

## What does feeling like crying when listening to music feel like?

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### **Abstract:**

Music often makes people feel like crying (get a lump in their throat and tears in their eyes) or actually cry. Because crying can co-occur with so many emotions, the present study explored what feeling like crying feels like. A sample of 892 adults reported whether they could remember a time when they cried or felt like crying when listening to music; people who recalled an event then rated it on a wide range of emotional states. A latent class analysis identified 2 underlying clusters of experiences: a 'sad' class defined by feeling sad, upset, and depressed, and an 'awe' class defined by feeling euphoric, amazed, happy, and inspired. People high in openness to experience were more likely to recall an event in the 'awe' class; people high in neuroticism were more likely to recall an event in the 'sad' class. These findings illustrate that feeling like crying from music can reflect different underlying states, and it adds to the growing literature on the complexity of powerful and transcendent aesthetic experiences.

**Keywords:** feeling like crying | music | awe | latent class analysis | personality

### **Article:**

People react to music in many ways—it makes them happy and sad, energetic and calm, reflective and impulsive. One strand of research on music and emotion has emphasized strong experiences of music (Gabrielsson, 2006, 2011), times when people had intense musical encounters that they could remember years later. Crying in response to music—a broad category that ranges from feeling like crying (getting a lump in one’s throat and feeling teary-eyed) to actually crying (Pelowski, 2015)—seems fairly common in people’s narratives of strong experiences of music (Gabrielsson, 2006, 2011), but it has attracted much less attention than similar markers of intense aesthetic experience (Nusbaum & Silvia, 2014), such as getting goosebumps (Silvia & Nusbaum, 2011) and feeling touched and moved (Menninghaus et al., 2015).

The experience of feeling like crying is both complex and intense. Many markers of intense experiences, such as getting goosebumps and feeling moved, can reflect both positive and negative experiences (Kuehnast, Wagner, Wassiliwizky, Jacobsen, & Menninghaus, 2014; Maruskin, Thrash, & Elliot, 2012). Consistent with this finding, the small literature on “aesthetic crying” suggests that crying has diverse psychological meanings (Braud, 2001; Miceli

& Castelfranchi, 2003; Pelowski, 2015). In the present research, we use latent class analysis to explore subtypes of feeling like crying experiences in response to music. This bottom-up approach allows us to see if different kinds of aesthetic crying experiences exist, and if so, what they are like and who tends to report them.

### **Aesthetic Reactions to Music**

Music and emotion are tightly linked. People experience a variety of emotions when listening to music, and music's role in shaping how people feel is one of the main reasons why people listen to it in daily life (Parkinson, Totterdell, Briner, & Reynolds, 1996; Saarikallio, Nieminen, & Brattico, 2013). Many of the emotions induced by music are prototypical states that are easy to place in the two-dimensional space of valence and arousal (Barrett, & Russell, 1999), positive and negative activation (Watson, 2000), or energy and tension (Thayer, 2012). Feelings such as happiness, sadness, anger, calm, and excitement are both common responses to music (Juslin, Liljeström, Laukka, Västfjäll, & Lundqvist, 2011; Juslin, Liljeström, Västfjäll, Barradas, & Silva, 2008; Ladinig & Schellenberg, 2012; Lundqvist, Carlsson, Hilmersson, & Juslin, 2009; Vuoskoski & Eerola, 2011) and states that are easy to understand using mainstream theories of emotion (e.g., Lazarus, 1991; Scherer, 2001).

Other emotional responses to music, however, are less easily categorized, such as feeling moved (Juslin & Laukka, 2004), touched (Silvia & Nusbaum, 2011), and awe-inspired (Silvia, Fayn, Nusbaum, & Beaty, 2015), and getting physiological reactions like chills or goosebumps (Laeng, Eidet, Sulutvedt, & Panksepp, 2016). Many studies have found that music is a common cause of these complex states (Craig, 2009; Grewe, Nagel, Kopiez, & Altenmüller, 2007; Juslin, Harmat, & Eerola, 2014; Panksepp, 1995). Chills, for example, can be induced in laboratory studies (Goldstein, 1980; Grewe et al., 2007; Juslin et al., 2014) and occur often in everyday music listening (Nusbaum et al., 2014).

#### **The Inspired, Positive, Euphoric Sense of Crying**

As we mentioned earlier, research on intense aesthetic reactions—such as chills, awe, and feeling touched and moved—suggests that they have several emotional senses (Kuehnast et al., 2014; Maruskin et al., 2012). Like those states, feeling like crying seems to appear as part of both intensely positive and negative experiences. The sense that has received the most attention is the essentially positive one: people cry as part of an inspired, transcendent, or euphoric response to the arts. Crying, in this case, is wrapped up in a compelling positive experience.

In their analysis of “aesthetic crying,” Miceli and Castelfranchi (2003) proposed that *helplessness* was the core theme, but that the helplessness came from an inability to comprehend and express something ineffably wondrous or beautiful. In their stage model, people's attempt to understand something sublime is frustrated, and they are then unable to cope with their feelings of frustration and their inability to understand the experience. People then feel helpless, give up in their attempt to understand and express the experience, and cry as result. Although aesthetic crying shares the same essential theme of helplessness as other forms of crying, Miceli and Castelfranchi point out that the aesthetic experience is essentially positive and

“devoid of suffering,” but that “if any suffering or distress is to be included, it is a very pleasant and ‘sweet suffering’” (p. 260).

A similar but more elaborate stage model was proposed by Pelowski (2015; Pelowski & Akiba, 2011) in his analysis of crying in response to visual art. In this model, people first try to assimilate and cognitively master art when they encounter it. If assimilation works, people have an ordinary “facile” experience (Pelowski, 2015, p. 3), such as simply finding the artwork pleasing or interesting. But if they cannot cognitively master it, they engage in “abort and escape” strategies, such as recategorizing the experience to be mundane, leaving the environment, or withdrawing mentally. If these attempts at escape fail, then people experience helplessness and give up. The process of quitting, in this model, involves a broad set of experiences, such as feeling like crying, heightened self-awareness, insight, schema change, and feelings of happiness and epiphany.

In these two models, the path to the positive experience of awe-inspired crying runs through struggling but failing to understand an experience (and, in Pelowski’s model, an additional failure to escape from it). The euphoric experience is thus rooted in appraisals of helplessness. Other models of awe-inspired crying, however, cut straight to the chase. Braud (2001) introduced the concept of *tears of wonder-joy*—crying connected with intense positive feelings like joy, awe, wonder, and transcendence. Such feelings seem common in music (Craig, 2009; Gabrielsson, 2002; Pelowski, 2015; Scherer, Zentner, & Schacht, 2001–2002). For example, people often describe feeling euphoric (Gabrielsson, 2011), seized or consumed by the music (Gabrielsson, 2002), or moved (Scherer et al., 2001–2002).

To Braud (2001), tears of wonder-joy stem not from helplessness and thwarted understanding but from “encountering something of vast importance and meaning” (p. 100). The experience can come from a range of events, aesthetic or otherwise, but they seem essentially like the emotion of *awe* as described in theoretical (Keltner & Haidt, 2003) and phenomenological research (Bonner & Friedman, 2011; Schneider, 2009). Although this issue is tacit in Braud’s writing, the experience of wonder-joy crying seems relatively direct: when people are open to new and wondrous experiences, they can have inspired and euphoric responses to them directly, not indirectly via first trying and failing to minimize and escape from the experience. Indeed, an assumption of the humanistic and transpersonal traditions that motivate much of this research is that it is natural for people to desire and seek ineffable, transcendent, and self-transforming events.

### The Sad, Distressed, Upset Sense of Crying

Their subtle differences aside, the models we’ve discussed so far share a sense of aesthetic crying as essentially positive, as a state of inspiration and wonder. The second sense of aesthetic crying is the obvious one: people are sad, distressed, and upset. People commonly cry when they’re sad—further proof that psychology isn’t always rocket surgery—and this is surely one of the major senses of feeling like crying in response to music.

But crying rooted in sadness is complex in its own way. Tan’s (1996) notion of types of emotion experienced from film serves as a useful parallel for music. People can experience emotions as a

result of a film (e.g., sadness at the tragic narrative events), or they can experience emotions associated with the film as an artifact in the world (e.g., anger at a terrible one). In the one case, their emotions are “from” the film; in the other, they are “about” the film.

Likewise, sadness-based crying from music can reflect different sources. In the one case, people feel like crying “from” the music. Much music deliberately seeks to evoke feelings of sorrow and loss through a range of songwriting and performance devices (Vuoskoski & Eerola, 2012), from depressing lyrics to aspects of the musical structure (Scherer et al., 2001–2002), such as descending harmonic passages, melodic structure, and melodic ornamentation (Sloboda, 1991). In this case, musicological features internal to the song evokes feelings of sadness and crying from people who weren’t feeling that way beforehand. In the other case, people feel like crying from the broader sad context that the music is embedded in, such as when people hear music at funereal and commemorative events or when a song reminds people of a tragic event or loss. Music in these contexts could but needn’t be “sad” formally or lyrically. For example, someone might cry upon hearing an upbeat “wedding dance” song after the loss of a spouse.

As with Tan’s (1996) categories of film emotions, these aren’t distinct categories (e.g., people can choose to listen to “sad songs” when they are already feeling sad). Nevertheless, the distinction between features of music itself versus the broader context highlights the complexity of the seemingly simple act of feeling like crying when sad and listening to music.

## **The Present Research**

The present study examined the notion that there are at least two distinct “emotional types” of feeling like crying in response to music: a type marked by feeling awe-inspired, moved, and euphoric (an “awe” group), and another marked by feeling upset, distressed, or helpless (a “sad” group). These likely aren’t the only ones, given the variety of feelings associated with crying (Miceli & Castelfranchi, 2003), but they are likely the most common ones and hence a fruitful place to start. A large sample of adults was asked to recall, if they could, an example of when they cried or felt like crying while listening to music. After describing the event, they rated their emotions during the experience on a broad range of feelings. To explore the prevalence and qualities of types of musical crying, we used latent class analysis. This largely bottom-up technique allows us to cluster participants who report similar emotional profiles when feeling like crying during music listening. We expected that this analysis will yield two major classes of emotional profiles—an “awe” class and a “sad” class.

To evaluate the validity of our latent class solution, we examined how two personality traits—neuroticism and openness to experience—predict class membership. Because neuroticism is characterized by a propensity to experience negative emotional states (Widiger, 2009) and people higher in neuroticism experience more intense sadness when listening to music (Ladinig & Schellenberg, 2012), we expect that people high in neuroticism would more likely to report an event in the “sad” class. In contrast, we expect openness to experience to predict reporting an event in the “awe” class. Openness has previously been associated with awe experiences (Silvia et al., 2015) and feeling touched (Hanich, Wagner, Shah, Jacobsen, & Menninghaus, 2014) in relation to music, and is more generally related to emotional complexity (Terracciano, McCrae, Hagemann, & Costa, 2003) and a deeper appreciation for and engagement with the arts and

creativity (Fayn, MacCann, Tiliopoulos, & Silvia, 2015; Kaufman, 2013; Kaufman et al., 2016; Thomas, Silvia, Nusbaum, Beaty, & Hodges, 2016).

Additionally, we explored how different features of the event (e.g., were people alone? Was it music that they picked? Would they like it to happen again?) were related to personality and to the kind of event (sad or awe-inspired) that people reported. Collectively, the findings should illuminate what feeling like crying when listening to music feels like.

## Method

### Participants and Procedure

Participants were 892 adult university students who participated and received credit toward a research option. The data were collected as a series of subsamples over the course of several years as part of different research projects. Most participants were from convenience samples of young adults collected at the University of North Carolina at Greensboro ( $n = 787$ ); the remaining participants ( $n = 105$ ) were from the University of Sydney, Australia. The full sample was 69.6% female and 18.98 years old ( $SD = 6.16$ ), which mirrors the age and gender composition of the broader young adult population at these institutions. Some participants had been excluded from these subsamples because of elevated scores on an infrequency scale, indicative of inattentiveness or careless item responses (for details, see Maniaci & Rogge, 2014; McKibben & Silvia, 2015, 2016).

After providing informed consent, participants were asked to recall and describe a time when they felt like crying, or did cry, in reaction to listening to music. The participants who reported having an experience of feeling like crying then completed the full feeling like crying measure, which asked them to describe and rate the experience. Participants then completed measures of personality and other measures unrelated to the present research. All participants completed the study in small groups at individual computers. Participants were given credit toward a course's research participation option.

### Measures

**Feeling like crying.** Participants completed a 25-item questionnaire developed for this project that asked about feeling like crying in response to music (see the Appendix). Participants were first asked,

Please take a moment to remember a time when music made you feel like crying or cry. It can be recent, or it can be far in the past, so long as you remember the experience. Can you remember a time when music made you cry or feel like crying? (*Yes or No*)

Participants who indicated they could remember such an experience were then asked a series of questions about the context of the experience and qualities of the music: "What was the song or event, and roughly how long ago was it?" (*Free response*); "Were you alone, by yourself, or were you with other people?" (*Alone or With Others*); "Was the music something familiar that you had heard before, or was it something new?" (*Familiar, had heard before or New, never*

heard before); “Did you choose the music that made you cry or feel like crying?” (Yes or No); and “Did the music have special meaning to you?” (Yes or No).

Participants then rated how intensely they felt 16 emotions on a scale from 1 (*Not at all*) to 5 (*Very*). All emotion questions were framed in a similar way (e.g., “How HAPPY did you feel?”), and covered a range of emotional experiences—*happy, sad, inspired, curious, anxious, overwhelmed, out of control, amazed, touched, euphoric, awe, upset, depressed, angry, chills or goosebumps, and pleasant*. Participants were then asked whether they would like this experience to happen again (*No, definitely not* to *Yes, definitely*; 5-point scale) and how often listening to music made them cry or feel like crying (*Never* to *Often*; 5-point scale).

**Assessment of personality.** Personality was measured using four scales, with subsets of our sample completing different combinations of these measures. Table 1 shows the measures each subsample completed. The five factor model of personality—neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness—was measured using the NEO FFI-3 (McCrae & Costa, 2007). Each factor is measured with 12 items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*). Four hundred and five participants completed this measure. Additionally, 204 participants completed the openness to experience items from the NEO PI-3 (McCrae & Costa, 2010), which consists of 240 items on a scale from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Table 1.** Patterns of Missing Data for Openness to Experience and Neuroticism Measures

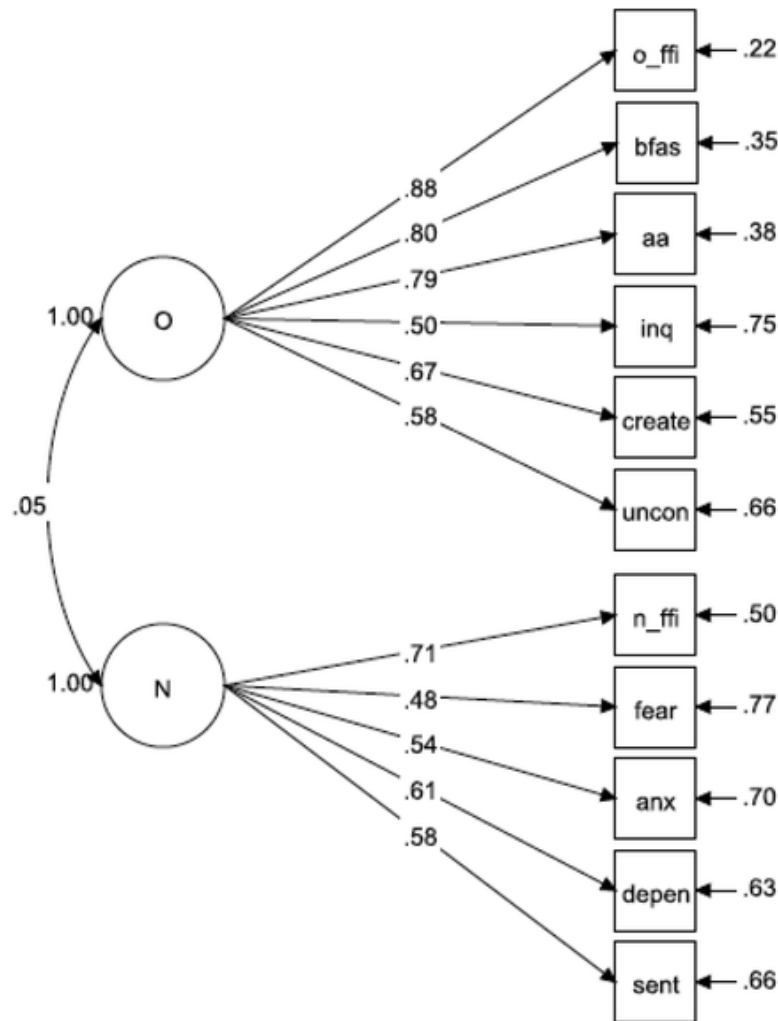
Personality measure	Participants in subsample					Total
	<i>n</i> = 102	<i>n</i> = 303	<i>n</i> = 139	<i>n</i> = 144	<i>n</i> = 204	
BFAS Openness Aspect	X	X		X	X	753
NEO Neuroticism	X	X				405
NEO Openness	X	X			X	609
HEXACO Fear Facet	X		X	X	X	589
HEXACO Anxiety Facet	X		X	X	X	589
HEXACO Dependence Facet	X		X	X	X	589
HEXACO Sentimentality Facet	X		X	X	X	589
HEXACO Aesthetic Appreciation Facet	X		X	X	X	589
HEXACO Inquisitiveness Facet	X		X	X	X	589
HEXACO Creativity Facet	X		X	X	X	589
HEXACO Unconventionality Facet	X		X	X	X	589

Note. *N* = 892. An “X” indicates that the subsample completed the measure. BFAS = Big Five Aspect Scale.

Seven hundred and fifty-three participants completed the openness to experience portion of the Big Five Aspects Scale (DeYoung, Quilty, & Peterson, 2007) consisting of 20 items rated on a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*). This scale divides each of the five personality factors (neuroticism, extraversion, openness to experience, agreeableness, and conscientiousness) into two aspects, which is a middle-ground between overarching personality traits and more detailed facets, such as those measured by the NEO. For openness to experience, these aspects were *openness* (10 items) and *intellect* (10 items).

Some participants also completed the HEXACO (Lee & Ashton, 2004), a measure of the six-factor model of personality. The six-factor model, like the five factor model, includes trait and

facet level scores for extraversion, agreeableness, conscientiousness, emotionality (neuroticism), and openness to experience. The additional personality trait in this model is honesty-humility. Because the present research is interested in openness to experience and neuroticism, we examined scores only for these traits and their respective facets—for openness to experience, *aesthetic appreciation*, *inquisitiveness*, *creativity*, and *unconventionality*, and for emotionality (neuroticism), *fearfulness*, *anxiety*, *dependence*, and *sentimentality*. Sixteen items were rated on a scale from 1 (*Strongly Disagree*) to 5 (*Strongly Agree*) for each factor. Five hundred and 89 participants completed this measure.



**Figure 1.** A confirmatory factor analysis of openness to experience and neuroticism.  $n = 892$ . Standardized effects are displayed.

We formed latent variables for openness to experience and neuroticism for use in the latent class analysis. Because a part of the sample completed all the measures, maximum likelihood methods for missing data allow a confirmatory factor analysis of the scales for the full sample (Enders, 2010) and a latent variable factor score to be estimated for each person. For openness to experience, the indicators were the overall openness score from the NEO, the openness aspect from the Big Five Aspects Scale, and the four openness facets from the HEXACO. For neuroticism, the indicators were the overall neuroticism score from the NEO FFI and the four

HEXACO emotionality facets. The confirmatory factor analysis fit well:  $\chi^2(143) = 148.46, p < .001$ ; CFI = .93; RMSEA = .05, 90% CI [.04, .06]; SRMR = .07. Reliability for the openness (Coefficient  $H = .90$ ) and neuroticism (Coefficient  $H = .74$ ) factors was acceptable. Figure 1 depicts the model.

The latent variable factor scores were saved to be used as predictors in the latent class analysis. These factor scores were standardized ( $M = 0, SD = 1$ ) to enable more intuitive interpretations of their relationships. We elected to use observed factor scores to simplify the estimation of the latent class models, which are computationally intensive. Additionally, because not all participants reported having a feeling like crying experience, the openness and neuroticism factor scores are based on the entire sample, ensuring that these factor scores do not just represent the relative personality scores of the subsample who felt like crying when listening to music.

## Results

### Who Recalled a Crying Experience?

Overall, 801 (89.80%) of our participants reported having felt like crying in response to music. Because some participants didn't report having experienced feeling like crying in response to music, we used our personality factor scores to predict who was more likely to have this experience. We simultaneously regressed the binary variable of remembering an experience on the standardized openness and neuroticism factor scores.<sup>1</sup> The results indicated that openness ( $b = .56, SE = .12, p < .001$ ) and neuroticism ( $b = .87, SE = .13, p < .001$ ) were significant, positive predictors of remembering a feeling like crying experience. These logistic coefficients can be framed as odds ratios. As openness increased by 1 standard deviation, the odds of remembering a feeling like crying experience increased,  $OR = 1.74, 95\% CI [1.37, 2.21]$ . Similarly, as neuroticism increased by 1 standard deviation, the odds of remembering a feeling like crying experience increased,  $OR = 2.39, 95\% CI [1.86, 3.08]$ . The probability of remembering or not remembering an experience based on openness and neuroticism are presented in Figure 2.

### Qualities of Feeling Like Crying

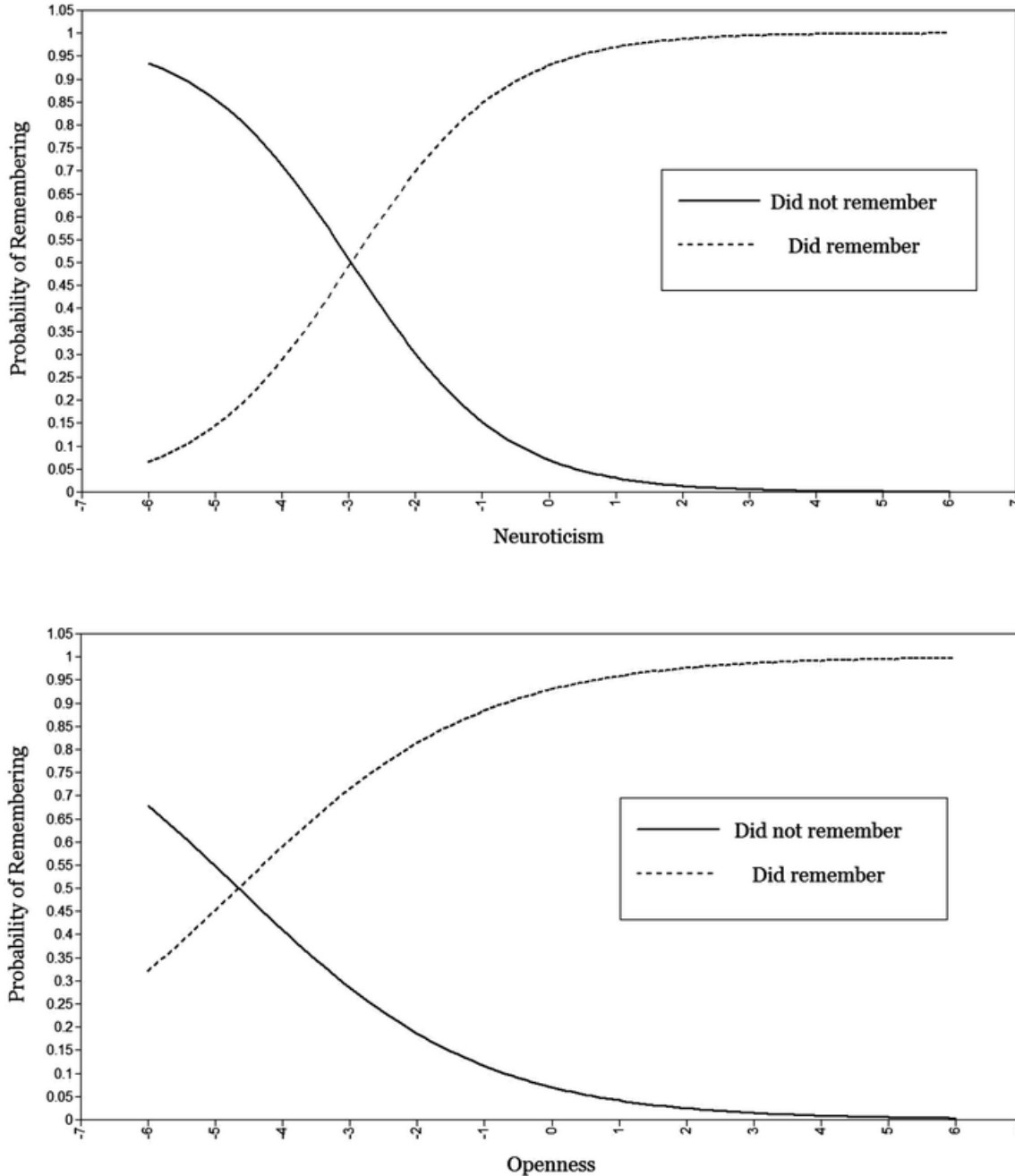
For people who could recall an instance of musical crying, we also asked about different qualities of the experience: if the music was familiar, self-chosen, or had special meaning, if people were alone during this experience, and if they would like this experience to happen again. Additionally, people reported how often music makes them feel like crying (see Appendix for the items). Overall, people reported that feeling like crying to music experiences occurred infrequently ( $M = 2.58, SD = .78$ , on a 1–5 scale). As for the particular experience people reported, the music was usually something familiar that participants had heard before (82.65%) and had special meaning to them (82.40%), and people tended to be by themselves (71.79%). It is interesting to note that participants reported feeling like crying to music they selected (52.81%) and music they didn't (47.19%) almost equally. On average, people did not want to have another feeling like crying experience ( $M = 2.89, SD = 1.52$ ), but a substantial group of participants reported strongly wanting to have a similar experience in the future (23.35% selected

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<sup>1</sup> The interaction of the openness and neuroticism factor scores was not significant ( $b = -.13, SE = .13, p = .322$ ).



5 on the 5-point Likert scale).



**Figure 2.** The odds ratio of remembering a feeling like crying experience predicted by neuroticism and openness.

We then examined how openness to experience and neuroticism predicted responses to the features of the feeling like crying experience and overall feeling like crying frequency. Both openness ( $\beta = .20, SE = .03, p < .001$ ) and neuroticism ( $\beta = .33, SE = .03, p < .001$ ) predicted how often people have feeling like crying experiences—as openness and neuroticism increase, so did the frequency with which people have these experiences. Additionally, people higher in openness were more likely to say they wanted this experience to happen again ( $\beta = .25, SE =$

.03,  $p < .001$ ); neuroticism did not predict wanting the experience to happen again ( $\beta = .01$ ,  $SE = .04$ ,  $p = .695$ ).

Because the other items were binary outcomes, we performed logistic regressions (see Table 2 for full results). People higher in openness were more likely to have selected the music ( $b = .23$ ,  $SE = .07$ ,  $p = .002$ )—as openness increased by 1 standard deviation, the odds of having selected the music increased,  $OR = 1.26$ , 95% CI [1.09, 1.45]. Additionally, people higher in neuroticism were more likely to have been listening to music that was personally meaningful,  $b = .40$ ,  $SE = .10$ ,  $p < .001$ . As neuroticism increased by 1 standard deviation, the odds of listening to personally meaningful music increased,  $OR = 1.50$ , 95% CI [1.23, 1.83].

**Table 2.** Qualities of Feeling Like Crying Predicted by Openness to Experience and Neuroticism

Outcome	Openness to Experience		Neuroticism	
	<i>b</i> ( <i>SE</i> )	<i>OR</i> [95% CI]	<i>b</i> ( <i>SE</i> )	<i>OR</i> [95% CI]
Familiar music	.03 (.09)	1.03 [0.85, 1.24]	.04 (.09)	1.04 [0.87, 1.25]
Picked music	.23* (.07)	1.26 [1.09, 1.45]	.13 (.08)	1.14 [0.98, 1.32]
Personally meaningful	.05 (.09)	1.05 [0.87, 1.26]	.40*** (.10)	1.50 [1.23, 1.83]
Alone or with others	-.07 (.03)	.94 [0.81, 1.09]	.08 (.08)	1.08 [0.93, 1.26]

Note. The regression weights are logistic regression coefficients. *OR* = odds ratio; *CI* = confidence interval.

\*  $p < .05$ . \*\*\*  $p < .001$ .

### Latent Class Specification and Estimation

To determine whether there are distinct, nominal types of aesthetic crying, we performed latent class analysis. For sample size guidelines, Swanson, Lindenberg, Bauer, and Crosby (2012) recommended an average class size of at least 300 to avoid incorrectly estimating the number of classes. We expected the analysis to yield two classes, so an overall sample size of 892—801 for those reporting a feeling like crying experience—should be sufficiently large.

In latent class analyses, several starting values are chosen to avoid local solutions (Hipp & Bauer, 2006). When solutions using a range of starting values converge, the final model probably represents the best global solution. Mplus 7 produces random sets of starting values based on a seed value, which are perturbed by a scaling factor. The present research used several seed and perturbation values. These starting values iterate to initial solutions, and the best initial solutions are then run to completion to produce the final solution. The final model in the present research used 10,000 random starting values, with 500 solutions run to completion. The final model was then evaluated with different seeds.

Much like determining the number of factors in exploratory factor analysis, determining the number of classes in latent class analysis involves a mix of statistical tests, fit indices, rules of thumb, and conceptual guidance (Collins & Lanza, 2010; Jung & Wickrama, 2008; Nylund, Asparouhov, & Muthén, 2007; Silvia, Kaufman, & Pretz, 2009; Swanson et al., 2012). First, there are statistical tools that can help in this determination. Entropy is an index of classification quality—an entropy value of .90 or greater is considered a marker of a good solution. The Akaike's information criterion (AIC), Bayesian information criterion (BIC), and adjusted (based on sample size) BIC are other statistical tools that also indicate model fit, with lower values

indicating better fit. Additionally, there are inferential tests that can be conducted to see which of two solutions better fits the data. For example, likelihood ratio tests allow direct comparison of two adjacent solutions (e.g., a two class vs. three class model; Lo, Mendell, & Rubin, 2001). Though these statistical tools can help guide the selection of the number of classes, they do not always point in the same direction.

In addition to statistical methods, there are some common rules-of-thumb. For this work, we sought to avoid small classes (e.g., less than 5% of the sample). Parsimonious solutions consisting of fewer-but-bigger classes are more likely to replicate because small classes may be quirks of a particular sample. Additionally, Swanson et al. (2012) recommends an average of 300 people per class. Because our conceptual interest is in qualitative, nominal groups, we avoided solutions with quantitative “intensity classes” (Silvia et al., 2009), which are classes with a similar profile as another class but at a different level (i.e., the shape of the profiles is the same, but one class has consistently higher means). Again, these methods may not agree with one another or with the statistical indices, so it is important to use “a combination of statistical criteria, parsimony, and interpretability” (Collins & Lanza, 2010, p. 82).

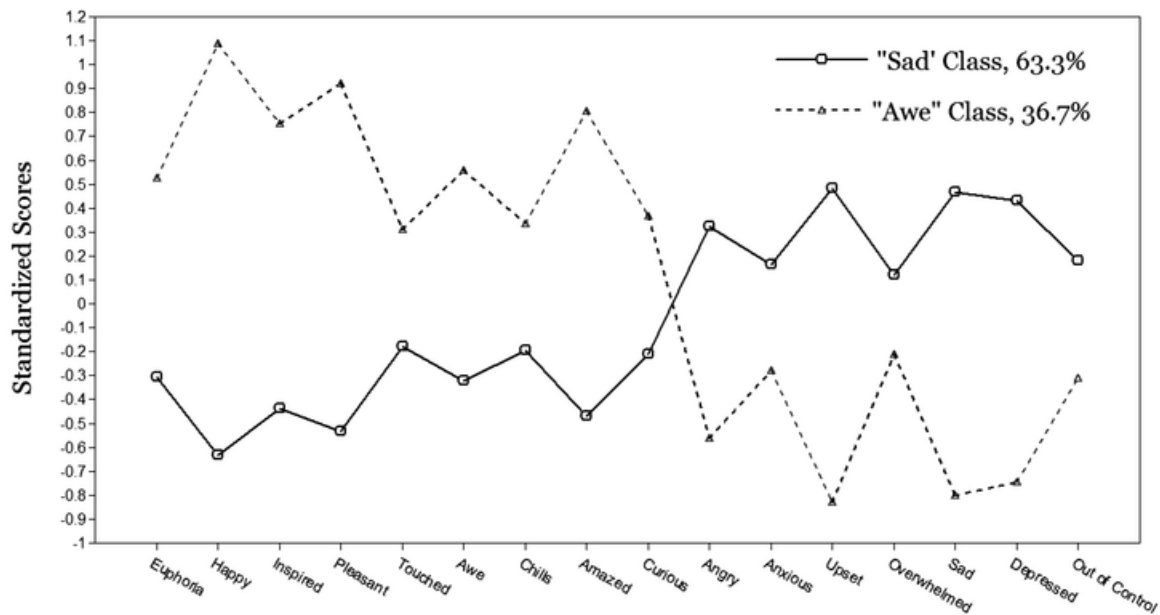
In the present research we examined solutions with two, three, and four classes. For these latent class models, we used standardized scores from the 16 emotion items as indicators. The entropy, AIC, BIC, and adjusted BIC values for two, three, and four class solutions in the current study are presented in Table 3. The statistical indices provided mixed results: entropy favored a two class solution, but the AIC, BIC, and adjusted BIC suggested a four class solution. We tested our three class solution against the two class solution (considered the null hypothesis in this analysis) using a likelihood ratio test, and the results indicate that the two class solution is more appropriate,  $p = .083$ . No statistical index favored a three-class solution, and none of the solutions produced tiny class sizes, so the determination was largely between the two and four class solutions. The additional classes in the four-class model had similar profiles but different levels, which suggested that they could be assimilated into the larger sad and awe classes yielded by the two-class model.

**Table 3.** Statistical Indices of Latent Class Model Fit

Index of fit	Class solution		
	Two classes	Three classes	Four classes
Entropy	.94	.87	.88
BIC	33,684.40	33,052.47	32,520.58
Adjusted BIC	33,528.99	32,842.88	32,257.00
AIC	33,454.79	32,743.20	32,131.65

*Note.*  $n = 801$ . BIC = Bayesian information criterion; AIC = Akaike’s information criterion.

The two-class solution is shown in Figure 3; Table 4 shows the estimated mean emotion ratings (standardized and raw) for each class. Table 5 shows the class-assignment probabilities. The “sad” class, the largest class, contained 63% of the sample; the “awe” class had the remaining 37% of the sample.



**Figure 3.** The latent class profiles for the two-class model.

**Table 4.** Estimates Emotion Means for the Two Classes

Emotion	Standardized scores		Raw scores	
	Sad	Awe	Sad	Awe
Euphoria	-0.30	0.53	2.14	3.16
Happy	-0.63	1.09	1.53	4.01
Inspired	-0.44	0.75	2.51	4.18
Pleasant	-0.53	0.92	2.11	4.22
Touched	-0.18	0.31	3.71	4.29
Awe	-0.32	0.56	2.60	3.80
Chills	-0.19	0.33	2.96	3.71
Amazed	-0.47	0.81	2.15	3.99
Curious	-0.21	0.37	2.08	2.82
Angry	0.32	-0.56	2.70	1.46
Anxious	0.16	-0.28	2.69	2.11
Upset	0.48	-0.83	4.07	2.18
Overwhelmed	0.12	-0.21	3.72	3.30
Sad	0.47	-0.80	4.33	2.64
Depressed	0.43	-0.75	3.58	1.89
Out of control	0.18	-0.31	2.51	1.87

*Note.* These are model-estimated means for the emotion items for the two classes. The analyses used the standardized scores (shown in Figure 3), which are more intuitive to interpret, but the raw scores are shown as well for interested readers. The items were completed on a 1–5 scale.

**Table 5.** Average Probabilities of Most Likely Class Membership (Row) by Class (Columns)

Group	"Sad" class	"Awe" class
"Sad" class	.98	.02
"Awe" class	.02	.98

*Note.* This class solution is depicted in Figure 3.

## Interpreting the Latent Classes

Figure 3 shows the class profiles for the emotions felt during the feeling like crying episode. The  $y$ -axis shows the level of intensity for each emotion (on a standardized  $z$ -metric), and the  $x$ -axis lists the 16 emotions. The two classes demonstrated different patterns of intensity across the reported emotions. The “sad” class reported higher levels of anger, anxiety, feeling upset, feeling overwhelmed, sadness, depression, and feeling out of control. The “awe” class showed an opposite pattern, with higher levels of euphoria, happiness, inspiration, pleasantness, feeling touched, feeling awe, experiencing chills, amazement, and curiosity. This solution was consistent with our expectations: the “sad” class was characterized by higher levels of feelings of upset, sadness, and anxiety, whereas the “awe” class reported higher levels of awe, euphoria, and happiness.

## Personality and the Latent Class Solution

We next examined how openness to experience and neuroticism predicted group membership. Using the standardized personality factor scores, we regressed class membership on openness to experience and neuroticism.<sup>2</sup> Because there are only two classes, a logistic regression analysis can estimate whether personality affects the odds of belonging in one class instead of the other. The model was scaled to predict membership in the sad class.

These results indicated that openness was a significant, negative predictor of membership in the “sad” class,  $b = -.56$ ,  $SE = .20$ ,  $p = .005$ . (Put differently, people high in openness to experience were more likely to be in the “awe” class than the “sad” class.) Neuroticism was a marginal predictor of membership in the “sad” class,  $b = .45$ ,  $SE = .24$ ,  $p = .067$ . As openness to experience increased by 1, the odds of belonging in the “sad” class decreased,  $OR = .57$ , 95% CI [0.39, 0.84]. As neuroticism increased by 1, the odds of belonging in the “sad” class increased,  $OR = 1.56$ , 95% CI [0.97, 2.52].

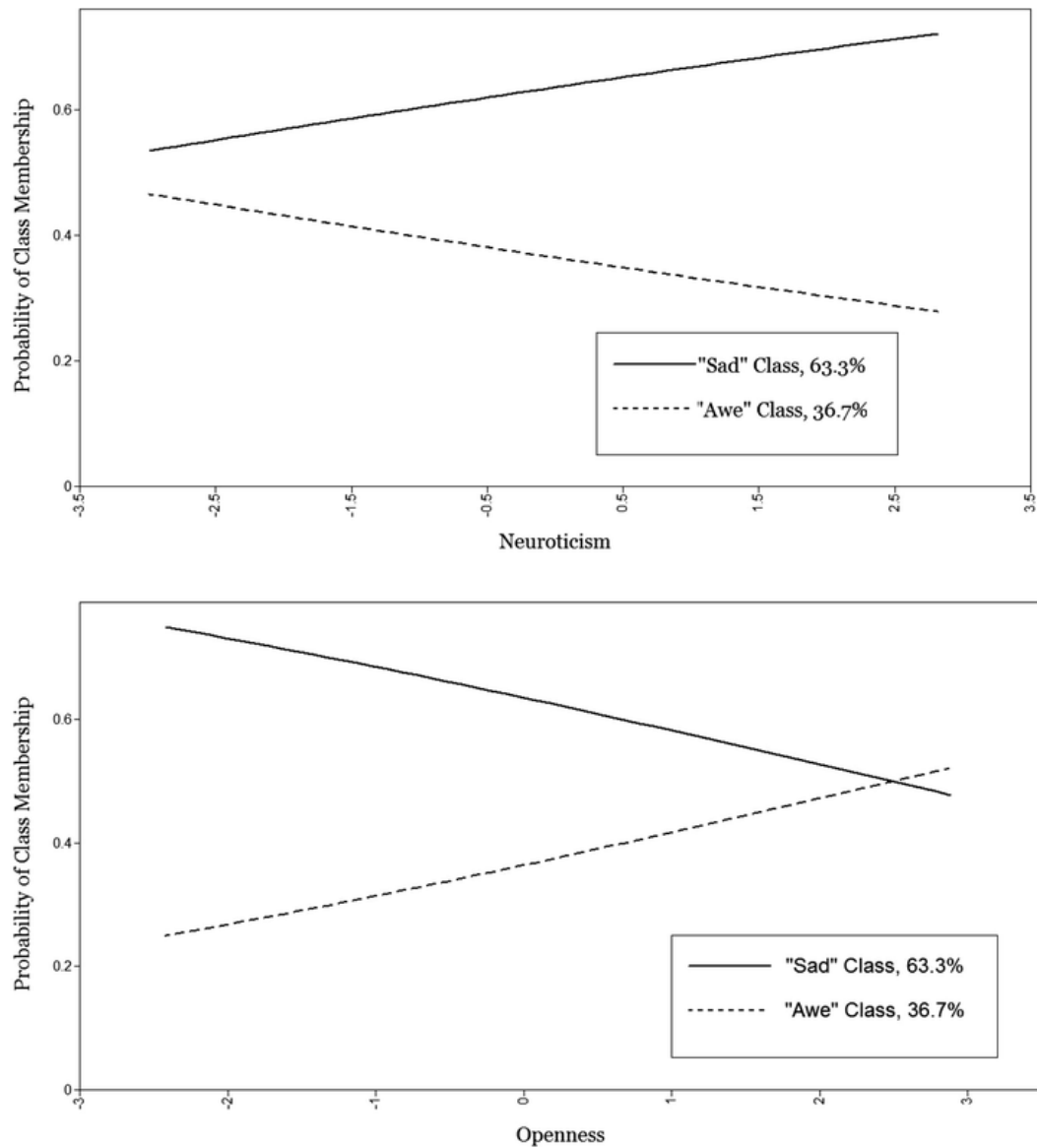
These effects can be visualized in terms of probabilities. Figure 4 depicts the probability of belonging to either class as a function of openness to experience and neuroticism. As the figure shows, people’s experience of feeling like crying is more likely to belong in the “awe” class as openness to experience goes up.

## Qualities of the Crying Event and the Latent Class Solution

How was membership in the two classes related to the qualities of the feeling like crying event? To explore other differences between the two classes, we regressed the classes on the six experience quality items. The model was scaled to predict membership in the sad class. Responses for overall frequency of feeling like crying experiences and wanting the experience to happen again were standardized.

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<sup>2</sup> We also tested the interaction of the openness and neuroticism factor scores. This, however, was nonsignificant ( $b = .57$ ,  $SE = .56$ ,  $p = .31$ ).



**Figure 4.** The probability of belonging to the “Sad” or “Awe” class as a function of neuroticism and openness to experience.

**Table 6.** Class Membership Predicted by Qualities of Feeling Like Crying Experience

Predictor	<i>b</i> ( <i>SE</i> )	<i>OR</i> [95% <i>CI</i> ]
Frequency of experience	.43*** (.13)	1.54 [1.20, 1.97]
Familiar music	-.53 (.28)	0.59 [0.34, 1.01]
Picked music	.21 (.23)	1.24 [0.79, 1.94]
Personally meaningful	.06 (.27)	1.07 [0.63, 1.79]
Alone or with others	-.76** (.25)	0.47 [0.29, 0.76]
Want to happen again	-1.76*** (.14)	0.17 [0.13, 0.23]

*Note.* The regression weights are logistic coefficients. The predictors “Frequency of experience” and “Want to happen again” are in standardized units; the other predictors are dichotomous. *OR* = odds ratio; *CI* = confidence interval.

\*\*  $p < .01$ . \*\*\*  $p < .001$ .

The results indicated that three qualities predicted class membership (see Table 6). People who more frequently had feeling like crying experiences were more likely to belong in the “sad” class,  $\beta = .43$ ,  $SE = .13$ ,  $p = .001$ ,  $OR = 1.54$ , 95% CI [1.20, 1.97]. People who wanted the experience to happen again were more likely to belong to the “awe” class,  $\beta = -1.76$ ,  $SE = .14$ ,  $p < .001$ ,  $OR = .17$ , 95% CI [0.13, 0.23]. Finally, those who were with others during the feeling like crying experience were more likely to be in the “awe” class,  $b = -.78$ ,  $SE = .25$ ,  $p = .001$ ,  $OR = .46$ , 95% CI [0.28, 0.74].

## Discussion

Feeling like crying is an interesting aesthetic experience that hasn't attracted much attention (Nusbaum & Silvia, 2014). The present research extended the small literature surrounding feeling like crying in aesthetic contexts by focusing on music listening. Based on past theories (Miceli & Castelfranchi, 2003; Pelowski, 2015), it seems likely feeling like crying can accompany diverse emotional contexts. The present research used latent class analysis to explore the largest kinds of feeling-like-crying experiences based on people's retrospective reports of a single memorable event. The findings suggested that there is a “sad” class characterized by feeling sad, upset, and overwhelmed, and an “awe” class consisting of feeling happy, excited, touched, and awe-inspired. The sad class was roughly twice as large as the awe class, so our participants were much more likely to report a feeling-like-crying experience that was distressing.

To further evaluate the validity of the two-group model, we examined the relationship these two classes had with personality. We expected that people who reported a sad experience would be higher in neuroticism, and that people who reported an awe-inspired experience would be higher in openness to experience, a trait associated with more frequently experiencing goosebumps and awe from music (Nusbaum & Silvia, 2011, 2014; Silvia et al., 2015). As expected, as the openness factor scores increased, people's experience was more likely to belong to the “awe” class rather than the “sad” class. Also as expected, as the neuroticism factor scores increased, people's experience was more likely to belong to the “sad” class. Because people were asked to recall a feeling like crying experience of their choice, the ability of personality to predict class membership ultimately reflects people higher in openness being more likely to recall an “awe” experience and people high in neuroticism more readily recalling a “sad” experience. People may very well experience both subtypes but more easily recall one type.

Additionally, we examined how different qualities of feeling like crying experiences related to class membership. People who reported feeling like crying from music more often were more likely to belong to the “sad” class. Because the “sad” class contained two thirds of the sample, the sad feeling like crying experience is probably the more frequently experienced subtype. The “awe” class was predicted by wanting the experience to happen again. This reaffirms this subtype of feeling like crying experience is a positive one, reflected by both the emotional profile and the desire to repeat the experience. Additionally, events in the “awe” class were more likely to happen when people were with others during their feeling like crying experience. This may be related to the context in which this experience happens (e.g., public performance of music),

which future research should explore. Whether the music was familiar, picked by the listener, or had personal meaning did not predict class membership.

The dual quality of feeling like crying mirrors findings from recent research on similar unusual aesthetic states. Aesthetic chills, for example, are a common marker of awe-like states (Silvia et al., 2015) that happen when people feel amazed and inspired, but they also occur when people feel anxious and threatened (Maruskin et al., 2012). Likewise, a recent line of research on the conceptual structure of “being moved” shows that it is essentially ambivalent (Kuehnast et al., 2014). The state of being moved was most closely associated with sadness and joy, and it typically involved the activation of both positive and negative states (Menninghaus et al., 2015), consistent with the enjoyment of moving but upsetting stories (e.g., Hanich et al., 2014). The relationships between states like chills, awe, crying, and feeling moved are not well understood, but emotional heterogeneity is a salient feature of each of them. As a result, as research progresses, it might be fruitful to view these experiences as a family of states, perhaps with feeling moved or awe as the central, prototypical experience and the rest as variants or markers of the prototypical experience.

Past theory and research on feeling like crying has emphasized crying in fine arts contexts, primarily people viewing paintings in gallery settings (Pelowski, 2015; Pelowski & Akiba, 2011). Music, for both cultural reasons (e.g., its ubiquity and popularity) and structural reasons (e.g., its temporal qualities), varies from the fine arts in ways that might make it less easily captured with past models. Pelowski’s (2015) model of aesthetic crying, for example, details stages people go through that culminate in a feeling like crying experience. Some of these stages, however, seem less applicable to music contexts. In particular, the model suggests that people try to assimilate the aesthetic object to existing knowledge. If they are unable to do so, people enter the model’s “escape” stage, where they seek to behaviorally or cognitively leave the situation. Only if escape is unsuccessful do people capitulate to the situation, thus creating the theme of helplessness that animates feeling like crying.

More general theories of awe (Keltner & Haidt, 2003) or crying (Miceli & Castelfranchi, 2003) do propose encountering something “vast” that lies outside of one’s normal experience and is not easily assimilated, and this is central to the family of awe states. But such models do not assume that people necessarily try to escape from the situation, either mentally or physically, during this process of understanding. It is hard to accommodate an “escape stage” to musical crying for a couple of reasons. With the widespread availability of streaming music and the portability of personal music, people largely control their musical environment, whether by selecting a specific song or turning on a radio station they enjoy. In our sample, for example, about half of the participants chose the music they were listening to, and most of them were familiar with it. Furthermore, many people desire and seek out intense, moving experiences (Braud, 2001). It seems awkward to insert an “escape stage” that presumes that people necessarily resist the unsettling of knowledge and experience that evokes the states that people were seeking.

In addition, the temporal qualities of music complicate a stage-wise understanding of the dynamics of aesthetic crying developed in museum contexts. Unlike static paintings, such as the monumental Rothko paintings used in past work (Pelowski & Akiba, 2011), music unfolds over time. Models of musical chills, such as Huron’s (2006; Huron & Margulis, 2010) ITPRA model,



emphasize that the chill response to music depends upon the confirmation or contradiction of expectations. These expectations stem from general musical knowledge and from song-specific expectations established by the piece. Experiences like chills and feeling like crying thus rise and fall over the course of song. The stages involved in intense experiences like chills and crying during the course of a piece of music probably differ from stages involved in static art forms.

In short, future research should explore both domain-general and domain-specific aspects of feeling like crying in aesthetic contexts. It seems likely that important factors are specific to particular art forms, such as the 3D quality of sculpture, the narrative quality of film and theater, the social quality of live theater and dance, and the often monumental scale of architecture. These domain-specific features complicate the development of general models of feeling like crying and the application of models developed in one domain to others.

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## **APPENDIX A: Feeling Like Crying Questionnaire**

People get a wide range of feelings when listening to music. Sometimes, music makes people feel like crying (they might “choke up” or “tear up”) or actually start crying.

The following questions ask about people’s experiences of feeling like crying and actually crying as a result of music.

1. Please take a moment to remember a time when music made you feel like crying or cry. It can be recent, or it can be far in the past, so long as you remember the experience. Can you remember a time when music made you cry or feel like crying? (*Yes or No*)
2. Please briefly describe it. What was the song or event, and roughly how long ago was it? (*Free response*)
3. Were you alone by yourself, or were you with other people? (*Alone or With Others*)
4. Was the music something familiar that you had heard before, or was it something new? (*Familiar, had heard before or New, never heard before*)
5. Did you choose the music that made you cry or feel like crying? (*Yes or No*)
6. Did the music have special meaning to you? (*Yes or No*)

The following questions ask you to rate the different feelings and emotions you had at the time music made you feel like crying. (Rated from 1 *Not at all* to 5 *Very*)

1. How HAPPY did you feel?
2. How SAD did you feel?
3. How INSPIRED did you feel?
4. How CURIOUS did you feel?
5. How ANXIOUS did you feel?
6. How OVERWHELMED did you feel?
7. How OUT OF CONTROL did you feel?
8. How AMAZED did you feel?
9. How TOUCHED did you feel?
10. How EUPHORIC did you feel?
11. How full of AWE did you feel?
12. How UPSET did you feel?
13. How DEPRESSED did you feel?
14. How ANGRY did you feel?
15. How much did you get CHILLS or GOOSEBUMPS?
16. Overall, how PLEASANT was the experience?
17. Overall, is this an experience you would like to happen again? (Rated from 1 *No, definitely not* to 5 *Yes, definitely*)
18. In general, how often does listening to music make you feel like crying or cry? (*Never, Very Rarely, Occasionally, Often, or Very Often*)