedness was first introduced by Hargreaves (1982) to describe the way young children are open to styles of music that adults might hear as foreign, unsophisticated, or unconventional. That is, children are less susceptible to the effects of *acculturation* in music appreciation. Louven (2016) subsequently applied the concept to people of all ages, defining open-earedness as a willingness to engage with unfamiliar, novel, or unusual music, which includes tolerance for unfamiliar or disliked music, and an openness or desire to engage with novel and unfamiliar musical situations. Hargreaves and Bonneville-Roussy (2017) suggested that open-earedness may also include an immediate inclination to explore new forms of music and a tendency to enjoy a wide range of musical styles. Drawing upon these descriptions, the current study defined open-earedness as *the willingness to explore, listen to, tolerate, and learn about various kinds of novel and unfamiliar music*.

Why should open-earedness predict adaptation to Australian society? A central factor is the intimate connection between music and identity. Homology models of this link argue that music mirrors cultural values and attitudes, whereas process models suggest that social groups come to know themselves through cultural activities such as music engagement and aesthetic judgement (Frith, 1996). That is, not only does music function to express cultural identity; it is also used to help transform established cultural identities (Lidskog, 2017).

It is tempting to assume that open-earedness is merely an instance of the broader personality trait of openness. However, we argue that open-earedness plays a distinctive role in cultural adaptation because music is an explicit expression of culture, whereas the personality trait of openness is broader and not culture-specific. Nonetheless, empirical data show that among the ‘Big Five’ personality traits (openness, conscientiousness, extroversion, agreeableness, and neuroticism), openness is the best predictor of psychological acculturation and adaptation (Berry, 2006; Mak & Tran, 2001; Swagler & Jome, 2005; Van der Zee et al., 2016; Zhang et al., 2010). For this reason, we statistically accounted for openness in our assessment of the significance of open-earedness.

Why should openness facilitate cultural adaptation? Kosic (2006) argued that individuals with higher openness have fewer rigid opinions, so are more likely to learn about a different culture and adjust their behaviour to be more consistent with the norms of the host culture. Openness is the only ‘Big Five’ trait that can predict cultural intelligence – the capability of effectively adapting to a culturally diverse environment (Ang et al., 2006). Furthermore, openness is the only intercultural trait that can predict all three key intercultural adjustments (i.e., life satisfaction, intercultural interaction, sociocultural adjustment; Ali et al., 2003). Openness is also a predictor of migrant students’ perceived self-efficacy when interacting with local people (Mak & Tran, 2001), which in turn has been shown to facilitate adaptation to a new culture (Zhang & Goodson, 2011).

Research has also revealed an association between openness and music preference (Dunn et al., 2011; Ladinig & Schellenberg, 2012; Langmeyer et al., 2012; Rawlings & Ciancarelli, 1997; Rentfrow & Gosling, 2003; Schäfer & Mehlhorn, 2017; Vella & Mills, 2016). For example, a meta-analysis showed that participants higher in openness were more open to listening to new music genres (Schäfer & Mehlhorn, 2017). Hargreaves and Bonneville-Roussy (2017) also found an association between individuals' openness and the quantity of preferred music genres. Dunn et al. (2011) reported that aesthetic openness and openness to new ideas were positively correlated with the duration of listening to jazz music. Similarly, Yoo et al. (2017) examined American participants' preference for world music, defined as ethnic, folk and/or pop music that is not influenced by European or Western music traditions (Olsen, 1992; Rahkonen, 1994), and found that openness was positively correlated to world music preferences.

In short, the personality trait of openness is associated with both cultural adaptation and musical preferences. However, these statistically reliable associations are modest, at best. For example, in the analysis by Hargreaves and Bonneville-Roussy (2017), openness and age jointly explained just 7% of the total variance in the number of liked musical genres. Thus, we argue that open-mindedness, as an explicit instantiation of cultural openness, should predict cultural adaptation over and above the relevance of the broad personality trait of openness. Evidence suggests that world music preferences are related to multicultural attitudes. Fung (1994) found that individuals' preferences for world music were correlated with their interest in engaging with different racial/ethnic groups, preference for social diversity, and multicultural opinions. In addition, Bryson (1996) proposed that music preferences can be used to identify symbolic boundaries including social group identity. Thus, world music open-mindedness may indicate an open social identity. Furthermore, Paredes (2021) regarded the acceptance of cultural objects and experiences as the "backbone" of *cultural omnivorousness* – a construct first introduced by Peterson (1992) to characterise people with broad cultural tastes and interests. Omnivorous people have tastes that transcend age, gender, class, ethnicity, and religious boundaries (Peterson, 2005), and are willing to accept new objects and experiences (Warde et al., 2007). Given that musical omnivorousness is another key aspect of open-mindedness (Hargreaves & Bonneville-Roussy, 2017), world music open-mindedness is likely related to an acceptance of cultural differences, and hence should predict student sojourners' psychological and sociocultural adaptation to a new culture.

Functions of Music in Intercultural Settings

In addition to world music open-mindedness, music's capacity to serve different psychosocial functions in intercultural settings may also impact psychological and sociocultural adaptation. Music can function in several different ways that are relevant to intercultural settings. For example, listeners use music to enhance peer interactions, manage and regulate emotions, and explore and express identity (Giles et al., 2009; Schäfer & Sedlmeier, 2009, 2010; Tekman & Hortaçsu, 2002; Vidas et al., 2021). These functions of music align with known contributors to intercultural effectiveness: stability of emotion, flexibility in managing stress, degree of involvement in the host culture, and knowledge about one's own culture (Berry, 2006). In addition, music listening can function to help listeners achieve socio-cultural goals (e.g., arousal and mood regulation, social relatedness, and self-awareness; Schäfer, 2016). Furthermore, two motivations of music listening – 'mood regulation' and 'agency and identity' (e.g., personality expression, self-esteem improvement) – significantly predict psychological well-being (i.e., self-acceptance, personal growth, positive and negative affect; Laukka, 2007). The personality trait *openness* predicts adaptive emotional uses of music such as the enjoyment of mood-congruent music (Eerola et al., 2018; Ferwerda et al., 2015; Ladinig & Schellenberg, 2012; Thompson & Olsen, 2018; Vella & Mills, 2016; Vuoskoski et al., 2012). Thus, student sojourners' inclinations to use music for adaptive outcomes might also influence psychological and sociocultural adaptation. Five common psychosocial functions of music were assessed: 1) communication; 2) self-reflection; 3) mood and emotion; 4) arousal and activation; and 5) cultural expression (Schäfer & Sedlmeier, 2010).

To evaluate whether world music open-mindedness and the five psychosocial functions of music independently contribute to psychological and sociocultural adaptation, we established the following hypotheses. First, we hypothesised that among student sojourners in Australia, higher open-mindedness to world music should predict greater psychological adaptation (H1a) and sociocultural adaptation (H1b). Second, we hypothesised that higher scores in the five functions of music (communication, self-reflection, mood and emotion, arousal and activation, cultural expression) should predict greater psychological adaptation (H2a) and sociocultural adaptation (H2b). We also measured and statistically controlled

demographic variables (e.g., age, gender, nationality, education level, length of residence in Australia, music training background, and English proficiency), familiarity with the music stimuli used in the study, heritage and mainstream acculturation strategies, personality variables, tendency for open-mindedness, and collectivist/individualist values (described below).

METHODS

Participants

Seventy-six participants ($M = 24.92$ years, $SD = 4.63$, range = 18 to 37 years; 53 females) participated in this study. Fifty-eight participants were born in Asia; three were born in Africa; four were born in South America; five were born in North America; six were born in Europe. Thirty-seven were undergraduate students and 39 were postgraduate students. The mean length of residence in Australia was 2.64 years ($SD = 1.6$, range = 8 months to 9 years). Thirty-eight participants had received individual one-on-one musical training. All participants were recruited through recruitment flyers posted on internet forums (e.g., the School of Psychological Science's first-year student participant pool at Macquarie University, Facebook groups, and email lists) or invitation emails sent to the International Offices or International Student Associations of 29 universities across Australia. Eligibility criteria required participants to be living in Australia but not born in Australia, to be 18 years old or above, and to currently hold an Australian student visa.

The G*Power 3.1 software package (Faul et al., 2009) was used to calculate the expected sample size for linear multiple regression (fixed model, R-square deviation from zero) to reach the statistical power. With the parameters of $f^2 = .25$ (medium-large effect), $\alpha = .05$, power = .80, and number of predictors = 8 (i.e., age, length of residence in Australia, perceived English fluency, the familiarity with world music, openness to world music, openness to experience, acculturation strategy, and collectivist values), the estimated sample size required to reveal a medium effect size was 69.

Music Stimuli

To assess preferences for world music and diverse musical cultures, past research has used the World Music Preference Rating Scale (WMPRS – Fung, 1996) and the Musical Preferences Questionnaire (MPG – Gilboa, et al., 2009). However, the music samples included in these scales are not sufficiently representative of world music, as the WMPRS only represents the music of major ethnic groups in America, while the MPG focuses on musical cultures in Israel. Thus, the current study created and validated a new scale of world music preference.

First, music pieces were extracted from “The Ethnic Sampler” (SONOTON Production Music, 1989a, 1989b, 1994a, 1994b, 1997, 1998), which contains music from Africa, South America, Southeast Asia, South Asia, the Middle East, East Asia, and Oceania. These albums included authentic ethnic music performed by local performers on original instruments in the country of origin. The initial pool of stimuli contained 75 music pieces after excluding music from European countries and North America, and including instrumental music pieces only, so the influence of language and gender of the singer on music preferences could be controlled (Fung, 1994). Some musical parameters have previously been shown to affect music preference ratings (e.g., rhythm, timbre, tonality, tempo; Schäfer & Sedlmeier, 2010; Williams, 2016). To enable an objective comparison of the pieces, the MIR toolbox (Lartillot et al., 2008) was used in Matlab (version R2018b) to calculate the temporal distribution of energy, brightness, tempo, and rhythmic clarity. The Timbre Toolbox (Peeters, et al., 2011) was used in Matlab to calculate the zero-crossing rate, effective duration, temporal centroid, inharmonicity, noisiness, odd-to-even harmonic energy ratio, harmonic spectral deviation, noise energy, and spectral parameters of the harmonic sinusoidal partials (i.e., spectral centroid, spectral spread, spectral skewness, spectral kurtosis, spectral decrease, spectral roll-off, spectro-temporal variation). BPM Finder 1.1.1.0 (Fei, n.d.) was used to estimate the music tempo manually. Music pieces with two standard deviations below or above the means of all other music pieces in at least one of the above parameters were excluded. At this point, 37 music pieces were excluded from the initial sample of 75.

Next, a pilot study was conducted to finalize the pool of music samples to be used in the main study. To match the loudness and duration across pieces, the first 30 seconds of each music piece was extracted, and the intensity of each excerpt was scaled to 70dB using Praat (version 6.1.08). Twenty-four first-year psychology students ($M = 23$ years; 19 females) listened to each 30-second music excerpt and were asked to

indicate whether they had heard it before, and to rate their preference for it on a 7-point Likert scale. One excerpt was excluded because over 40% of participants indicated they had heard it before. This ensured that the novelty of music excerpts was comparable across stimuli in the final sample. Two additional music excerpts were excluded because their consistency index[2] was lower than 0.2. Correlations were also calculated between one excerpt and the total scores of its corresponding region of the world. Three excerpts in each world region with the highest correlations were selected for the main survey. This process resulted in a final sample of 21 music excerpts, with three excerpts representing each of the following regions: Africa, South America, Southeast Asia, South Asia, the Middle East, East Asia, and Oceania (Table 1). Cronbach's alpha revealed a high internal consistency among the excerpts ($\alpha = .94$).

Table 1: List of world music excerpts in the World Music Open-earedness Scale

Title	Album
<i>Africa</i>	
Herd Migration	The Ethnic Sampler, Vol.1 (1989)
Mhuba	The Ethnic Sampler, Vol.1 (1989)
Song of Zaire	The Ethnic Sampler, Vol.1 (1989)
<i>East Asia</i>	
Autumn-fete	The Ethnic Sampler, Vol.1 (1989)
Fantasy of Waves	The Ethnic Sampler, Vol.1 (1989)
Poem of Crickets	The Ethnic Sampler, Vol.1 (1989)
<i>Middle East</i>	
Aiki	The Ethnic Sampler, Vol.3 (1994)
Kerbala Scene	The Ethnic Sampler, Vol.3 (1994)
Toumbalalaika	The Ethnic Sampler, Vol.5 (1997)
<i>Oceania</i>	
Didgeridoo Morning	The Ethnic Sampler, Vol.1 (1989)
Dingo	The Ethnic Sampler, Vol.1 (1989)
Tahitian Drums	The Ethnic Sampler, Vol.2 (1989)
<i>South America</i>	
A Nova Estrela	The Ethnic Sampler, Vol.3 (1994)
Bailecitos	The Ethnic Sampler, Vol.2 (1989)
Mayo Pata Retamita	The Ethnic Sampler, Vol.2 (1989)
<i>South Asia</i>	
Marathi	The Ethnic Sampler, Vol.5 (1997)
North Indian Wedding	The Ethnic Sampler, Vol.5 (1997)
Santoor Solo	The Ethnic Sampler, Vol.5 (1997)
<i>Southeast Asia</i>	
Legong Dance	The Ethnic Sampler, Vol.1 (1989)
Sita Bride	The Ethnic Sampler, Vol.1 (1989)
Khamae Keao	The Ethnic Sampler, Vol.4 (1994)

Measures

PSYCHOLOGICAL ADAPTATION

The 10-item Schwartz Outcome Scale (SOS-10; Blais et al., 1999) was used to assess participants' overall psychological adjustment over the last week on a 7-point Likert scale (1 = never, 7 = all of the time). This scale has high convergent and divergent validity correlations with positive affect, negative affect, life satisfaction, and psychiatric symptoms. An example of an item on the scale is: "My life is progressing

according to my expectations” (Blais et al., 1999, p. 372). The scale had high reliability in the current study with, as measured by Cronbach's alpha ($\alpha = .89$).

SOCIOCULTURAL ADAPTATION

The 29-item Sociocultural Adaptation Scale (SCAS; Ward & Kennedy, 1999) was used to assess student sojourners' intercultural competence in the host culture. The scale contains situations that sojourners may experience in a foreign country. Participants were asked to rate the difficulty of each situation they had experienced when in Australia, on a 5-point scale (1 = no difficulty, 5 = extreme difficulty). Sample items include: “making friends”, “understanding jokes and humour”, and “adapting to local accommodation”. Cognitive items were also included (e.g., “understanding the locals' world view”). The construct validity was confirmed by the significant correlation with depression (Ward & Kennedy, 1999). The scale can significantly distinguish sojourners from locals and has been used in many acculturation studies (e.g., Swagler & Jome, 2005; Zhang et al., 2010). Cronbach's alpha for the scale was estimated to be .92 in the current study, indicating high reliability.

WORLD MUSIC OPEN-EAREDNESS

After listening to each 30-second excerpt of music, participants provided five ratings: (1) preference: I like this music; (2) familiarity: I am familiar with this music; (3) exploration: I would like to listen to more of this kind of music; (4) cultural learning motivation: I would like to learn about the culture that this music belongs to; (5) tolerance: If I heard this music in a random playlist for the first time, I would likely listen to what percentage of the music before skipping to a different song. The first four statements were rated on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree), while the last statement required a percentage value, which was obtained using a slider from 0-100. The reliability coefficients were high across these five items (α 's $\geq .91$).

To calculate an overall world music open-earedness (OE) score for each participant, a principal component analysis (PCA) was conducted on four of the above items – preference, exploration, cultural learning motivation, and tolerance. This resulted in a component score per participant, ranging from -2.58 to 2.41. This principal component score represents a linear combination of the four standardised items, and explains 77% of the total variability in the four original items. To account for the effect of familiarity, we calculated the OE score as the component score divided by the familiarity rating. Using this metric of OE, a negative score signifies relatively low OE compared to the sample of participants, while a positive score signifies relatively high OE. OE across the sample was not normally distributed.

FUNCTIONS OF MUSIC IN INTERCULTURAL SETTINGS

To assess participants' inclinations towards various uses of music in Australia, the current study adapted the scale developed by Schäfer and Sedlmeier (2010) that includes five psychosocial functions of music: (a) communication (e.g., “this music can express my personal values”); (b) self-reflection (e.g., “this music helps me perceive my thoughts and feelings more intensely”); (c) mood and emotion (e.g., “this music can put me in a good mood”); (d) arousal and activation (e.g., “this music puts me into a comfortable or optimal state of arousal”); and (e) cultural expression (e.g., “this music can express and convey our culture very well”). For the purpose of the current study, these scales were adapted to include an intercultural context. For example, “this music expresses my personal values” was adapted to “After residing in Australia, I prefer to use music to express my personal values”. This adapted scale had 23 statements, which were rated on 7-point Likert scales (1 = strongly disagree, 7 = strongly agree). In the current study, the reliability of these five functions was acceptable: $\alpha = .78$ for ‘arousal and activation’, $\alpha = .84$ for ‘mood and emotion’, $\alpha = .86$ for ‘communication’, $\alpha = .75$ for ‘self-reflection’, and $\alpha = .81$ for ‘culture’.

ACCULTURATION STRATEGIES

Individuals often identify with two or more cultures (Berry et al., 2011). For example, sojourners can identify with their home culture (heritage acculturation) and simultaneously with a new culture (mainstream acculturation). These two kinds of acculturation strategies are related to student sojourners' psychological and sociocultural adaptation to their new culture (Taušová et al., 2019; Zhang et al., 2010), and were statistically controlled in the current study. To measure participants' acculturation strategies, the Vancouver

Index of Acculturation (VIA; Ryder et al., 2000) was adapted to measure student sojourners' bi-dimensional identification with their heritage culture and their Australian culture. Participants were shown ten paired statements; one asking about their heritage culture and the other asking about Australian culture. These ratings were collected on a 9-point Likert scale (1 = strongly disagree, 9 = strongly agree). For example, in one pair, one statement pertained to the heritage culture ("I believe in the values of my heritage culture"), while the other was about the Australian culture ("I believe in the mainstream Australian values"). A higher score on one statement represents higher identification with the corresponding culture. This scale has been widely used to investigate the relationships between personality, acculturation, and adjustment in a host culture (Swagler & Jome, 2005; Zhang et al., 2010). In this study, the scale had good internal consistency: $\alpha = .81$ for heritage acculturation and $\alpha = .84$ for mainstream acculturation.

BIG FIVE PERSONALITY TRAITS

The Big Five Inventory (i.e., openness to experience, conscientiousness, extroversion, agreeableness, and neuroticism), a measure of personality traits, is one of the most frequently studied personality predictors of adaptation. For example, Zhang et al. (2010) revealed that for Chinese international students in Germany, neuroticism and conscientiousness predict depression, self-esteem, and life satisfaction, whereas extroversion predicts life satisfaction, and openness to experience predicts self-esteem. A strong relationship between music preferences and the Big Five personality traits has also been reported (George et al., 2007; Langmeyer et al., 2012; Rentfrow & Gosling, 2003).

The Ten-Item Personality Inventory (TIPI; Gosling, et al., 2003) was used to examine the 'Big-Five' personality traits in the current study. Each trait was assessed by two opposite descriptors. For instance, the two descriptors used for extraversion were "extraverted, enthusiastic" and "reserved, quiet". Gosling et al. (2003) reported that this scale has a relatively high convergent correlation with the original 44-item Big-Five Inventory (John & Srivastava, 1999).

OPEN-MINDEDNESS

This study examined four aspects of open-mindedness that are most likely associated with world music open-mindedness and adaptation outcomes: tolerance, openness to diversity, curiosity about music from diverse cultures, and openness to experience (as measured by the Big Five Inventory).

Tolerance was examined using the Six-facet Openness Scale (Woo et al., 2013), which assessed participants' interests in learning about and tolerating different ideas, cultures, and experiences (e.g., "I feel that an opportunity to learn about the cultures of others is something to be treasured"). The scale had high internal consistency reliability ($\alpha > .80$), high correlations with the Openness/Intellect factor in the Big Five Factor, and equivalent psychometric properties across nations (Christensen et al., 2018; Woo et al., 2013). Reliability of the tolerance facet was high in the current sample with $\alpha = .75$.

Openness to diversity was also examined, as it can mediate the indirect effect of open-mindedness on psychological adjustment (Yakunina et al., 2012). It was assessed using the short form of the Miville-Guzman Universality-Diversity Scale (M-GUDS-S; Fuertes et al., 2000), focusing on two components: (a) *diversity of contact* (the desire to engage in social and cultural activities that are diverse and international; e.g., "I often listen to the music other cultures"), and (b) *comfort with differences* (the extent of comfort with diverse people; e.g., "It is really hard for me to feel close to a person from another race"). There were five items for each component (10 items in total). In the current study, this scale had an acceptable coefficient of reliability, with $\alpha = .71$ for the diversity of contact and $\alpha = .79$ for comfort with differences.

Curiosity about music from diverse cultures was assessed on a 7-point Likert scale using four items, which were adapted from the Interest/Deprivation Epistemic Curiosity model (I/DE; Litman, 2008): (a) "I enjoy exploring music from diverse cultures", (b) "I enjoy listening to music that is unfamiliar to me", (c) "I find it fascinating to listen to music from diverse cultures", and (d) "When I listen to music from another culture, I would like to find out more about it". The Cronbach's alpha showed that this adapted scale had an internal consistency of $\alpha = .85$. *Openness to experience* from the Big-Five personality traits was measured by the TIPI (see above for more detail).

Given that the inclusion of all five measures of open-mindedness in models of regression may increase the probability of multicollinearity, we attempted to reduce the number of factors by conducting a Maximum Likelihood Factor Analysis with oblique promax rotation on responses to all five factors (i.e., tolerance, diversity of contact, comfort with differences, curiosity, and openness to experience). The Kaiser-

Meyer-Olkin measure of factor adequacy was .50, and Bartlett's test of sphericity was significant, $\lambda^2(10) = 111.66, p < .001$. However, the openness to experience factor in the TIPI was discarded as it failed to meet the factor loadings cutoff of loading onto the primary factor above .4 and no cross-loading of .2 or above (Howard, 2015). As can be seen from the pattern matrix in Table 2, results from the parallel analysis showed that there were two factors of open-mindedness. According to the primary factor loadings of these two factors, factor 1 reflected interests in diverse music and participation in activities that involve diverse cultures; whereas factor 2 reflected tolerance to and comfort with different races, ideas, and experiences. Thus, the two new open-mindedness factors were named as *openness to activity* (OA) and *tolerance to difference* (TOD), respectively. For each participant, the means of these two factors were calculated.

Table 2. Principal Component Analysis for Open-mindedness

Open-mindedness Scales	Factor 1	Factor 2
Diversity of contact (Fuentes et al., 2000)	.97	.09
Curiosity to music from diverse cultures	.72	-.07
Tolerance (Woo et al., 2013)	.14	.96
Comfort with differences (Fuentes et al., 2000)	-.08	.66
Eigenvalues	2.05	1.33
Percentage of the total variance (%)	38	35

INDIVIDUALIST-COLLECTIVIST VALUES

Australia is predominantly an individualist culture, yet 61% of international students in Australia are from collectivist cultures in Asia (Australian Government, 2021). Some studies suggest that acculturation stress can occur when individualistic and collectivist cultures come together. For example, migrants with collectivist values had difficulties acculturating to American society (Gomez, 2003), but had little difficulty acculturating to Korean society (Oh et al., 2014). Given that most international students in Australia come from collectivist cultures, it is reasonable to assume that they will encounter challenges in adapting to Australian society. Therefore, individualist-collectivist values were also measured and controlled in the statistical models. These values were assessed using the 8-item Asian Cultural Collectivism Scale (Oh et al., 2014) [3] on a 7-point Likert scale (1 = strongly disagree, 7 = strongly agree), where a higher score indicates collectivism and a lower score indicates individualism. A sample item from the scale is: "One should think about one's group before oneself". The reliability coefficient was .86 in the current study.

DEMOGRAPHIC QUESTIONNAIRE

A demographic questionnaire was used to record participants' age, gender, nationality, education level, length of residence in Australia, music training background, and self-perception of English proficiency. For their self-perception of English proficiency, participants were asked to indicate whether English is their native language. If not, they were asked to rate their ability of speaking, understanding, reading, and writing English on a 5-point scale.

Procedure

The study was completed online using the Qualtrics online survey platform. Informed consent was provided by participants before completing the study. Participants first answered a number of screening questions to confirm eligibility. The demographic questionnaire was then administered, followed by the music listening task. This task comprised 21 randomly presented trials, for which participants were advised to use headphones, if possible, at a comfortable loudness level. Each trial included one 30-second excerpt of music. After each excerpt, participants rated the five statements regarding preference, familiarity, exploration, cultural learning motivation, and tolerance.

After the music listening phases of the study, participants completed the remaining scales: the functions of music in intercultural settings, acculturation strategies, psychological adaptation, sociocultural adaptation, big five personality (TIPI), tolerance to difference, openness to diversity, curiosity about music from different cultures, and individualist-collectivist values. The study took approximately 45 minutes to

complete and was approved by the Human Research Ethics Committee at Macquarie University (reference number: HREC 52021951328092).

Data Analysis

Participants were not required to answer each question, so responses of “I don’t want to answer this question” were coded as missing values, which accounted for only .04% of the final data set. Backward elimination with Akaike Information Criterion (AIC) as the criterion was performed to obtain the most parsimonious models for psychological adaptation and sociocultural adaptation. Demographics (i.e., age, gender, education level, length of residence in Australia, confidence in English, musical training experience), acculturation strategies, the Big Five Personality traits, two factors of open-mindedness, individualist-collectivist values, world music OE, and five functions of music were entered as predictors. Backward elimination is a reliable method for variable selection (Heinze & Dunkler, 2017). The AIC factor-based method was employed to address the potential for bias. It minimises the mean squared error of estimation and hence minimises this risk (Vrieze, 2012). RStudio (R Core Team, 2019) was used to clean and analyse the data.

RESULTS

Appendix A shows the correlations among all continuous variables. Without controlling for any variables, psychological adaptation was positively correlated with world music OE ($\rho = .24, p = .03$) and the music function cultural expression ($r = .23, p = .04$). Difficulties in sociocultural adaptation were negatively correlated with world music OE ($\rho = -.28, p = .01$), but were not related to any function of music.

To identify a parsimonious model of psychological adaptation, backward multiple regression analysis with AIC was conducted. Age, gender, education level, years of residence, confidence in English, heritage acculturation, mainstream acculturation, extroversion, agreeableness, conscientiousness, neuroticism, tolerance to difference, openness to activity, collectivism, world music OE, and five functions of music were entered before the model reduction. The assumptions of normality, linearity, multicollinearity, and homoscedasticity were not violated. The parsimonious model is shown in Table 3.

Table 3. Results of AIC Backward Regression Analysis Predicting Psychological Adaptation

Variables	β	SE	t	p
Music experience	-.34	.16	-2.12	.04
Confidence in English	-.30	.14	-2.13	.04
Heritage acculturation	.30	.07	4.17	<.001
Extroversion	.20	.05	4.38	<.001
Conscientiousness	.30	.07	4.46	<.001
Neuroticism	-.25	.07	-3.78	<.001
Self-reflection	.20	.11	1.94	.06
Arousal and activation	-.33	.13	-2.56	.01

This model was significant: $F(8, 67) = 12.12, R^2_{adj.} = .54, p < .001, f^2 = 1.45, power = .999$ [4]. The music function ‘arousal and activation’ ($p = .01$) significantly predicted psychological adaptation, and the music function ‘self-reflection’ marginally predicted psychological adaptation ($p = .06$). Moreover, psychological adaptation was also predicted by musical training experience, confidence in English, heritage acculturation, extroversion, conscientiousness, and neuroticism. However, neither world music OE, open-mindedness nor individualist-collectivist values contributed to psychological adaptation. Thus, H1a was not supported, while H2a was partially supported.

To identify a parsimonious model of sociocultural adaptation, AIC backward multiple regression analysis was conducted with the same predictor variables entered in the model of psychological adaptation. Two datapoints with studentized residuals higher than 3 were removed from the model. The model satisfied the normality, linearity, multicollinearity, and homoscedasticity assumptions after removing the outliers. The parsimonious model is shown in Table 4.

Table 4. Results of AIC Backward Regression Analysis Predicting Difficulties in Sociocultural Adaptation

Variables	β	SE	<i>t</i>	<i>p</i>
Age	.04	.01	3.17	.002
Gender	.22	.13	1.77	.08
Mainstream acculturation	-.14	.04	-3.33	.001
Tolerance to difference	-.36	.07	-5.12	<.001
Arousal and activation	.15	.06	2.61	.01
World music OE	-.50	.15	-3.33	.001

This model was significant: $F(6, 67) = 11.49$, $R^2_{adj} = .46$, $p < .001$, $f^2 = 1.03$, $power = .999$ [5]. World music OE ($p = .001$) and the music function ‘arousal and activation’ ($p = .01$) significantly predicted difficulties in sociocultural adaptation. Moreover, sociocultural adaptation was predicted by age, gender, mainstream acculturation, and the open-mindedness factor ‘tolerance to difference.’ Thus, H1b was supported and H2b was partially supported.

DISCUSSION

This study investigated whether world music OE and psychosocial functions of music are predictors of student sojourners’ psychological acculturation and adaptation in Australia, beyond several relevant variables such as personality traits, open-mindedness, individualism-collectivism, age, and education level. Two major results emerged: (a) psychological adaptation was significantly predicted by the use of music for ‘arousal and activation’, and marginally predicted by using music for ‘self-reflection’; (b) sociocultural adaptation was significantly predicted by world music OE and the use of music for ‘arousal and activation’.

World Music Open-Earedness

The findings suggest that, beyond other relevant predictors, world music OE in intercultural settings is an important predictor of successful sociocultural adaptation to the host culture. Why did world music OE predict student sojourners’ sociocultural adaptation? OE reflects one’s willingness to explore, listen to, tolerate, and learn about different styles of unfamiliar music. When listening to a piece of novel music that one does not prefer or enjoy, individuals with high OE may continue listening with an interest in understanding and exploring its aesthetic purpose, aesthetic scope, and socio-cultural significance. Given that musical preferences often reflect one’s cultural and social identity (Brittin, 2014; Giles et al., 2009; Hallam et al., 2016; Iușcă, 2018; Peterson, 2005; Sakai, 2011; Vella & Mills, 2016; Williams, 2016), it is hypothesized that student sojourners with high levels of world music OE are more likely to exhibit omnivorous musical preferences. Peterson (2005) proposed that omnivorous musical preferences are an integral part of cosmopolitan identity. Cosmopolitan individuals tend to identify themselves as ‘world citizens’ whose identities are not bounded by nationality or ethnicity. Therefore, individuals with high world music OE may be cosmopolitan. For these individuals, the boundaries between different cultural groups are dissolved or broadened, and the whole society is categorised as an inclusive “we”.

As such, individuals with high OE may actively explore different cultures and interact with people from different cultures. Indeed, Lizardo (2006) found that tastes assist in the formation and maintenance of personal networks. A popular taste is associated with a larger social network as it can connect people with heterogeneous backgrounds (Van Eijck & Lievens, 2008). Direct contact between members from two different cultures can help them have a better understanding of each other and build up mutual trust (Zhang & Goodson, 2011). Benefiting from intercultural interaction, student sojourners with high OE thereby establish strong intercultural relationships and experience fewer sociocultural adaptation problems (Berry et al., 2011; Masgoret & Ward, 2006; Van der Zee & Van Oudenhoven, 2001; Zhang & Goodson, 2011).

It is important to note that the present study’s correlational nature precludes drawing conclusions regarding causality. It is also possible that student sojourners’ successful sociocultural adaptation led to an enhanced appreciation of world music. Indeed, both LeBlanc’s model and Hargreaves’s reciprocal feedback model propose that listeners’ responses toward music can be affected by the listeners’ social circumstances,

except for the music itself and the listeners' personal characteristics (Hallam et al., 2016; Hargreaves et al., 2016; Yoo et al., 2018). There is also research suggesting that omnivorous tastes are predicted by culturally diverse social networks (Michelson, 2013; Peterson, 2005). Interaction with culturally-varied people enables individuals to accumulate a wealth of cultural knowledge and learn about different cultural preferences (Erickson, 1996; Van Eijck & Lievens, 2008). As Australia is a multicultural society, studying in Australia may enhance student sojourners' world music OE through communication with people from diverse cultural backgrounds. Future research could evaluate OE in international students prior to arrival in Australia, and then re-evaluate OE as well as adaptation in sojourners after they have resided in Australia for a period of time. Such a design could reveal whether open-earedness increases with exposure to Australian society, and whether there is an association between pre-migration open-earedness and adaptation to Australian society.

Although we observed a significant positive association between world music OE and psychological adaptation, modelling results did not support the possibility that world music OE predicts psychological adaptation after controlling for other relevant variables; open-mindedness also did not predict psychological adaptation. Instead, psychological adaptation was predicted by higher extroversion and conscientiousness, but lower neuroticism. Similarly, these three personality traits were shown to significantly influence international students' life satisfaction in Germany (Zhang et al., 2010), and relate to sojourners' psychological adaptation (Ward et al., 2004). These findings are in line with theoretical frameworks linking acculturation success with stress and coping. The acculturative stress model suggests that when sojourners appraise the experience of acculturation as threatening, and determine that they cannot deal with the challenges of acculturation by changing their behaviour, then negative outcomes will occur such as distress, anxiety, and feelings of inferiority (Berry, 2006). Gallagher (1990) found that individuals with higher neuroticism tend to appraise a stressful event as a threat rather than a challenge. They are more sensitive to the possible negative outcomes of stressful events and tend to appraise their resources as excessively burdened. On the contrary, maintaining a stable emotional state is helpful for international students to adapt to a different culture. This is particularly true when they tend to seek stimulating social environments (i.e., being extroverted) and possesses attributes of persistence, self-motivation, and self-discipline (i.e., being conscientious (Berry et al., 2011; Swagler & Jome, 2005). Therefore, compared to being open-minded, emotional stability may be a more important personality trait for maintaining student sojourners' well-being and life satisfaction in a new society.

Functions of Music in Intercultural Settings

The current study also examined whether any of the psychosocial functions of music in intercultural settings predicted student sojourners' adaptation. Five functions of music were considered: 'mood and emotion', 'arousal and activation', 'communication', 'self-reflection', and 'cultural expression'. Results suggested that using music for 'arousal and activation' significantly predicted both psychological and sociocultural adaptation, and using music for 'self-reflection' marginally predicted psychological adaptation.

To the best of our knowledge, only Laukka (2007) has investigated how different *motives* for listening to music can impact psychological well-being, and found that two listening motives, 'mood regulation' and 'agency and identity', predicted affective well-being. Similarly, the present study also revealed that the emotional functions of music – 'arousal and activation' and 'self-reflection' – independently contributed to psychological adaptation. The 'arousal and activation' function emphasises that listening to music can cause chills, warmth, tension, relaxation, activation, or other physiological arousal experience (Schäfer & Sedlmeier, 2010). The 'self-reflection' function emphasises reminiscence, the perception of feelings, and problem management on an emotional level, which has a long-term effect on emotional regulation and management. This finding suggests that music's emotional function may have a unique significance for international students. They can use music to manage tension or stress, regulate emotions, and even promote life satisfaction and well-being in the new society. Moreover, this study found that 'arousal and activation' was also a significant predictor of sociocultural adaptation. Indeed, emotional stability and flexibility while adapting to the stresses of cross-cultural interactions are essential in intercultural effectiveness (Berry et al., 2011). Quite possibly, listening to music can reinforce these psychological abilities. In turn, acquiring these abilities may help international students develop the social competence to blend in with the host culture, thereby improving their sociocultural adaptation.

CONCLUSION

The current study is the first to reveal that student sojourners' world music open-earedness and the use of music for 'arousal and activation' are predictors of psychological and sociocultural adaptation, independent of their demographics and personality traits. It confirms that music inclinations can assist with healthy adaptation to multicultural societies. The findings also support the possibility that: (a) world music OE scales can be used to identify international students who may have difficulty with psychological and sociocultural adaptation, and (b) intercultural music engagement programs might be developed to help reduce international students' difficulties with adjustment while they adapt to their new country and host culture. Indeed, a recent rich intercultural music engagement program showed that learning a non-Western musical instrument improved Australians' ethnocultural tolerance and attitudes towards ethnocultural groups (Li et al., 2023). Such a program *could also* improve international students' open-earedness and psychosocial adaptation. Given that the participants of the current investigation were studying in Australia – a multicultural society that is relatively tolerant of diversity and cultural variation (Uchiyama et al., 2021) – our conclusions are primarily relevant to student sojourners' experience in similarly tolerant multicultural cities around the world. Whether world music OE and functions of music are applicable to less multicultural and less tolerant societies remains an empirical question for future research.

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NOTES

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[2] The consistency index indicates the consistency between a music excerpt with the remaining excerpts. It was calculated using the corrected Pearson item-total correlations between preference ratings for each music excerpt and the total rating scores of the remaining excerpts (total scores did not include ratings of each specific excerpt that was compared to the total score).

[3] The "Individualism-collectivism (INDCOL)" scale was considered but rejected because it has 66 items, which would be overwhelming for participants who already had many scales to complete. The short-form of the INDCOL with only 11 items was also considered, but it focuses on only two relational domains – family and neighbours – and the neighbours domain is not relevant to the current study. The "Asian cultural collectivism" scale is optimal as it assesses attitudes toward social norms, one's group, and one's family, and can be assessed as a continuous variable. This scale may have been developed in Asia but is not specific to Asian participants.

[4] The model remained significant when all the control variables were included (i.e., age, gender, education level, musical training experience, length of residence, confidence in English, mainstream acculturation, heritage acculturation; $F(13, 62) = 7.35, R^2_{adj} = .52, p < .001$). The music functions, 'self-reflection' ($\beta = .22, p = .049$) and 'arousal and activation' ($\beta = -.29, p = .03$), remained significant after controlling for these control variables. Variables of interest (i.e., using music for 'self-reflection' and 'arousal and activation') also remained significant after excluding the five participants from North America.

[5] The model remained significant when all the control variables were included ($F(11, 62) = 6.11, R^2_{adj} = .43, p < .001$). World music OE ($\beta = -.48, p = .004$) and the music function ‘arousal and activation’ ($\beta = .14, p = .02$) remained significant after controlling for these control variables. Variables of interest (i.e., world music OE and using music for ‘arousal and activation’) also remained significant after excluding the five participants from North America.

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APPENDIX

Appendix A. Means, Standard Deviations, and Correlations Among All Variables

Variables	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
1.Age	24.92	4.63																		
2.Y_Residence	2.64	1.60	-.12																	
3.English	4.41	0.62	-.04	.04																
4.Acc_heritage	6.75	1.22	-.3†	.09	.09															
5.Acc_mainstream	6.10	1.28	.05	-.05	.2	.47†														
6.Extroversion	3.64	1.75	.04	-.19	.09	.03	.3†													
7.Agreeableness	4.80	1.20	.15	-.14	.15	.05	.06	.01												
8.Conscientiousness	4.93	1.35	.17	.05	.31†	-.02	.15	.12	.38†											
9.Neuroticism	3.75	1.33	-.21	.02	0	-.09	.05	-.04	-.01	-.13										
10.TOD	4.96	0.78	-.09	-.1	.45†	-.05	-.03	.08	.11	.27*	-.02									
11.OA	4.83	0.92	-.09	-.03	.15	.04	.25*	.31†	.04	.02	.15	.17								
12.OE	-0.06	0.35	-.06	-.08	-.14	.18	.16	.13	-.02	-.02	.02	-.10	.50†							
13.Use_ME	5.96	0.95	-.14	.18	.07	.27*	.17	.07	.26*	.21	.09	.01	.21	.06						
14.Use_AA	5.89	1.01	-.39†	.18	-.09	.32†	.17	.14	.25*	.18	.23*	.05	.27*	.15	.69†					
15.Use_Com	5.03	1.26	-.27*	.24*	-.07	.38†	.19	.10	.22	.08	.09	-.18	.33†	.32†	.57†	.72†				
16.Use_SR	5.34	1.15	-.38†	.21	-.08	.33†	.11	.06	.25*	.04	.19	-.07	.33†	.21	.5†	.71†	.68†			
17.Use_CE	4.25	1.67	-.06	.02	-.23*	.35†	.02	.21	.09	-.06	-.08	-.17	.18	.33†	.27*	.42†	.56†	.35†		
18.Adap_psy	5.18	1.03	.13	-.13	.05	.36†	.36†	.37†	.07	.37†	-.46†	.02	.01	.24*	.14	.1	.16	.11	.23*	
19.Adap_socio	2.00	0.57	.24*	.02	-.26*	-.1	-.22	-.2	.07	-.06	.11	-.5†	-.26*	-.28*	.07	.03	.07	-.01	-.02	-.25*

Note. Analyses that include years of residence and confidence in English, OE, four ways of uses of music (mood and emotion, arousal and activation, communication, self-reflection) are Spearman correlations, the rest analyses are Pearson correlations. OE = world music open-mindedness; Y_residence = year of residence in Australia; Acc_heritage = heritage acculturation; Acc_mainstream = mainstream acculturation; TOD = tolerance to difference; OA = openness to activity; Use_ME = using music for mood and emotion; Use_AA = using music for arousal and activation; Use_Com = using music for communication; Use_SR = using music for self-reflection; Use_CE = using music for cultural expression; Adap_psy = psychological adaptation; Adap_socio = sociocultural adaptation. * $p < .05$. † $p < .01$. ‡ $p < .001$.