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Short Research Report

Music as an emotion regulation strategy:
An examination of genres of music and their roles in emotion regulation

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Abstract

Research suggests that people frequently use music to regulate their emotions. However, little is known about what kinds of music may regulate affective states. To investigate this, we examined how the music preferences of 794 university students were associated with their use of music to regulate emotions. We found that preferences for pop, rap/hip-hop, soul/funk, and electronica/dance music were positively associated with using music to increase emotional arousal. Soul/funk music preferences were also positively associated with using music for up-regulating positive emotionality and down-regulating negative emotionality. More broadly, energetic and rhythmic music was positively associated with using all examined forms of musical emotion regulation, suggesting this dimension of music is especially useful in modulating emotions. These results highlight the potential use of music as a tool for emotion regulation. Future research can extend our findings by examining the efficacy of different types of music at modulating emotional states.

Keywords

affect, emotion regulation, emotions, music

Scientists and philosophers have long been interested in the emotional qualities of music (e.g., Dewey, 1934; Eerola & Vuoskoski, 2013; Konečni, 2005; Robinson, 2005; Tolstoy, 1898/1962; Västfjäll, 2002) as well as the effect of music on emotions (Gross, 1998; Juslin & Lakka, 2004; Sloboda & O'Neil, 2001; Uhlig, Jaschke, & Scherder, 2013). Given the powerful emotional effects of music, people might want use music to regulate their emotions in several possible

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ways. For example, some may want to increase positive emotionality, or use negative emotions in order to achieve a certain goal (Tamir, 2009). On the other hand, people may wish to decrease negative emotionality or even increase emotional intensity or arousal (Lonsdale & North, 2011).

Research has found that music may induce (Lundqvist, Carlsson, Hilmersson, & Juslin, 2008; Song, Dixon, Pearce, & Halpern, 2016) or potentially regulate (Allen, Hill, & Heaton, 2009; Dingle, Hodges, & Kunde, 2016; Sharman & Dingle, 2015; Thoma, Ryf, Mohiyeddini, Ehlert, & Nater, 2012; Trehub, Ghazban, & Corbeil, 2015; Van Den Tol & Edwards, 2014; Vieillard, Harm, & Bigand, 2015; Vuoskoski & Thompson, 2012; White & Rickard, 2015; Zoteyeva, Forbes, & Rickard, 2015) positive and negative emotions. For instance, Lonsdale and North (2011; Study 3) found that approximately 96% of their participants listened to music in order to regulate their emotions. Altogether, this work suggests that music can not only elicit various emotions, but can also be a tool that people can use to regulate their emotions.

Studies on emotion regulation that have largely focused on specific genres of music have somewhat diverse findings. Many of these studies suggest that sad music may increase pleasure not only through emotion regulation, but through the aesthetic context of the stimulus (Konečni, 2008, Sachs, Damasio, & Habibi, 2015; Van Den Tol & Edwards, 2014; Vuoskoski & Thompson, 2012; White & Rickard, 2015). For instance, Vuoskoski and Thompson (2012) found that participants experienced sadness while listening to sad music, but enjoyed it almost as much as happy music, especially if they scored highly on the trait "openness to experience", which is related to aesthetic appreciation. Other research suggests that individuals may experience sad music with more pleasure when prolactin levels are high than when they are low (Huron, 2011). On the other hand, people may want to feel negative emotions such as anger, fear, or sadness, when these emotions are useful to achieve a specific goal (Tamir, 2009). For example, Tamir, Mitchell, and Gross (2008) found that after listening to anger-inducing music, participants were more willing to engage in a confrontational videogame.

Specific musical styles may have unique effects on emotionality. For instance, Sharman and Dingle (2015) found that rather than causing anger, extreme heavy metal music (metal music characterized by loud and heavy instruments and emotionally intense vocals, often including themes of depression and loneliness) is shown to decrease anger while maintaining physiological arousal. However, one limitation of music and emotion regulation research is that nearly half of the genres of music used in emotion regulation studies have been sampled from classical selections (48%), while only 3% have been pop/rock and 11% have been custom-made (Eerola & Vuoskoski, 2013). This finding highlights a paucity of research encompassing a wide variety of music genres, particularly those that are more commonly listened to. Based on this work, it is necessary to systematically investigate why individuals may listen to different genres of music, and also for what method of emotion regulation.

No research so far has asked individuals why they might listen to music in an effort to regulate their emotions and what specific genres they prefer. Building upon this gap, the current research investigates the relationship of individuals' preferences for genres of music and the ways in which they use music to regulate their emotions using a large cross-sectional survey of university students. This research distinguishes between specific genres of music, as well as more broad dimensions of musical styles (Rentfrow & Gosling, 2003). This study also distinguishes between different types of musical emotion regulation established with measures by Lonsdale and North (2011), including up-regulating positive emotionality (termed positive mood management), down-regulating negatively emotionality (termed negative mood management), and increasing arousal. In this study, we had two key aims. First, we investigated preferences for 14 specific musical genres and their relationships with the use of musical

emotion regulation strategies. Second, we investigated relationships between more broad dimensions categorizing music preferences (Rentfrow & Gosling, 2003) and the use of musical emotion regulation strategies.

Method

Participants

Undergraduate students (N=794; 73.5% females and 26.5% males) in the psychology subject pool of a large mid-western urban university participated in an online survey and received partial course credit as compensation. The large size of this sample allowed us to reach adequate statistical power (>.80) for detecting even small sized effects (r=.1) by the metric of Cohen (1988). Overall, the sample was relatively young ($M_{age}=21.68$, SD=4.86) and diverse (19.8% African American, 41.9% Caucasian, 15% Middle Eastern, 12.1% South Asian [e.g., Indian], 2.6% East Asian [e.g., Korean, Japanese, Chinese], 2.4% Latin American/Hispanic, 0.8% Pacific Asian [e.g., Filipino, Malaysian], 0.3% Native American, and 5.2% Mixed/Other). The socioeconomic status (household income) of the sample was as follows: 22.8% less than \$25,000; 16.1% reported their income as \$25,001–\$40,000; 17.4% reported \$40,001–\$70,000; 10.3% reported \$70,001–\$90,000; 17.6% > \$90,001; and 15.7% declined to indicate their household income. All procedures and measures were approved by the University Institutional Review Board.

Procedures and materials

Participants completed the survey through the university's online research participation website, SONA (sona-systems.com) and provided informed consent. After this, musical preferences were measured with the Short Test of Music Preferences (STOMP; Rentfrow & Gosling, 2003). In this measure, participants indicated how much they preferred 14 different genres of music (alternative, blues, classical, country, electronica/dance, rap/hip-hop, jazz, pop, religious, rock, soul/funk, folk, and sound tracks) on a seven-point Likert scale (1 = not at all, 7 = a great deal). Consistent with Rentfrow and Gosling (2003), the 14 genres of music were aggregated into four dimensions: reflective and complex (jazz, classical, blues, folk), intense and rebellious (alternative, rock, heavy metal), upbeat and conventional (country, pop, religious, sound tracks), and energetic and rhythmic (rap/hip-hop, soul/funk, electronica/dance). Cronbach's alpha was acceptable for reflective and complex (α = .79) and good for intense and rebellious (α = .84). Although the upbeat and conventional (α = .50), and energetic and rhythmic (α = .42) factors did not have acceptable internal consistency in this sample, previous research with larger sample sizes supports the factor structure, stability, and consistency of these factors (Rentfrow & Gosling, 2003).

Musical emotion regulation strategies were assessed with the six-item positive mood management, negative mood management, and arousal subscales from the 48-item Music Uses and Gratifications scale developed by Lonsdale and North (2011). Participants were asked to rate the extent to which each statement accurately described why they listened to music, and responses were measured on an 11-point scale ($0 = not \ at \ all$, 10 = completely). There were eight subscales, each with six items. Sample items include "to relieve anxiety" (negative mood management), "to brighten up my day" (positive mood management), and "to give me energy" (arousal). This measure also includes subscales measuring additional reasons for listening to music that are less affective in nature, including personal identity, surveillance, diversion, social

interaction, and reminiscing (results for these are presented in supplementary materials). All subscales had good internal consistency ($\alpha \ge .74$).

Two items were included to identify participants who were carelessly responding. First, participants were asked if their responses were accurate and effortful by selecting either "No, my responses were not accurate and I did not give much effort on this survey", or "Yes, my responses represent my honest, accurate feelings and perceptions". Additionally, participants responded to a catch-item included in the measures stating "Some people do not pay attention. To indicate you are paying attention, select 7".

Data analytic strategy

After conducting preliminary analyses for honest, accurate responses, we examined both of our research aims in a two-step approach. First, we examined zero-order correlations between the music preferences and emotion regulation strategies. In the second step, we more robustly predicted emotion regulation strategies by regressing them on all music preferences and the demographic covariates of age, gender (1 = male, 0 = female), race/ethnicity (dummy coded as 1 = Caucasian, 0 = Not Caucasian), and income. These two steps were repeated when examining how specific genre preferences related to musical emotion regulation preferences (Aim 1) and how the overall dimensions of musical preferences were associated with musical emotion regulation preferences (Aim 2). Due to a substantial amount of missing data regarding income (15.2%), mode imputation was used in place of these missing values in our analysis. It was necessary to control for these demographic variables in our models because they are associated with musical preferences and emotion regulation (Bonneville-Roussy, Rentfrow, Xu, & Potter, 2013; Christenson & Peterson, 1988; Ho, 2003; McRae, Ochsner, Mauss, Gabrieli, & Gross, 2008). Finally, we also conducted all of our analyses using bootstrapping, noting whether the significance of any findings changed using this approach.

Results

Preliminary analyses

To eliminate participants who were carelessly responding, those who failed to respond correctly to the catch-item were removed (N=124), along with those who failed to indicate honest, accurate responses (N=5). This left 665 participants in the analyzed data.

Aim 1: Associations between specific musical genre preferences and musical emotional regulation

First, we examined the associations between specific music genre preferences and musical emotion regulation strategies (presented in Table 1, upper portion). Most substantially, rap/hip-hop (r=.28, p < .001), electronica/dance (r=.23, p < .001), and soul/funk (r=.19, p < .001) were all positively associated with arousal. Soul/funk was also greatly associated with positive (r=.22, p < .001) and negative mood management (r=.23, p < .001), while rap/hip-hop (r=.12, p=.002) and electronica/dance (r=.12, p=.003) were more loosely associated with positive mood management (PMM) and not associated with negative mood management (NMM). Blues (PMM: r=.11, p=.007; NMM: r=.15, p < .001) and jazz (PMM: r=.16, p < .001; NMM: r=.18, p < .001) were significantly associated with positive and negative mood management, while classical (r=.13, p=.001) and folk (r=.13, p=.001) were associated only with negative

Table 1. Descriptive statistics and correlations between the emotion regulation strategies and music preferences.

Regulation	Genre								
strategy	Blues	Jazz	Classical	Folk	Rock	Alternative	Heavy metal	M	SD
PMM	.11***	.16***	.05	.05	.01	00.	02	6.20	0.67
NMM	.15***	.18***	.13**	.13**	.07	.10*	.07	5.86	0.92
Arousal	.03	.07	90	.03	01	.03	07	2.68	0.99
M	2.51	2.81	3.09	2.23	3.75	3.83	2.08		
SD	1.51	1.67	1.75	1.53	1.86	1.97	1.59		
Regulation	Genre								
strategy	Country	Soundtracks	Religious	Pop	Rap/ hip–hop	Soul/funk	Electronica/dance		
PMM	05	00.	.04	.05	.12**	.22***	.12**		
NMM	01	.10*	90.	.07	.04	.23***	01		
Arousal	80.	90.	.07	.28***	.28***	.19***	.23***		
M	3.45	3.65	2.75	5.09	5.23	3.28	4.08		
SD	2.11	1.71	1.95	1.60	1.72	1.98	1.94		
Regulation	Higher order factor	factor							
strategy	Reflective and complex	d complex	Intense and rebellious	spellious	Upbeat and	Upbeat and conventional	Energetic and rhythmic	thmic	
PMM	.12**		00.		.01		.23***		
NMM	.19***		.10*		*80.		.13**		
Arousal	.02		02		.18***		.34***		
M	2.66		3.22		3.74		4.20		
SD	1.27		1.58		1.17		1.28		

Note. PMM = positive mood management; NMM = negative mood management. *p < .05, ** ^{t}p < .01, *** ^{t}p < .001.

mood management. Pop was strongly associated with arousal (r = .28, p < .001). Overall, these findings suggest that genres associated with reflective and complex music are preferred for using music to alter affective valence, whereas energetic and rhythmic music is more effective for increasing positive emotionality and arousal.

We examined these associations with more robust multiple regression models predicting emotion regulation strategies (see Table 2, lower portion). For brevity, we present these findings with the effect size, partial r (r_p), but the full statistical information (B, SE, t, significance) for effects is presented in Table 2. Soul/funk preferences were positively associated with all emotional regulation strategies ($r_p \ge .10$, p < .010). Electronica/dance preferences were positively associated with PMM and arousal ($r_p = .09$, p = .031 and $r_p = .18$, p < .001, respectively) and hip-hop and pop preferences were also associated with arousal ($r_p = .14$, p < .001 and $r_p = .09$, p = .021, respectively). The included covariates suggested that women preferred music for NMM, PMM, and increasing arousal, relative to men (r_p from p < .001), and that preferences for music as a source of NMM declined with age ($r_p = -.14$, p < .001).

Aim 2: Associations between musical dimensions and musical emotional regulation

For the next series of analyses, we combined genre preferences into the dimensions established by Rentfrow and Gosling (2003). Table 1 (lower portion) presents correlations between higher order dimensions of music preferences and emotion regulation strategies. Notably, all three forms of musical emotion regulation were positively associated with preferences for energetic and rhythmic music (PMM: r = .22, p < .001; NMM: r = .13, p = .001; arousal: r = .33, p < .001), suggesting that energetic and rhythmic music is preferred among those who seek to regulate their emotions via music. Preferences for reflective and complex music were associated with positive (r = .12, p = .003) and negative mood management (r = .19, p < .001), but were not associated with arousal. Additionally, preferences for upbeat and conventional music were positively associated with increasing arousal (r = .18, p < .001), but were not associated with other emotion regulation strategies. Overall, these results suggest that energetic and rhythmic music is often preferred for arousal and PMM, while reflective and complex music may be sought after for PMM and NMM.

We followed up these analyses by regressing music emotion regulation strategies on the four music dimensions and our demographic covariates. The full statistical information for these results is presented in Table 2. Consistent with our correlations, the energetic and rhythmic dimension was positively associated with all three emotional regulation strategies (r_p from .09 to .35, $p \le .018$). Additionally, using music for negative mood management was linked to preferences for intense and rebellious music ($r_p = .08$, p = .035) and reflective and complex music ($r_p = .15$, p < .001). The upbeat and conventional dimension also was associated with increased preferences for using music for arousal ($r_p = .08$, p = .033). Finally, the associations with our demographic covariates were similar to that of previous analyses, with the exception that age was also negatively associated with arousal preferences ($r_p = .09$, p = .029).

Demographic analyses

We conducted independent samples t-tests to account for any potential gender and race (Caucasian versus non-Caucasian) differences in music preference or reported use of emotion regulation strategy. For brevity, we report all means and standard deviations, split by gender and race/ethnicity in the supplemental materials online (Supplemental Tables 3a-3c). We found that more females preferred upbeat and conventional, country, pop, and all three emotion regulation strategies ($t \ge 1.98$, p < .05). In addition, more males preferred the broad factors

Table 2. Multiple regression analyses predicting musical emotion regulation strategies.

Emotion regulation strategies as a function of music genre

Predictor	Negative mood management			Positive mood management			Arousal		
	β	t(632)	r_p	β	t(632)	r_p	β	t(632)	r_p
Blues	03	-0.47	02	05	-0.85	02	04	-0.75	03
Jazz	.05	0.74	.03	.10	1.53	.03	.04	0.62	.03
Classical	.07	1.45	.06	.01	0.12	.01	07	-1.50	06
Folk	.05	1.03	.04	.03	0.54	.02	.08	1.83†	.07
Rock	.00	-0.02	.00	.05	0.70	.03	01	-0.19	01
Alternative	.08	1.33	.05	01	-0.12	01	.06	1.08	.04
Heavy metal	.05	1.03	.04	02	-0.50	.02	06	-1.30	05
Country	01	-0.16	01	.00	0.40	.00	.04	1.07	.04
Soundtracks	03	-0.62	03	08	$-1.82\dagger$	07	05	-1.09	04
Religious	03	-0.60	02	03	-0.63	03	.03	0.60	.02
Pop	.03	0.60	.02	01	-0.14	01	.11	2.31*	.09
Rap/Hip-hop	.02	0.50	.02	.04	0.87	.04	.16	3.62***	.14
Soul/Funk	.22	4.06***	.16	.19	3.53***	.14	.13	2.60*	.10
Electronica/Dance	07	-1.58	06	.09	2.12*	.08	.18	4.55***	.18
Gender	18	-4.44***	17	09	-2.22*	09	19	-4.98***	19
Age	14	-3.60***	14	07	$-1.75\dagger$	07	05	-1.40	06
Race	04	-0.85	04	04	-0.93	04	.04	0.88	.04
Income	02	-0.39	02	.01	0.28	.01	.00	-0.06	.00

Emotion regulation strategies as a function of music dimensions

Predictor	Negative mood management			Positive mood management			Arousal		
	β	t(642)	r_p	β	t(642)	r_p	β	t(642)	r_p
Reflective and complex	.16	3.78***	.15	.09	2.05	.08	06	-1.37	05
Intense and rebellious	.09	2.07*	.08	01	-0.11	.00	.00	-0.07	.00
Upbeat and conventional	02	-0.46	02	07	$-1.72\dagger$	07	.08	2.14*	.08
Energetic and rhythmic	.10	2.43*	.10	.22	5.24***	.20	.36	9.23***	.34
Gender	21	-5.52***	21	11	-2.72**	11	21	-5.74***	22
Age	12	-3.16*	12	05	-1.24	05	08	-2.15*	09
Race	07	$-1.70\dagger$	07	04	-1.04	04	.06	1.46	.06
Income	02	-0.55	02	.01	0.12	.01	.01	0.20	.01

Note. $^{\dagger}p < .10, ^{*}p < .05, ^{**}p < .01, ^{***}p < .001.$

of reflective and complex, intense and rebellious, and blues, classical, folk, and electronica/dance (t = -2.03, p < .05). More Caucasians preferred intense and rebellious music, folk, rock, alternative, heavy metal, and electronica/dance (t = -1.97, p < .05), while other race/ethnicity groups preferred energetic and rhythmic music, religious, pop, rap/hip-hop, and soul/funk (t = 4.75, p < .05). Bivariate correlations of age revealed that as age increased, preferences for reflective and complex, intense and rebellious, and soul/funk increased (r = .11, p < .01), while preferences for rap/hip-hop decreased (r = -.16, p < .001).

Secondary analyses: Correcting for skewness and nonnormality

Because musical emotion regulation strategies were highly skewed (PMM: -1.80, NMM: -1.29, arousal: -1.04; SE = .09), we also conducted all previous analyses using bootstrapping; a reiterative nonparametric analysis that is to be used when data do not meet the distributional assumptions for parametric analyses (e.g., Adèr, Mellenbergh, & Hand, 2008). Using bootstrapping analysis with 5,000 iterations and 95% bias-corrected confidence intervals did not alter the statistical significance of any reported findings.

Discussion

Research has generally found associations between music and affectivity, and, to a certain extent, emotion regulation. The results of this study show that energetic and rhythmic music is associated with reported use of music for positive emotion up-regulation, negative emotion down-regulation, and increasing arousal. However, within this category, only soul/funk is related to reported use of negative emotion down-regulation. Interestingly, music in the reflective and complex factor, especially blues and jazz, is also significantly related to reported use of music for positive and negative emotion regulation strategies, but not arousal. This suggests that individuals may seek out different genres of music for different emotion regulation strategies, but does not yet present a direct link. Energetic and rhythmic music is related to reports of a significant increase of arousal when listening to music (especially for genres like rap/hip-hop and electronica/dance), whereas reflective and complex music is related to reported use of positive and negative mood management when listening to music. These results represent an important addition to existing research on musical emotion regulation, as Rentfrow and Gosling's STOMP scale (2003) incorporates a more comprehensive, complete, and generalizable list of music genres than previous research, which largely focused on classical music (Eerola & Vuoskoski, 2013), and the current research suggests a step forward to investigate these music genre preferences more directly with emotion regulation strategies.

Overall, these results suggest that different styles of music are used for different emotion regulation strategies. Previously, Rentfrow and Gosling (2003) suggested that music in the energetic and rhythmic category is associated with the personality traits extraversion and agreeableness, while music in the reflective and complex category is associated with openness. With the addition of our current research, demographic and emotional predictors of musical preferences are now known. More research is needed to determine which genres are specifically used for an emotion regulation strategy.

This research has several limitations. The primary limitation is that the data have been collected from surveys, and therefore the results cannot determine that music is actually being actively used for emotion regulation strategies. In addition, correlations cannot indicate causal relationships between variables. Another limitation of the current research is that the mechanisms of musical emotionality measured primarily focus on up-regulating positive emotionality and down-regulating negative emotionality. Many forms of emotion regulation have been identified that were not assessed in this study, such as down-regulating positive emotions (See du Pont, Welker, Gilbert, & Gruber, 2016 for a review), or increasing negative emotionality. Research has shown that experiencing sad emotions may also elicit pleasure (e.g., Vuoskoski & Thompson, 2012). In addition, frustration and anger are thought to incite effortful goal pursuit (Carver, 2004), and aggressive, anger-inducing music may in turn be used to help reach goal-oriented states. Therefore, it is plausible that music in the intense and rebellious category could have associations with these other emotion regulation strategies. Strategies such as using music as a distraction or to facilitate suppression of emotions may

also have associations with some styles of music relative to others. Future work is needed to explore why individuals might use different musical genres to facilitate even more varied emotion regulation strategies. Additionally, recent work has highlighted the importance of lyrics in modulating emotions. Specifically, Greitemeyer (2009a, 2009b) found that listening to prosocial lyrics may increase empathy. Ali and Peynircioğlu (2006) found that although melody rather than lyrics had a greater modulating effect on emotions, lyrics increased perceptions of sad and angry music while decreasing perceptions of calm and happy music. Taken together, these findings suggest the need for future research to examine lyrical content with emotion regulation.

It is important to note that this sample is relatively young and mostly comprised female participants. Therefore, it may not represent the music genre preferences of the population. In our sample, as age increased, the preferences for reflective and complex, intense and rebellious, and soul/funk music increased. Bonneville-Roussy et al. (2013) discovered similar findings for "unpretentious" music, which contains the reflective and complex music genres, but found preferences for "intense" (rock, punk, alternative, heavy metal) music to decline with age. These contrasting results may be in part due to Bonneville-Roussy et al. (2013) having an older sample ($M_{age} = 40.53$ years) with a greater age range (13–65 years) compared to our younger sample. Relatively older participants in our study likely grew up with heavy metal, alternative, and soul/funk as these genres were especially popular in the 1970s, 1980s, and 1990s (e.g., Bennet, 2001; Borthwick & Moy, 2004), whereas older generations in Bonneville-Rousy et al. (2013) grew up in the 1950s and 1960s when these genres may have been less popular. Additionally, the increase of rock music preferences with age in our sample may be explained by the recent decline in rock music popularity (Marino, 2016).

This research indicates that a variety of genres of music may be related to different emotion regulation strategies. It is critical to understand what aspects of a genre of music characterize certain emotions. This will help to elucidate why individuals may use different emotion regulation strategies for different genres of music. These aspects that may change across music genres may include differences in tempo, time signature, rhythmic or melodic complexity, tonality and key. The results show that individuals may listen to different genres of music to regulate different aspects of their emotions, and further exploration of other emotion regulation strategies could uncover more varied results across genres. It remains unclear what reasons individuals may have for listening to certain genres of music, particularly blues, jazz, and funk. These genre preferences were related to using music for both positive and negative emotion regulation. This may be because these particular genres of music commonly include songs that are both sad and happy in character. Experimental designs that involve presentations of audio recordings of specific genres are needed to expand the research on music and emotion regulation.

Altogether, music has long been thought to be an emotion regulation tool. In applied settings, many organizations and people use music to regulate or alter the emotional states of others, from playing fast-paced music in restaurants and stores to speed up customers or even playing calm music in hospitals or airports to relax patients and travelers. The current research is the first study to incorporate a broad variety of genres of music to analyze the use of emotion regulation strategies.

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Note

 Although we cannot be sure why the "upbeat and conventional" and "energetic and rhythmic" dimensions have decreased reliability compared to the results of Rentfrow and Gosling (2003), we speculate that temporal changes in the popularity of these styles of music following the early 2000s (e.g., decreased popularity of funk music) may have changed the consistency in these dimensions.

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