Personality and Individual Differences 50 (2011) 175–179

Contents lists available at ScienceDirect

Personality and Individual Differences

journal homepage: www.elsevier.com/locate/paid

Interactive effects of personality and frequency of exposure on liking for music

Patrick G. Hunter, E. Glenn Schellenberg *

Department of Psychology, University of Toronto Mississauga, Mississauga, ON, Canada L5L 1C6

ARTICLE INFO

Article history:
Received 29 June 2010
Accepted 17 September 2010
Available online 20 October 2010

Keywords:
Liking and exposure
Music preferences
Music and personality
Liking music

ABSTRACT

Liking for a stimulus often increases with initial exposure but decreases with over-exposure. Re-analyses of previous findings revealed marked differences among individual participants who heard music at different exposure frequencies. In fact, fewer than half exhibited the inverted-U shaped pattern that were evident for listeners as a group. We examined whether the dimension of personality called Openness-to-Experience is associated with individual differences in liking for music as a function of frequency of exposure. Undergraduates completed the Big Five Inventory and provided liking ratings for novel music excerpts as well as for excerpts they heard 2, 8, or 32 times. As a group, liking ratings varied as an inverted-U shaped function of exposure. Number of exposures interacted with Openness-to-Experience but not with any of the other four personality dimensions. Higher levels of Openness-to-Experience were associated with higher liking ratings for novel pieces but lower ratings for over-exposed pieces. Although an inverted-U shaped response pattern was relatively common among all listeners, *increases* in liking as a function of exposure were also common for those who were low in Openness-to-Experience, whereas *decreases* were the most common response pattern among those who were high in Openness-to-Experience.

1. Introduction

It is common to begin liking a song after hearing it a few times. When the same song is heard too often, it is also common to begin disliking it. Indeed, this rise and fall in liking for music as a function of exposure has been documented in the consumption of popular music (Jakobovits, 1966). The first effect—increases in liking after initial exposure—is also a well-documented psychological phenomenon. Zajonc (1968) demonstrated that simple exposure is sufficient to enhance liking for a neutral stimulus even when participants cannot explicitly remember it. This *mere exposure effect* has been replicated many times, primarily with visual stimuli (see Bornstein, 1989 for a review), although increases in liking as a consequence of exposure are also evident for music (e.g., Meyer, 1903; Moore & Gilliland, 1924; Mull, 1957; Peretz, Gaudreau, & Bonnel, 1998; Schellenberg, Peretz, & Vieillard, 2008; Szpunar, Schellenberg, & Pliner, 2004). Decreases in liking as a consequence of over-exposure have also been documented with visual stimuli (Zajonc, Shaver, Tavris, & Van Kreveld, 1972) as well as with music (Schellenberg et al., 2008; Szpunar et al., 2004).

Two models have been proposed to account for changes in liking as a function of exposure. Berlyne (1970) proposed the *two-factor model*, which was further developed by Stang (1974). The model posits that liking varies with arousal potential. A particular stimulus tends to be disliked if its arousal potential is too high or too low, but liked otherwise. More importantly, the arousal potential of a stimulus varies with its familiarity. A novel stimulus has a high arousal potential because it is a possible threat. The first factor stems from exposure with benign consequences, which reduces the threat of the stimulus, lowering its arousal potential to a more optimal level and generating a more positive affective response (Kalat & Rozin, 1973; Zajonc, 1968). The second factor explains satiety or boredom. Specifically, over-exposure leads to further reductions in arousal potential below optimum levels, and thus, to decreases in liking.

(Bornstein's 1992; Bornstein & D'Agostino, 1992) *perceptual fluency/attribution model* suggests that exposure to a stimulus increases processing fluency (i.e., speed and efficiency) for the stimulus. When the perceiver has no explicit memory for the stimulus, fluency is misattributed as liking for it. After many exposures, the perceiver becomes aware of the source of fluency and no longer attributes it to liking. In a similar approach, Reber, Schwarz, and Wikielman (2004) propose that unexpected fluency is inherently pleasant, which explains preferences for symmetrical faces and prototypicality in addition to effects of familiarity. When the perceiver has explicit memory for the stimulus, fluency is expected and no longer pleasurable. In many instances, however, people often remember *and* like familiar stimuli such as music (Peretz et al., 1998; Schellenberg et al., 2008; Szpunar et al., 2004). Similar findings are evident in other domains, such as when participants

* Corresponding author. Tel.: +1 905 828 5367; fax: +1 905 569 4326.
E-mail addresses: patrick@psych.utoronto.ca (P.G. Hunter), g.schellenberg@utoronto.ca (E.G. Schellenberg).

0191-8869/$ - see front matter © 2010 Elsevier Ltd. All rights reserved.
doi:10.1016/j.paid.2010.09.021

consciously remember and like visual stimuli (e.g., polygons or photographs of faces; Newell & Shanks, 2007). Moreover, fluency explanations do not explicitly address disliking for over-exposed stimuli. Nevertheless, some aspects of the fluency models may work in concert with the two-factor model. For example, reductions in the arousal potential of a stimulus may be mediated by increased fluency.

Szpunar et al. (2004) examined effects of exposure on liking for music. They varied stimulus complexity (from random tone sequences to excerpts from recordings) and the listening context. *Focused* listeners completed an orienting task that required them to listen intently to each presentation, whereas *incidental* listeners completed a distractor task while the music was presented quietly in the background. For focused listeners who heard real music, liking increased monotonically from zero to two to eight exposures, when it reached a peak; liking decreased to baseline levels for music heard 32 times. By contrast, incidental listening to simple and complex stimuli led to linear increases in liking as a function of exposure, whereas liking for simple stimuli among focused listeners was independent of exposure.

A follow-up study (Schellenberg et al., 2008) used music stimuli that were computer-generated and clearly happy- or sad-sounding. Once again, incidental listening led to linear increases in liking from 0 to 32 exposures, whereas focused listening gave rise to an inverted-U shaped function. In contrast to Szpunar et al. (2004), liking peaked at two rather than eight exposures. With more than two exposures, there were monotonic decreases in liking. The authors suggested that the stimuli sounded simple because they were computer-generated, and somewhat familiar because they had obvious cues to happiness (major key, fast tempo) or sadness (minor key, slow tempo; see Hunter & Schellenberg, 2010). The orienting task likely played an additional role. Focused listeners in Szpunar et al. counted the number of tones in short sequences or identified the lead instrument in orchestral music excerpts, whereas the focused group in Schellenberg et al. identified whether the excerpts sounded happy or sad.

In short, increases and decreases in liking as a function of exposure are moderated by stimulus complexity and the exposure context. Individual differences are also likely to moderate the effect. In Zajonc et al. (1972, Experiment 1), although responses for the sample as a whole followed an inverted-U shaped function, this pattern was evident for only 36% of the participants. A slightly smaller proportion (32%) had decreases in liking with exposure, whereas increases and upright-U associations were seen in 19% and 13% of participants, respectively. The present study provided a more detailed examination of individual differences in associations between liking and exposure, and the factors that contribute to these differences. First, though, we sought additional evidence of individual differences in the association between liking and exposure.

1.1. Re-analyses of previously reported data

We reanalyzed the data from the focused-listening conditions of Szpunar et al. (2004, Experiment 2) and Schellenberg et al. (2008). Following Zajonc et al. (1972), we examined mean liking for low, medium, and high exposure frequencies in order to derive a three-point pattern for each participant. The participants in Szpunar et al. and Schellenberg et al. had four levels of exposure (i.e., 0, 2, 8, and 32 exposures). To make response patterns comparable to Zajonc et al. we averaged the two moderate exposure levels (2 and 8) and compared them to liking ratings for novel stimuli (0 exposures) and those with a high number of exposures (32). *Inverted-U* and *upright-U* associations were defined as patterns in which mean liking for the moderate exposure level was highest and lowest, respectively. Participants with *increases* had the lowest mean liking at 0 exposures and highest liking at 32 exposures, with liking at moderate (2 and 8) exposures falling in between, whereas participants with *decreases* exhibited the opposite pattern.

For listeners tested by Szpunar et al. (2004), the inverted-U response pattern was the most common (45%), followed by increases (35%), decreases (10%), and an upright-U pattern (10%). Response patterns for listeners tested by Schellenberg et al. (2008) were distributed more evenly. The inverted-U pattern was again the most common (29%), followed by an upright-U pattern (25%), decreases (23%), and increases (22%). Both re-analyses suggested that averaging liking ratings across participants may conceal individual differences that modify the association between liking and exposure. Although the modal response pattern was indeed an inverted-U in both instances, fewer than half of the individual participants actually exhibited this pattern of responding.

1.2. Aim

We sought to determine whether personality differences moderate the association between liking for music and frequency of exposure. Big five models of personality (e.g., Costa & McCrae, 1992; Goldberg, 1993) explain personality using five broad personality dimensions: Agreeableness, Conscientiousness, Emotional Stability (or Neuroticism), Extraversion, and Openness-to-Experience. Some of these dimensions are known to be associated with preferences for particular genres of music. For example, two studies that measured liking for many different music genres—one with adults (Rentfrow & Gosling, 2003) and another with adolescents (Delsing, Ter Bogt, Engels, & Meeus, 2008)—used principal components analysis to reduce the number of genres to four broad dimensions: *Elite* (e.g., jazz, classical), *Rock* (e.g., rock, metal), *Urban* (e.g., hip-hop, soul), and *Conventional* (e.g., pop). Both studies tested for associations between personality scores and liking scores on each of the four music dimensions. Higher levels of Extraversion and Agreeableness predicted increased liking for Urban and Conventional music. Emotional Stability was correlated positively with liking Elite music among adults, but negatively among adolescents. Both studies also found a positive association between Openness-to-Experience and liking Elite and Rock music. For the adults, relatively low scores on Openness were also predictive of liking Conventional music.

We were particularly interested in the dimension of Openness-to-Experience and whether it would moderate the association between liking for music and frequency of exposure. Higher levels of Openness are associated with a greater appreciation of novelty and a greater comfort with ambiguity (McCrae, 2007; McCrae & Costa, 1997). Thus, participants who exhibit high or low levels on this personality dimension may have an attenuated or augmented effect of novelty on arousal, respectively. In other words, participants who are high in Openness should respond more favorably to novel stimuli, whereas participants who are less open should be particularly wary of novelty. These hypothesized differences in liking responses should also be associated with rate on onset of satiety, because Openness involves "a recurrent need to enlarge and examine experience" (McCrae & Costa, 1997, p. 826).

Thus, we predicted that higher scores on Openness-to-Experience would be associated with greater liking for novel pieces and reduced liking for pieces that are over-exposed, as well as a shifted (earlier) peak in liking compared to those who score lower on Openness. We had no reason to expect that any other personality dimension would moderate the association between exposure and liking. In other words, these other dimensions of personality served as control measures. Our method was identical to the focused-listening condition from Szpunar et al. (2004, Experiment 2), including their stimuli (orchestral excerpts) and their instrument-identification task. Participants also completed the Big Five

Inventory (BFI; Benet-Martínez & John, 1998; John, Donahue, & Kentle, 1991), a commonly used 44-item measure of the big five personality dimensions.

2. Method

2.1. Participants

Participants were 79 undergraduates (52 women, 27 men). They were recruited without regard to music training from an introductory psychology class and received partial course credit for participating.

2.2. Apparatus and stimuli

The stimuli were presented at a comfortable volume over high-quality headphones. Stimulus presentation and response recording were controlled by software written with PsyScope (Cohen, MacWhinney, Flatt, & Provost, 1993) installed on an iMac computer. The stimuli were identical to those used in Szpunar et al. (2004). They consisted of 18 15-s excerpts taken from commercial recordings of orchestral music. The excerpts were drawn primarily from concerti from the Baroque, Classical, and Romantic periods. Each excerpt had a clearly identifiable lead instrument. There were equal numbers (i.e., 3) of excerpts with cello, flute, horn, oboe, piano, or violin as the lead instrument.

2.3. Procedure

Each participant was tested individually in a quiet room. The experiment consisted of an initial exposure phase followed by a liking phase. The exposure phase consisted of 84 trials in which participants heard an excerpt then identified the lead instrument. Choices were made by clicking on one of six buttons. Prior to the exposure phase, participants were familiarized with each of the six instruments. The 84 presentations in this phase comprised six different excerpts—each with a different lead instrument—presented 2, 8, or 32 times, with two excerpts presented at each frequency and assignment of excerpts to frequencies determined randomly for each participant. The order of excerpts was also randomized separately for each participant but constrained so that there were no repetitions.

In the liking phase, participants heard the six excerpts from the exposure phase as well as six novel excerpts selected randomly from the remaining 12 but constrained so that each novel excerpt had a different lead instrument. The 12 excerpts were presented in random order. After hearing each excerpt, participants rated how much they liked it on a seven-point rating scale. Participants subsequently completed the BFI.

3. Results

Listeners had four liking scores. Their baseline score (0 exposures) was an average of the six original liking ratings they made for novel excerpts. Their three other liking scores were for excerpts that were heard 2, 8, or 32 times in the exposure phase. Each of these scores was averaged over two original ratings. An initial one-way repeated-measure analysis of variance (ANOVA) was used to test whether the present data replicated the results of Szpunar et al. (2004). Descriptive statistics are illustrated in Fig. 1. Liking varied with exposure frequency, $F(3, 234) = 5.59$, $p < .005$, partial $\eta^2 = .067$. A quadratic trend confirmed that an inverted-U shaped function was evident, $F(1, 78) = 16.92$, $p < .0001$, partial $\eta^2 = .178$. Linear and cubic trends were not significant, $ps > .05$. As in Szpunar et al., liking ratings peaked at eight exposures. When participants were classified according to response style (as in the re-analyses reported above), 37%, 28%, 19%, and 16% showed an inverted-U pattern, decreases, increases, and an upright-U pattern, respectively. Thus, as in previous research, the association between liking for music and number of exposures varied across individuals.

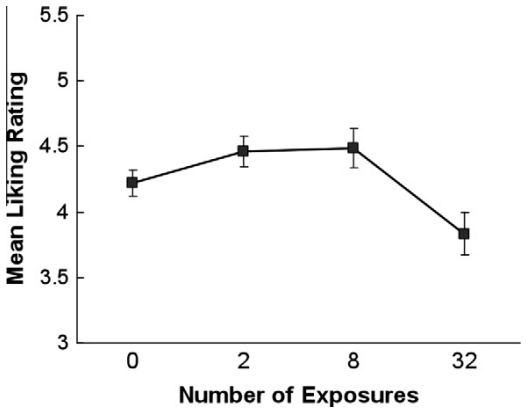

Fig. 1. Liking for music excerpts as a function of number of exposures. Error bars are standard errors.

Correlations among the five personality variables were small and none was statistically significant after correcting for multiple (i.e., 10) tests. The highest correlation ($r = .26$) was between Conscientiousness and Openness-to-Experience. We used a median split to divide participants into low- and high-scoring groups for each of the five personality dimensions. We then analyzed liking ratings with five separate mixed-design ANOVAs (one for each personality dimension), with personality (high or low) as a between-subjects variable and number of exposures (0, 2, 8, or 32) as a within-subjects variable. The results from each analysis are presented in Table 1. Response patterns were consistent with our predictions. In each analysis, liking varied as a function of exposure frequency. Only for Openness-to-Experience, however, was there an interaction between personality and exposure frequency (Fig. 2).

Follow-up analyses examined liking ratings separately for participants who were low or high in Openness-to-Experience. For those who were low in Openness, liking varied as a function of exposure frequency, $F(3, 111) = 2.78$, $p < .05$, partial $\eta^2 = .070$, and the quadratic trend was significant, $F(1, 37) = 9.93$, $p < .005$, partial $\eta^2 = .212$, but the linear and cubic trends were not, $Fs < 1$. As shown in Fig. 2, liking ratings for these participants followed a classic inverted-U shaped pattern with a peak at eight exposures. Liking also varied as a function of exposures for participants who were high in Openness, $F(3, 120) = 6.60$, $p < .0005$, partial $\eta^2 = .142$. For these participants, however, a negative linear trend was evident, $F(1, 40) = 10.46$, $p < .005$, partial $\eta^2 = .207$, as well as a smaller quadratic trend, $F(1, 40) = 7.07$, $p < .05$, partial $\eta^2 = .150$. Liking peaked for excerpts heard twice in the exposure phase, although these ratings were virtually identical to those for novel excerpts.

Additional analyses examined differences in liking between participants who were low or high in Openness-to-Experience separately for each exposure frequency. As predicted, compared to their counterparts who were low in Openness, participants who were high in Openness responded *more* favorably to the novel music excerpts, $t(77) = 2.09$, $p < .05$, but *less* favorably to the excerpts heard 32 times, $t(77) = 2.15$, $p < .05$. The two groups did not differ in liking for excerpts they heard two or eight times.

The final analysis tested for an association between individual response style (inverted-U, upright-U, increases, and decreases) and whether or not participants scored low or high in Openness-to-Experience (Fig. 3). A chi-square test of independence confirmed that the two variables were not independent, $\chi^2(3, N = 69) = 10.99$,

Table 1
Results from ANOVAs testing effects of personality and exposure frequency on liking for music.

Dimension	Personality main effect		Exposure main effect		Personality X exposure interaction	
	$F(1, 77)$	p	$F(3, 231)$	p	$F(3, 231)$	p
Openness	1.80	n.s.	5.64	<.001	3.47	<.05
Extraversion	3.94	n.s.	5.16	<.005	<1	n.s.
Conscientiousness	<1	n.s.	5.47	<.005	<1	n.s.
Agreeableness	1.10	n.s.	5.47	<.005	<1	n.s.
Emotional Stability	1.49	n.s.	5.54	<.005	1.14	n.s.

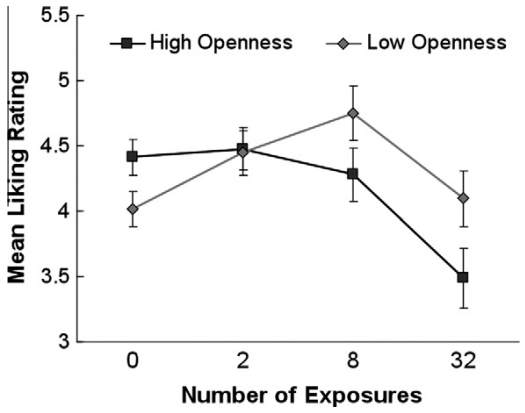

Fig. 2. Liking for music excerpts as a function of number of exposures and whether participants were high or low on Openness-to-Experience. Error bars are standard errors.

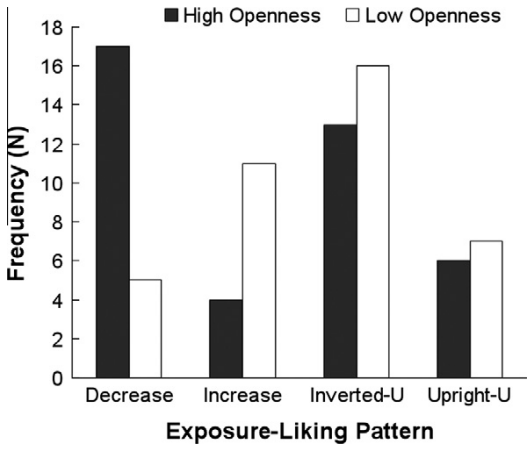

Fig. 3. Number of participants who exhibited each response style, calculated separately for participants who were high or low on Openness-to-Experience.

$p < .05$, Cramer's $V = .399$. As shown in the figure, although several participants in both groups exhibited an inverted-U shaped response pattern, many participants who were low in Openness exhibited increases in liking for music as a function of exposure, whereas the modal response pattern for participants who were high in Openness was a decrease in liking.

4. Discussion

The goal of the present study was to examine whether the personality dimension of Openness-to-Experience moderated the effect of exposure on liking for music. Increases in liking are typically evident after a moderate number of exposures followed by decreases after many exposures. We first presented a re-analysis of previously collected data (Schellenberg et al., 2008; Szpunar et al., 2004), which revealed substantial individual differences in response patterns. In a new experiment, listeners rated how much they liked music they had previously heard 0, 2, 8, or 32 times. Of the big five dimensions of personality, only Openness-to-Experience interacted with exposure. Participants who were low in Openness exhibited the inverted-U shaped pattern when considered as a group, although many individuals showed simple increases in liking as a function of exposure. By contrast, high levels of Openness were associated with increased levels of liking for novel pieces and decreased liking for overly familiar pieces, and the most common response pattern was a linear decrease in liking.

Because listeners who were high on Openness provided liking ratings for novel pieces that were already at or near peak levels, they showed little or no sign of neophobia. From the perspective of the two-factor model, this lack of neophobia would be accounted for by a lower arousal potential generated by novelty, such that novel music excerpts generated levels of arousal potential that were at or near optimum levels. Consequently, arousal potential fell below optimum after relatively few exposures, which, in turn, caused liking to decrease. By contrast, listeners who were low on Openness exhibited evidence of neophobia, needing eight exposures to reach optimum liking. By 32 exposures, though, liking decreased for them as well.

Another possible explanation for our results comes from the findings of a study that examined *why* people listen to music (Chamorro-Premuzic & Furnham, 2007). Participants' self reports were used to identify three styles of music listening. The first was an emotion-focused style; these listeners used music to manipulate their mood. The second was an intellectual style, such that listeners focused on the music itself, perhaps judging the artistry of the performance or the composition. Finally, a background-listening style indicated that music was played typically while the listener's attention was focused on another task. Openness-to-Experience was predictive of an intellectual listening style. This finding suggests that the present listeners who were high in Openness may have paid more attention to the music they heard, which would then have become familiar more quickly. Although this perspective predicts a relatively early peak in liking and more rapid satiety, it cannot explain greater liking for completely novel stimuli that we observed among participants who were high in Openness.

Another possibility is that high-scorers on Openness were more familiar, in general, with classical music. Classical pieces, then, even if novel, would sound more familiar because they came from a familiar genre. Indeed, a correlation between Openness and a preference for Elite genres, which includes classical music, has been reported among adults (Rentfrow & Gosling, 2003) and adolescents (Delsing et al., 2008). From this perspective, one might expect higher levels of liking in general for those who were familiar with classical music. In the present study, however, there was no difference in overall liking between groups (i.e., no main effect of Openness). In fact, peak levels of liking were higher for the low-Openness group. Nevertheless, future research could measure

familiarity with the music genre of the stimuli as well as personality variables in order to test the hypothesis that pre-existing levels of familiarity are accounting for some of the effects we observed.

Our results do not speak directly to whether the two-factor or fluency models best account for effects of exposure on liking for music. Both an intellectual listening style and an initial familiarity with classical music could lead to attenuated neophobia and/or higher fluency. Only the two-factor model, however, accounts for decreases in liking as a consequence of over-exposure. Moreover, fluency models propose that greater liking is evident when the participant is unaware of the source of fluency (Bornstein & D'Agostino, 1992) or when fluency is unexpected (Reber et al., 2004). In the case of intellectual listening, greater attention would presumably lead to greater memory for the piece and, consequently, greater awareness of previous exposure. In the case of familiarity with classical music, listeners would recognize novel excerpts as nonetheless belonging to a familiar genre.

Our findings shed some light on associations between personality and genre preferences that have been reported previously (Delsing et al., 2008; Rentfrow & Gosling, 2003). Both studies reported that Openness-to-Experience was related positively to liking for relatively non-mainstream music genres. Delsing et al. attributed this finding to a desire for variety and unconventionality among individuals who are high in Openness. Moreover, when they examined longitudinal changes in preferences, they found that Openness was related to decreases in liking over time for Conventional music, and to a relatively slow increase in liking for Urban music. Considering the ubiquity of Conventional and Urban music in mainstream media, the results of the present study raise the possibility that those who are high in Openness might tire of an entire genre of music over time, perhaps driving them to seek out less familiar musical styles. Although it seems probable that these individuals would be prone to dislike specific over-exposed pieces (e.g., Pachabel's Canon) or artists (e.g., U2), it is unclear whether satiety would occur at the level of a music genre. Rather, individuals who are high in Openness may tend to show greater liking for less-common pieces (e.g., Sigur Rós's Gobbledygook) or artists (e.g., MIA, Broken Social Scene) who can still be classified as belonging to popular genres.

Our findings highlight individual differences in the association between liking music and number of exposures for only one of the big five personality dimensions: Openness-to-Experience. Future research may reveal that other personality constructs also lead to interactions between exposure and liking for music. Sensation Seeking is a definite possibility, because it involves a desire for novelty and complexity as well as a willingness to take risks (Zuckerman, 1979). Future research could also attempt to replicate the present results with music taken from completely unfamiliar musical styles, such as music from a foreign culture. The use of unfamiliar music would help to tease apart effects of fluency and attenuated neophobia. Music from a foreign and unfamiliar culture should sound novel to all participants such that individual differences in fluency would be negligible. Thus, relatively high levels of liking for novel pieces among participants who are high in Openness could be attributed directly to attenuated neophobia. A third direction for future research could be to test the arousal-mediation hypothesis directly by measuring arousal levels. The present results suggest that Openness-to-Experience would be negatively associated with arousal levels when listeners are exposed to unfamiliar music.

In sum, the present findings reveal that liking for novel classical music varies in an interactive manner as a function of personality and number of exposures. They also raise questions about whether similar findings would be evident with a different style of music, whether other personality constructs would moderate the association between liking and exposure to music, and which theoretical model or models best describe liking for music that is heard a few times or many times.

References

Benet-Martínez, V., & John, O. P. (1998). Los Cinco Grandes across cultures and ethnic groups: Multitrait method analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75*, 729–750.

Berlyne, D. E. (1970). Novelty, complexity, and hedonic value. *Perception and Psychophysics, 8*, 279–286.

Bornstein, R. F. (1989). Exposure and affect: Overview and meta-analysis of research, 1968–1987. *Psychological Bulletin, 106*, 265–289.

Bornstein, R. F. (1992). Inhibitory effects of awareness on affective responding. In M. S. Clark (Ed.), *Emotion: Review of personality and social psychology (No. 13)* (pp. 235–255). Thousand Oaks, CA: Sage.

Bornstein, R. F., & D'Agostino, P. R. (1992). Stimulus recognition and the mere exposure effect. *Journal of Personality and Social Psychology, 63*, 545–552.

Chamorro-Premuzic, T., & Furnham, A. (2007). Personality and music: Can traits explain how people use music in everyday life? *British Journal of Psychology, 98*, 175–185.

Cohen, J. D., MacWhinney, B., Flatt, M., & Provost, J. (1993). PsyScope: A new graphic interactive environment for designing psychology experiments. *Behavioral Research Methods, Instruments, and Computers, 25*(2), 257–271.

Costa, P. T., Jr., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO-PI-R) and NEO Five-Factor Inventory (NEO-FFI) manual*. Odessa, FL: Psychological Assessment Resources.

Delsing, M. J. M. H., Ter Bogt, T. M. F., Engels, R. C. M. E., & Meeus, W. H. J. (2008). Adolescents' music preferences and personality characteristics. *European Journal of Personality, 22*, 109–130.

Goldberg, L. R. (1993). The structure of phenotypic personality traits. *American Psychologist, 48*, 26–34.

Hunter, P. G., & Schellenberg, E. G. (2010). Music and emotion. In M. R. Jones, R.R. Fay, & A. N. Popper (Eds.), *Music perception* (pp. 129–164). New York: Springer.

Jakobovits, I. A. (1966). Studies of fads: I. The "Hit Parade". *Psychological Reports, 18*, 443–450.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The "Big Five" Inventory—Versions 4a and 54*. Berkeley: University of California, Berkeley, Institute of Personality and Social Research.

Kalat, J. W., & Rozin, P. (1973). "Learned safety" as a mechanism in long-delay taste-aversion learning in rats. *Journal of Comparative and Physiological Psychology, 83*, 198–207.

McCrae, R. R. (2007). Aesthetic chills as a universal marker of openness to experience. *Motivation and Emotion, 31*, 5–11.

McCrae, R. R., & Costa, P. T. Jr., (1997). Conceptions and correlates of openness to experience. In R. Hogan, J. A. Johnson, & S. R. Briggs (Eds.), *Handbook of personality psychology* (pp. 825–847). San Diego, CA, US: Academic Press.

Meyer, M. (1903). Experimental studies in the psychology of music. *American Journal of Psychology, 14*, 456–476.

Moore, H. T., & Gilliland, A. R. (1924). The immediate and long-term effects of classical and popular phonograph selections. *Journal of Applied Psychology, 8*, 309–323.

Mull, H. K. (1957). The effect of repetition on the enjoyment of modern music. *Journal of Psychology, 43*, 155–162.

Newell, B. R., & Shanks, D. R. (2007). Recognising what you like: Examining the relation between the mere-exposure effect and recognition. *European Journal of Cognitive Psychology, 19*, 103–118.

Peretz, I., Gaudreau, D., & Bonnel, A.-M. (1998). Exposure effects on music preference and recognition. *Memory and Cognition, 26*, 884–902.

Reber, R., Schwarz, N., & Wikielman, P. (2004). Processing fluency and aesthetic pleasure: Is beauty in the perceiver's processing experience? *Personality and Social Psychology Review, 8*, 364–382.

Rentfrow, P. J., & Gosling, S. D. (2003). The do re mi's of everyday life: The structure and personality correlates of music preferences. *Journal of Personality and Social Psychology, 84*, 1236–1256.

Schellenberg, E. G., Peretz, I., & Vieillard, S. (2008). Liking for happy and sad sounding music: Effects of exposure. *Cognition and Emotion, 22*, 218–237.

Stang, D. J. (1974). Methodological factors in mere exposure research. *Psychological Bulletin, 81*, 1014–1025.

Szpunar, K. K., Schellenberg, E. G., & Pliner, P. (2004). Liking and memory for musical stimuli as a function of exposure. *Journal of Experimental Psychology: Learning, Memory, and Cognition, 30*, 370–381.

Zajonc, R. B. (1968). Attitudinal effects of mere exposure. *Journal of Personality and Social Psychology, 9*(2, Pt.2), 1–27.

Zajonc, R. B., Shaver, P., Tavris, C., & Van Kreveld, D. (1972). Exposure, satiation, and stimulus discriminability. *Journal of Personality and Social Psychology, 21*, 270–280.

Zuckerman, M. (1979). *Sensation seeking: Beyond the optimal level of arousal*. Hillsdale, NJ: Erlbaum.