

## Who Enjoys Listening to Violent Music and Why?

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Negative emotions are usually avoided in daily life yet often appreciated in artistic endeavors. The present study investigated emotional experiences induced by death metal music with extremely violent themes and examined whether enjoyment of this genre of music is associated with personality traits. Fans ( $N = 48$ ) and nonfans ( $N = 97$ ) listened to 60-s excerpts of death metal music and rated their emotional experiences. Compared with nonfans, fans experienced a wide range of positive emotions including power, joy, peace, and wonder. In contrast, nonfans reported uniformly negative experiences, including tension, anger, and fear. Fans and nonfans were also distinguished by personality traits, with fans lower in conscientiousness and agreeableness, and in their motivations for listening to music. Results suggest that individuals with certain personality traits and music-listening motivations are drawn toward aggressive music with violent themes, and their enthusiasm for this genre promotes a range of positive emotional responses to this music.

### ***Public Policy Relevance Statement***

Music listening is a ubiquitous pastime for teenagers, but when that music contains themes of extreme violence, questions arise as to who listens to this music and why. Here, we show that fans of violent music differ from nonfans in personality, with lower conscientiousness and agreeableness. They also have different motivations for listening to music and contrasting emotional responses to violent music, with fans reporting feelings of power and joy, and nonfans reporting feelings of tension, fear, and anger.

*Keywords:* aggressive behavior, emotions, music, preferences, violent media

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Music listening is a ubiquitous pastime for children and teenagers. Rideout, Foehr and Roberts (2010) reported that American youths between the ages of eight and 18 listen to music an average of two hours and 31 minutes every day, and the amount of music listening increases with age. There are several motivations for listening to music, including pleasurable changes in mood and energy, establishing and maintaining social bonds, and affirming one's identity (MacDonald, Miell & Hargreaves, 2017; Thompson, 2015). Music listening can also confer temporary benefits for cognition, which may be mediated by transient changes in mood and arousal (Ilie & Thompson, 2011; Thompson, Schellenberg & Husain, 2001).

Certain genres of music owe their success to the exploration of difficult emotions, and sadness is a commonly reported emotional state induced by music (Juslin & Laukka, 2014). The popularity of dark or violent themes in music, film, and visual art raises important questions for the psychology and aesthetics of artworks (Davies, 1997; Eerola et al., 2018; Garrido & Schubert, 2011; Huron, 2011; Menninghaus, et al., 2017). Why are so many individuals drawn towards experiences that foster negative emotions such as fear and anger? What are the emotional and cognitive effects of persistent exposure to artworks that feature tragic or violent connotations?

In an examination of responses to tragic themes in film, De Wied, Zillmann, and Ordman (1994) found that tragic events were more likely to be enjoyed by viewers with high levels of empathy than by viewers with low levels of empathy. The authors argued that for many, tragic themes induce positive feelings, such as those associated with friendship, love, bravery, and perseverance. Along similar lines, Vuoskoski, et al. (2012) reported that people experience a range of emotions in response to artistic expressions of sadness. They presented 16 excerpts of sad music to 148 participants who rated their emotional responses and completed a personality questionnaire. Sadness was the most common emotion experienced, but other emotions were also induced by the music, including nostalgia, peacefulness, and

wonder. Positive evaluations of sad music were mediated by personality. Participants who reported a high level of preference for sad music were comparatively high on personality variables Openness to Experience and Empathy, implying that a desire for novelty and empathetic engagement may play important roles in the aesthetic enjoyment of sad music.

These findings are consistent with evidence that personality mediates preferences for music (Rentfrow & Gosling, 2003; Vuoskoski & Eerola, 2011a, 2011b) and that, conversely, music preferences communicate information about one's personality (Rentfrow & Gosling, 2006). Rentfrow and Gosling (2003) examined the structure of music preferences, as well as the association between personality and music preferences. They used exploratory and confirmatory factor analysis to reveal that music preferences revolved around four major types of music: Reflective and complex (classical, jazz, blues); intense and rebellious (alternative, rock, heavy metal), upbeat and conventional (country, pop, religious), and energetic and rhythmic (hip-hop, rap, soul, funk, electronic, dance). Preferences were also dependent on personality variables. For example, people who preferred intense and rebellious music – including heavy metal – tended to be open to new experiences, considered themselves to be intelligent and athletic, and showed no signs of neuroticism or disagreeableness.

Death Metal music – the focus of this investigation – falls within the category of intense and rebellious music. However, the extremely violent lyrics and aggressive textures associated with this subgenre are distinguishing characteristics, and hence the emotional consequences for listeners may be unique. Relatively little research has examined the emotional effects of listening to violent music, or the motivations for listening to such music. This gap in the literature is surprising given that genres such as Death Metal often contain lyrics with depictions of extreme sexual violence, murder, decapitation, suicide, and drug and alcohol abuse (Christenson, Roberts & Bjork, 2012).

According to Guibert and Guibert (2016), fans of Heavy Metal music such as Death Metal identify with the metal community and experience a powerful affinity to their subculture, suggesting that social bonding is one motivation for this music preference (see also Johnson & Cloonan, 2008). Membership to the community may overshadow any reservations that fans may have towards the aggressive, often misogynist lyrical content. Within the community of extreme metal fans, Kahn-Harris (2007) observed reluctance by fans to acknowledge or confront questions surrounding the lyrical messages of male violence, power and misogyny – a reluctance not borne of ignorance, but one that reflects a conscious decision to avoid engaging in critical thought – a stance Kahn-Harris refers to as *reflexive anti-reflexivity*.

Engagement with violent genres of music has also been linked with emotional and behavioral problems, including aggressive behaviors and drug and alcohol use (Chen, Miller, Grube, & Waiters, 2006; Selfhout, Delsing, ter Bogt, & Meeus, 2008). Indeed, there is an extensive body of research on media violence that suggests that high exposure to violent media, including video games with violent and anti-social content, is associated with aggression, substance abuse, early sexual behaviors, misogynist attitudes, and suicide (Gentile, 2014; Warburton & Braunstein, 2012). Some of this evidence comes from experiments involving random assignment of participants to conditions of violent and non-violent media exposure, permitting researchers to argue that exposure to violent media *causes* an increase in aggression (Anderson, et al., 2010). However, most evidence concerning the psychological and behavioral effects of media violence is correlational, restricting the kind of inferences that can be drawn. At least some of the associations between media violence and aggression reported in the literature can be explained by the fact that individuals with pre-existing problems of aggression find pleasure or comfort in listening to violent music.

Engagement with violent music may be a way for individuals who are already experiencing anger and other difficult emotions to process their feelings.

The latter possibility is consistent with research by Sharman and Dingle (2015). In their investigation, participants initially spent 16 minutes with an interviewer describing one or more events that produced intense feelings of anger. Following this anger-induction stage, one group of participants listened to extreme metal music from their own playlist, and the other group sat in silence. Listening to extreme music did not make angry participants angrier; instead, it triggered positive emotional experiences. The authors argued that listening to extreme music may, in some circumstances, be a healthy strategy for processing anger. On the other hand, the participants in this study only played music from their own playlist, so it is possible that the positive reports of emotional experience reflected their pre-existing enjoyment of this type of music. For individuals who do not already enjoy this music, such benefits might not be observed.

The current investigation sought to examine the variegated emotional experiences that are induced by music with violent themes in participants with a range of preferences for Death Metal music. We also investigated motivations for listening to violent music by fans, and the personality traits that may distinguish fans from non-fans. To that end, we administered a survey to fans and non-fans of Death Metal music. We restricted our music samples to Death Metal music that contains the following attributes: (a) lyrical content that endorses actions resulting in serious physical or emotional harm, or death, to one or more individuals; (b) non-linguistic (instrumental or prosodic) content associated with aggressive emotions such as anger, usually because the music emphasizes acoustic attributes known to induce heightened arousal and negative valence, such as high intensity, dissonance, extremes of pitch register, unpredictability, and rapid tempo.

The design of our survey was driven by three research questions. First, what emotional experiences are induced by music with extremely violent themes? Second, do fans and non-fans of violent music experience the same emotions after listening to this music? Third, is the tendency to enjoy music with violent themes associated with certain personality attributes? To address these questions comprehensively, we employed established measures of personality, empathic capacity, and propensity to use music for mood regulation, along with rating scales designed to evaluate emotional and aesthetic experiences. These ratings scales were derived from existing research on music and emotion, including research on negatively valenced (sad) music.

In view of the existing research on violent media, we considered four hypotheses. First, fans and non-fans of violent music should exhibit different personality characteristics. Second, fans and non-fans should exhibit different levels of empathic capacity. Third, fans and non-fans should report using music for different psychosocial functions. Fourth (H4), fans and non-fans of violent music should report different emotional and aesthetic responses to Death Metal music, with fans reporting more positive experiences.

## Method

### *Participants*

The sample comprised 145 Australian participants (101 females and 44 males;  $M = 21.83$  years,  $SD = 5.41$ , range = 16-44 years). Forty-eight identified as “fans of Death Metal music” and 97 identified as non-fans by responding to a question that required a categorical response of yes or no. Non-fans were recruited from Macquarie University’s pool of first-year psychology students and completed the task as part of course requirements. Fans of Death Metal music were recruited from: (1) Macquarie University’s pool of first-year psychology students; (2) a snowball sample targeting students of Sydney music colleges; and

(3) self-selection by responding to advertisements on Death Metal social media fan pages. All recruitment and data collection were completed in four months.

At the beginning of each testing session, participants were allocated by quasi-random assignment to either a 'lyric' or 'no lyric' condition. In the 'lyric' condition, the lyrics for each stimulus were displayed on the computer screen as the music was playing. In the 'no lyric' condition, participants listened to each stimulus item without the lyrics displayed. The factorial design permitted consideration of several variables, including genre preference (fans versus non-fans), the impact of lyrics, (lyrics displayed or not displayed), and sex (male/female).

Demographic information for each fan and lyric group is reported in Table 1. We recorded the amount of instrumental music training of each participant because past research suggested that music training is associated with aesthetic judgments of music (Müller et al., 2010). Participants in the fan group reported more years of music training ( $M = 6.17$  years,  $SD = 7.54$ ) than participants in the non-fan group ( $M = 2.75$  years,  $SD = 4.19$ ,  $t(143) = 3.51$ ,  $p = .001$ , 95% CI [1.49, 5.34]). However, the amount of music training of participants was uncorrelated with ratings for any emotion measure, and conclusions remained the same whether or not music training was statistically controlled.

Fans and non-fans were similar in age but the average age difference of 2.83 years was statistically reliable,  $t(143) = 3.05$ ,  $p = .003$ , 95% CI [1.00, 4.67]. Preliminary analyses revealed that one significant difference (anger ratings for fans and non-fans,  $p = .042$ ) became marginally significant ( $p = .066$ ) when the age of participants was held constant. No other statistical inferences were affected. Music training and age were excluded from further consideration. All participants reported normal hearing.

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Insert Table 1

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The decision to recruit 145 participants was determined by an examination of effect sizes observed in a parallel study that employed similar measures but considered preferences for ‘sad’ music rather than violent music (Vuoskoski, et al., 2012). In that study, 148 Finnish university students participated with an age range of 18-49 years ( $M = 23.50$ ,  $SD = 4.84$ , 114 females and 34 males). The power in Vuoskoski, et al. (2012) was strong and effect sizes were medium-to-large with generalized eta-squared values ranging between .10 and .53 (Bakeman, 2005). To avoid the practice of ‘optional stopping’ (Simmons, Nelson, & Simonsohn, 2011), a sample size of no more than 150 was deemed sufficient for the present study. This decision was corroborated using the G\*Power software platform (version 3.1.9.2) to estimate the required number of participants for a medium-to-large effect size. No participants were excluded from the analysis, all independent variables are reported, and all dependent variables were analysed.

### *Stimuli and Measures*

The music stimuli consisted of eight 60-second audio samples excerpted from Death Metal songs released within the last 20 years. We selected songs that were described by self-identified Death Metal fans as ‘most popular’, ‘best’ and ‘top’ Death Metal songs on online forums, websites and social media groups. The eight songs sampled as stimulus items appeared in multiple lists and were deemed to be suitably popular and representative of the genre. They were entitled: *Hammer Smashed Face* (Cannibal Corpse, 1992), *Blinded by Fear* (At the Gates, 1995), *We Will Rise* (Arch Enemy, 2003), *Black Seeds of Vengeance* (Nile, 2000), *Waiting for the Screams* (Autopsy, 2015), *Slowly We Rot* (Obituary, 1989), *Corporal Jigsaw Quandary* (Carcass, 1991), and *Eaten* (Bloodbath, 2004). Participants were instructed to press a ‘play’ button when they were ready to hear each excerpt. After each excerpt had finished playing, participants were able to click forward to the next page of the survey.



Participants were unable to move forward in the survey if they had not listened to a music excerpt, and they were allowed to listen to each excerpt only once. The lyrics of each of these songs are provided in the Supplemental Materials.

Quantitative measures were used to assess participants' (a) personality; (b) empathic capacity; (c) mood regulation strategies; (d) affective state; and (e) emotional and aesthetic responses to the music presented. These measures are described as follows:

(a) **Personality:** The Big Five Inventory (BFI) was used to assess participants' personality across McCrae and Costa's (1999) five personality dimensions: openness, conscientiousness, extraversion, agreeableness and neuroticism. This 44-item measure is considered to have the best psychometric properties of all of the 'Big Five' short measures (John, Donahue & Kentle, 1991; John, Naumann & Soto, 2008).

(b) **Empathic Capacity:** Participants' empathic capacity was assessed using the Interpersonal Reactivity Index (IRI; Davis, 1980, 1983), a 28-item measure of empathy across four different subscales: perspective taking (capacity to adopt others' point of view), fantasy (tendency to imaginatively transpose oneself into the feelings and actions of fictitious characters), empathic concern (other-oriented feelings of sympathy and concern for 'unfortunate others', which are described as "people less fortunate than me", "people having problems" or "someone being taken advantage of/treated unfairly"), and personal distress (self-oriented feelings of personal anxiety and unease in tense interpersonal settings). A hierarchical factor structure of the IRI found that these four subscales correspond to four separate first-order factors, suggesting that each subscale of the IRI measures a distinct and separate aspect of empathy (Pulos, Elison & Lennon, 2004).

(c) **Mood regulation strategies:** The 21-item Brief Music in Mood Regulation Scale (B-MMR; Saarikallio, 2012) was used to assess participants' use of seven different music-related mood-regulation strategies: Entertainment, Revival, Strong Sensation, Diversion, Discharge,

Emotional Experience and Solace. The B-MMR was employed to determine whether fans and non-fans of Death Metal music differ in their motivations for engaging in musical activities, for example to seek comfort, increase energy levels, or discharge difficult feelings (DeNora, 1999; Saarikallio & Erkkilä, 2007; Thayer, Newman, & McClain, 1994). It has been suggested that individuals with high levels of psychopathology may use music as a means of alleviating symptoms, and use of the mood regulation strategy Discharge (venting of negative emotions) predicts higher levels of depression, anxiety, and stress (Thomson, Reece, & Benedetto, 2014). Thus, a greater understanding of the motivations that fans and non-fans have for engaging with music may help to elucidate any differences in their emotional and aesthetic experiences to music with violent themes.

(d) Affective State: The positive and negative affect scale (PANAS) was used to evaluate participants' mood before and after listening to Death Metal music (Watson, Clark & Tellegen, 1988). The PANAS is a self-report questionnaire consisting of two 10-item scales to measure positive and negative affect. Items relating to positive affect include terms such as excited, strong, inspired, and enthusiastic whereas items relating to negative affect include terms such as irritable, ashamed, upset, and distressed.

(e) Emotional and aesthetic responses to the music: Quantitative and qualitative measures were used to assess emotions and other experiences induced by listening to violent music. The following measures were included in the survey: (1) 10 scales corresponding to categorical emotions were used as quantitative measures of a range of music-induced emotional responses. These 7-point rating scales were adapted from those used by Vuoskoski, et al. (2011) to examine emotional responses to sad music. They consisted of eight items from the Geneva Emotional Music Scale (GEMS-9, Zentner et al., 2008) (wonder, transcendence, power, nostalgia, peacefulness, joyful activity, tension, and sadness), and two additional categorical emotions of anger and fear (ratings of happiness were initially

obtained, but preliminary analysis indicated that they duplicated those obtained for “joyful activity” ( $r = .95$ ), so were excluded from the analysis). (2) Three ‘emotional reaction’ items measured engagement, enjoyment, and evoked emotion (the overall magnitude of emotional response). (3) Five items were used to assess affective responses associated with the three-dimensional model of affect (Schimmack & Grob, 2000) (positive and negative valence, high and low energy, and low tension). Ratings were obtained separately for each pole of valence and energy to accommodate the possibility of mixed emotions (e.g., high ratings of *both* positive and negative valence). For reasons of parsimony and to prevent double-measurement of the same construct, the high-tension item from this measure was omitted as its wording (“tense, clutched-up, jittery”) closely mirrored the GEMS-9 item measuring tension (“tense, agitated, nervous”). The low-tension item asked participants to rate the extent to which the words “relaxed, calm, at rest” described their emotional reaction to the song.

For measures derived from multiple items, we calculated the internal consistencies of items (Chronbach’s alpha). As shown in Table 2, consistencies for the Big Five Personality Index (BFI), Interpersonal Reactivity Index (IRI), Brief Music in Mood Regulation Scale (B-MMR), and Positive and Negative Affect Scale were satisfactory and comparable to previously reported values. Only one item was rated for each emotional and aesthetic response to the music. However, internal consistencies of the items from which the Geneva Emotional Music Scales were derived are reported in the original article, and range from 0.74 to 0.84 (Zentner, Grandjean, & Scherer, 2008).

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Insert Table 2

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Following these quantitative sections of the survey, qualitative items were included to probe behavioral tendencies associated with induced emotional states and to augment the validity of the survey. Participants were asked to nominate the strongest emotion/s they felt

during each trial and to describe why they believed listening to the music elicited this emotional response. They were also asked to list the things they felt like doing while listening to the music, given the strongest emotion/s they experienced. In addition, Death Metal fans were asked to list the strongest emotion/s they felt before listening to Death Metal, and to list what they would feel like doing if they were experiencing this emotional state, but were unable to listen to Death Metal music.

Qualitative descriptions provided by participants were subjected to a *summative content analysis*. Whereas a *manifest content analysis* involves tallying the frequency of the appearance of specific words or content (Kondracki & Wellman, 2002), a *summative* approach considers the underlying meaning of content reported by respondents (Babbie, 1992; Catanzaro, 1988; Morse & Field, 1995). For example, a summative approach would classify words such as ‘infuriated’ and ‘bursting with rage’ into a single category of, for example, ‘strong anger’. Drawing from the process outlined by Hsieh and Shannon (2005), descriptions by death metal fans and non-fans for each qualitative question were transferred into a spreadsheet. With a focus on identifying similarities in underlying meaning, words and content were tallied and then grouped together under broader category tags. The broader category tags that emerged for each question were then compared between fans and non-fans. For example, responses by fans of ‘contentedness’, ‘cheerful’ (x3), ‘enjoyment’ (x3), ‘happiness’ (x3) and ‘pleasure’ to the question *Describe the strongest emotion/s you felt while listening to the four music excerpts you have just heard*, were all classified under the broader category ‘happiness’ which was then clustered under the overarching category of ‘positively valenced emotion’ (see Table 5). This could then be compared to the categories of positively valenced emotion that arose for non-fans.

### *Procedure*

Participants were sent a link and completed the questionnaire on their own through the online platform Qualtrics using a personal or hand-held electronic device. After consenting to participate in the survey, participants answered demographic questions about age, sex, Death Metal fan status (yes or no), and if they played any musical instruments. Participants who played a musical instrument were asked to indicate which instrument they played and the years of instrumental music training. Participants then completed the PANAS, BFI, IRI and B-MMR. Participants listened to four of the eight possible stimulus items, selected randomly and independently for each participant. After hearing each stimulus item, participants completed the 18 scales adapted from Vuoskoski, et al. (2011). After completing all four trials, participants completed the PANAS for a second time, followed by all relevant qualitative measures. Participants were not forced to answer every question; however, all demographic information was provided and the proportion of missing ratings was only 0.0025, or 1 in 400 responses. Missing data were not replaced, given that the General Linear Model that was used in the analyses can accommodate small numbers of missing cells, and replacement of missing data can distort estimates of variability. The study was approved by the Macquarie University Human Research Ethics Committee (ref: 5201600451) and was carried out in accordance with the provisions of the World Medical Association Declaration of Helsinki.

## Results

### *Hypothesis 1: Personality*

Five  $2 \times 2$  between-subjects ANOVAs (fan group  $\times$  sex) were conducted across the five dimensions of the 'Big 5' personality inventory (McCrae & Costa, 1999). There were significant main effects for fan group and sex. As can be seen in Figure 1, fans of Death Metal music scored significantly lower than non-fans on the dimensions of *agreeableness*,

$F(1,141) = 4.63, p = .033, \eta^2_p = .032$ , and *conscientiousness*,  $F(1,141) = 3.92, p = .050, \eta^2_p = .027$ . Female participants scored significantly higher than males on the dimension of *neuroticism*,  $F(1,141) = 28.77, p < .001, \eta^2_p = .169$ , whereas male participants scored significantly higher than females on the dimension of *openness to experience*,  $F(1,141) = 6.41, p = .012, \eta^2_p = .043$ . There were no significant fan group  $\times$  sex interactions for all five dependent variables ( $F$ -values  $< 2.15, p$ -values  $> .108$ ).

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Insert Figure 1

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### *Hypothesis 2: Interpersonal Reactivity Index (IRI)*

A series of  $2 \times 2$  between-subjects ANOVAs (fan group  $\times$  sex) were conducted on the four dimensions of the IRI, as presented in Figure 2. There were no significant differences between fans and non-fans on the four dimensions of empathy measured by the IRI ( $F$ -values  $< .93, p$ -values  $> .338$ ). However, female participants scored significantly higher than males on the dimensions of *empathic concern*,  $F(1,141) = 17.66, p < .001, \eta^2_p = .111$ , and *personal distress*,  $F(1,141) = 11.65, p = .001, \eta^2_p = .076$ . There were no significant fan group  $\times$  sex interactions for all four dependent variables ( $F$ -values  $< 2.35, p$ -values  $> .127$ ).

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Insert Figure 2

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### *Hypothesis 3: Brief Music in Mood Regulation Scale (B-MMR)*

A series of  $2 \times 2$  between-subjects ANOVAs (fan group  $\times$  sex) investigated the music-related mood-regulation strategies of listeners (Figure 3). Of the seven different strategies captured by the B-MMR, fans scored significantly higher on *entertainment*,  $F(1,141) = 4.36, p = .039, \eta^2_p = .030$ , *revival*,  $F(1,141) = 5.06, p = .026, \eta^2_p = .035$ , *discharge*,  $F(1,141) = 5.99, p = .016, \eta^2_p = .041$ , and *emotion experience*,  $F(1,141) = 4.74, p = .031, \eta^2_p = .033$ .

There were no significant main effects of sex ( $F$ -values  $< 3.42$ ,  $p$ -values  $> .066$ ) and no significant fan group  $\times$  sex interactions ( $F$ -values  $< 2.27$ ,  $p$ -values  $> .134$ ).

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Insert Figure 3

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#### *Hypothesis 4: Emotional and aesthetic responses to music*

*Changes in positive/negative affect.* Difference scores between pre- and post-tests of the PANAS were calculated separately for positive and negative affect. Positive numbers indicate an increase and negative numbers indicate a decrease in each affective dimension after listening to violent music. The analysis considered fan group, sex, and lyric group. Therefore, two  $2 \times 2 \times 2$  between-subjects ANOVAs were conducted: one for the change in positive affect and one for the change in negative affect.

For changes in positive affect, there was a significant main effect of fan group,  $F(1,132) = 28.09$ ,  $p < .001$ ,  $\eta^2_p = .175$ . As seen in Figure 4, positive affect significantly decreased for non-fans relative to fans after listening to violent Death Metal music. There was no significant main effect of lyric group,  $F(1,132) = .11$ ,  $p > .250$ ,  $\eta^2_p = .001$ , no significant main effect of sex,  $F(1,132) = .20$ ,  $p > .250$ ,  $\eta^2_p = .001$ , and no significant interactions ( $F$ -values  $< 3.39$ ,  $p$ -values  $> .067$ ).

For changes in negative affect, there was also a significant main effect of fan group,  $F(1, 132) = 13.47$ ,  $p < .001$ ,  $\eta^2_p = .093$ . As shown in Figure 4, negative affect significantly increased for non-fans relative to fans after listening to violent Death Metal music. There was also a significant main effect of lyric group,  $F(1, 132) = 6.15$ ,  $p = .014$ ,  $\eta^2_p = .044$ .

Participants who were presented with lyrics during each excerpt of violent music showed a significant increase in negative affect ( $M = +2.98$ ,  $SE = 1.10$ ), relative to those who were not presented with lyrics ( $M = -.74$ ,  $SE = 1.03$ ). There was no significant main effect of sex,  $F(1,$

132) = .21,  $p > .250$ ,  $\eta^2_p = .002$ , and no significant interactions ( $F$ -values  $< 3.15$ ,  $p$ -values  $> .078$ ).

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Insert Figure 4

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*Experiential measures.* A series of  $2 \times 2 \times 2$  between-subjects ANOVAs (fan group  $\times$  lyric group  $\times$  sex) were conducted on each of the experiential measures. An overview of results from these analyses for the two fan groups and two lyric groups is shown in Tables 3 and 4, respectively. There were no significant main effects of sex for any experiential measure ( $F$ -values  $< 3.52$ ,  $p$ -values  $> .062$ ) and no significant interactions between any combination of the three independent variables ( $F$ -values  $< 2.97$ ,  $p$ -values  $> .087$ ). Table 3 summarizes means and significant main effects for fans and non-fans collapsed across sex and organized into three categories of findings: Categorical emotions (10 ratings), overall measures (3 ratings), and dimensional measures of emotion (5 ratings). Table 4 summarizes the significant main effects for conditions with and without lyrics collapsed across sex.

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Insert Tables 3 and 4

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*Categorical emotions.* As shown in Table 3, fans experienced significantly greater experiences of power, joy, wonder, nostalgia, peace, and transcendence, and significantly less tension, anger, and fear in response to Death Metal music, relative to non-fans. Figure 5 plots the most salient emotions experienced by fans and non-fans, and illustrates the striking difference in the experiences that these two groups had to Death Metal music. Whereas the most salient emotions experienced by fans were power, joy and peace, non-fans tended to experience tension, fear and anger in response to the music.



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Insert Figure 5

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The two most salient emotional experiences by fans, power and joy, were subjected to a series of multiple regression analyses to determine the extent to which such experiences were associated with (a) personality traits, (b) interpersonal reactivity, and (c) mood regulation strategies. First, using the big five personality measures as predictors of the two strongest emotions experienced by fans, feelings of Power and Joy were significantly predicted by Openness to Experience (Power:  $\beta = .23$ ,  $t = 2.86$ ,  $p = .005$ ; Joy:  $\beta = .31$ ,  $t = 3.88$ ,  $p < .001$ ) and (inversely) Neuroticism (Power:  $\beta = -.18$ ,  $t = -2.04$ ,  $p = .044$ ; Joy:  $\beta = -.24$ ,  $t = -2.85$ ,  $p = .005$ ) (all beta values in these results are standardized coefficients). Thus, across all participants, those who were more open to experience and less neurotic were significantly more likely to experience higher levels of power and joy while listening to the Death Metal excerpts.

Second, using the four interpersonal reactivity index measures as predictors of the strongest emotions experienced by fans, feelings of Power and Joy were significantly predicted by (inversely) Empathic Concern (Power:  $\beta = -.31$ ,  $t = -3.47$ ,  $p = .001$ ; Joy:  $\beta = -.23$ ,  $t = -2.58$ ,  $p = .011$ ). Thus, across all participants, those with less empathic concern were more likely to experience higher levels of power and joy while listening to the Death Metal excerpts than those with greater empathic concern.

Third, using the seven mood regulation measures (B-MMR) as predictors, feelings of Power were predicted by a tendency to use music for discharge ( $\beta = .23$ ,  $t = 2.29$ ,  $p = .024$ ) and (inversely) diversion ( $\beta = -.35$ ,  $t = -2.63$ ,  $p = .010$ ), whereas feelings of Joy were predicted by discharge ( $\beta = .25$ ,  $t = 2.40$ ,  $p = .018$ ), strong sensation ( $\beta = .24$ ,  $t = 2.05$ ,  $p = .043$ ), and (inversely) diversion ( $\beta = -.34$ ,  $t = -2.55$ ,  $p = .012$ ). Thus, across participants, those who listen to music for discharging emotions, but not as a diversion, tend to experience

higher levels of power while listening to the Death Metal excerpts. Similarly, those who listen to music for discharging emotions and to experience a strong sensation, but not as a diversion, tend to experience higher levels of joy while listening to the Death Metal excerpts.

As seen in Table 4, listeners who were visually presented with lyrics as they listened to each excerpt of violent music experienced significantly lower levels of *wonder*, *peacefulness*, and *joyful activity*, relative to listeners who were presented with only the audio excerpts.

*Overall measures of experience.* These three scales consisted of overall ratings of engagement and enjoyment, as well as the global magnitude of *evoked emotions* – a measure of the capacity of the music to elicit an emotional response, irrespective of the emotion elicited. As shown in Table 3, fans of Death Metal music responded with significantly higher levels of *engagement*, *enjoyment*, and *evoked emotions* when listening to violent music excerpts. As shown in Table 4, listeners who were visually presented with lyrics as they listened to each excerpt of violent music showed significantly lower levels of *engagement* than those who were not presented with lyrics.

*Three-dimensional model of affect.* Five scales capturing key dimensions underlying the three-dimensional model of affect were also measured (Schimmack & Grob, 2000). As shown in Table 3, fans of violent Death Metal music experienced significantly greater levels of *positive valence*, *high energy*, and *low tension*, and significantly lower levels of *negative valence* than non-fans. As shown in Table 4, listeners who were presented with lyrics while listening to excerpts of violent music responded with significantly lower levels of *positive valence* and *low tension*. Conversely, with no lyrics, listeners found the music more pleasant and less tense than those who were presented with lyrics.

### *Qualitative Measures*

Qualitative data were subjected to summative content analysis (Hsieh & Shannon, 2005). The analysis corroborated and extended the quantitative measures. Compared to non-fans, fans identified more positively valenced emotions and fewer negatively valenced emotions as the strongest emotions that arose while listening to the music. Both fans and non-fans listed musical features (e.g., “strong, deep guitar notes, constant drums, deep throaty/‘screamo’ vocals”) and the ‘direct triggering of emotional experience’ (e.g., “The fast pace of most Death Metal, combined with its grooves makes me excited, it hypes me up. This sort of music makes me feel energetic when I’m down, and when I’m angry it brings me to a dark place internally so that I can work through these feelings”) as reasons why they believed that the music elicited particular emotions. Non-fans also identified the lyrics and personal preference as further reasons why the music elicited particular emotions. In relation to behavioral tendencies associated with the strongest emotions generated by the music, fans mostly described a propensity to maintain and harness the emotional experience, while non-fans largely identified a desire to change or end the emotional experience. As such, emotions generated by exposure to violent music were associated with a predominantly excitatory behavioral effect (i.e., ‘approach’ behaviors) for fans and a predominantly inhibitory behavioral effect for non-fans (i.e., ‘retreat’ behaviors).

*Emotions induced by violent music.* As shown in Table 5, fans reported experiencing more positively valenced emotions than negatively valenced emotions while listening to the Death Metal music excerpts, while non-fans reported the opposite. For fans, positively valenced emotions clustered around themes of stimulation, strength, happiness, interest and stress reduction, while negatively valenced emotions clustered around themes of anger and fear. For non-fans, negatively valenced emotions clustered around themes of anger, distress/agitation, disgust, fear, boredom and sadness, while positively valenced emotions clustered around themes of stimulation, curiosity/interest and amusement.

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Insert Table 5

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*Participant-identified reasons behind emotion induction.* Whereas both fans and non-fans listed musical features and psychological factors as reasons for why they believed music induced the emotion/s identified, the degree of specificity of descriptions differed between groups. Fans' descriptions of musical features tended to be characterised by greater technical and analytic knowledge than those of non-fans. For example, one fan wrote, "Death Metal is an extremely energetic and evocative musical genre. With its repetitive fast-paced tempo, down-tuned instruments and blast beats, it is virtually impossible not to be excited!". In contrast, non-fans' descriptions of musical features tended to be more general and descriptive, for example "It sounds like messed up teenagers making throaty, irritating noises about how bad their lives are. It's annoying. My ears were attacked" and "It's really in-your-face music...loud and irritating".

Similarly, fans typically provided more involved descriptions of relevant psychological factors than non-fans, identifying three main factors: resonance (e.g., "The music elucidates my current feelings and stresses"), a capacity for processing and transformation (e.g., "When I'm angry, this music brings me to a dark place internally so that I can work through the emotions") and a cathartic function (e.g., "The sound releases a lot of negative emotions and stress and focuses your attention on something you enjoy"). Again, non-fans tended to list psychological factors only at a general level of abstraction (e.g., "My body tensed and the music took me by surprise each time").

Curiously, whereas an equal proportion of fans and non-fans were exposed to the lyric and no-lyric conditions, only non-fans identified song lyrics as a reason for why the music induced a particular emotion. Non-fan participants expressed strong opinions about the lyrics. For example, one non-fan wrote "The thoughts and ideas portrayed were very confronting in

a negative way. They painted horrible pictures in my mind”, while another stated “The lyrics are intense and negative, taking my mind to dark places”. Other non-fans described the lyrics as “really scary”, “very graphic and concerning”, “perverted and gross” and “gruesome and intense”. Non-fans also identified personal preference as another reason behind emotion induction, writing statements such as “I can’t understand how anyone finds this music pleasant to listen to”, “Not being a huge fan of Death Metal music, I’ve never been able to connect to it on any level AT ALL”, “This is not my type of music” and “I have never heard anything like it and do not relate to it at all”. It seems worth noting the emotional strength of these non-fan responses, especially given the frequency of negatively-valenced emotion that was aroused in non-fans by the music.

*Behavioral tendencies associated with the strongest emotion/s induced by the music.*

Marked differences emerged between fans and non-fans when identifying what they would like to do when they concentrated on the strongest emotion they felt during each trial. For most fans, the experience of positively valenced emotions such as those induced by the music was associated with increased levels of motivation to engage in a wide variety of activities in the following domains: physical (e.g., working out, running, surfing), social (e.g., meeting up with friends and/or family), music-related (e.g., performing and listening to Death Metal music), domestic (e.g., organise room, cook a meal), work/study-related (e.g., conduct research, study for exams, work on assignments) and creative (e.g., paint, draw, engage in a new activity). Most fans indicated a desire to remain with and turn towards such a positively valenced emotional experience and to use it to fuel engagement in constructive activities. A smaller number of fans identified more restful and relaxing activities such as sleeping, going on a holiday, and having a bath or shower as being associated with emotional experiences similar to those induced by the music. Only five fans associated the emotion/s they

experienced most strongly while listening to the music with antisocial behavior such as reckless driving and violent behavior towards others.

The predominantly excitatory effect of death metal music on fans is consistent with the emotions they reported experiencing before listening to that music. Most fans described feeling energised before listening to Death Metal music, using adjectives such as ‘excited’, ‘attentive’, ‘enthusiastic’ and ‘animated’ to describe their pre-listening emotional experience. Fans described how they would “find another way of capitalising on these feelings” if they were unable to listen to Death Metal music when undergoing such an emotional experience. Behaviors listed by fans included vigorous physical activity, social and domestic activity, and active reflection on the emotion they were experiencing. In this way, listening to Death Metal seemed largely to be a strategy used by fans of the genre to further capitalise on the constructive potential of positively valenced emotions they were experiencing. Fans did not identify a need to engage in anti-social behavior if they experienced the emotion/s that usually preceded listening to Death Metal music, but were then unable to listen to the music.

In contrast to fans, non-fans predominantly experienced negatively valenced emotions in response to the music. Consequently, some non-fans commented that, were they to experience emotions similar to those induced by the music, they would behave in ways that would help terminate these emotional experiences and/or help them tolerate the emotional experiences until they became more pleasant. Such behaviors identified by non-fans fell into four main categories: regulation of emotional experience (e.g., listen to music that evoked more pleasant emotions, seek physical comfort with another person), relaxation (e.g., watch a movie, go to sleep, eat food, drink tea, meditating), physical escape (e.g., move away from situation that triggered emotional experience) and distraction (e.g., engage in vigorous physical activity, socialise and share feelings of discomfort with friends and/or family). Only ten non-fans indicated that such emotional experiences would make them feel like engaging

in antisocial behaviors, including swearing, provoking an argument, drinking to excess, and a range of aggressive or violent behaviors such as pushing, punching, hitting, attacking, stabbing and murdering other humans and animals. In contrast to fans of the genre, exposing non-fans to Death Metal music typically induced unpleasant emotional experiences that gave rise to self-preserving avoidant behaviors, and to a lesser extent, antisocial behaviors.

### Discussion

The aim of this investigation was to elucidate the characteristics, motivations, and emotional experiences of individuals who regularly listen to and enjoy music with aggressive sounds and violent themes. To that end, we examined the personality traits and empathic capacity of fans and non-fans of violent music, their motivations for engaging with music, and their emotional and aesthetic responses to this music. Our results revealed differences between fans and non-fans of violent music in their personalities and motivations for listening to music, and striking differences in the way fans and non-fans respond emotionally and aesthetically to this genre of music. Our findings are consistent with Rentfrow and Gosling's (2003) suggestion that personality, self-views, and cognitive abilities all have roles to play in the formation of music preferences, and with results of Vuoskoski, et al. (2012) showing that individuals who gravitate to music with negative connotations (sad music) have distinctive personality profiles.

An examination of the big five personality traits indicated that fans in our sample were significantly lower than non-fans in the traits of agreeableness and conscientiousness. As scores on these measures were normally distributed in both groups, this difference cannot be attributed to a subset of fans with abnormally low scores on these traits, but represents a general difference between groups. There are two interpretations of this finding. First, individuals who are high in agreeableness and conscientiousness may find violent music

unappealing, because depictions of violence are incompatible with their personal sensibilities. However, as distributions for personality measures were highly overlapping among fan and non-fan groups, this interpretation should be understood as a subtle but reliable statistical trend, and not an indication that fans are uniformly less agreeable or conscientious than non-fans. Indeed, research on the enjoyment of negative emotions in the arts suggests that there are many reasons for appreciating artistic depictions of negative circumstances and emotions (Menninghaus, et al., 2017; Eerola, et al., 2018).

A second possibility is that long-term, persistent exposure to violent media may lead to subtle changes in one's personality, desensitizing fans to violence and reinforcing negative social attitudes. This interpretation is compatible with evidence that persistent engagement with other forms of media violence such as video games is associated with increased aggressive behaviors and decreased empathy and prosocial behaviors (Anderson & Bushman, 2002; Anderson, et al., 2010). However, the correlational nature of such research makes it difficult to draw strong conclusions about causation, and research findings have not always been consistent (Ferguson, 2015; Ferguson et al., 2015).

Interestingly, we observed no group difference between fans and non-fans in any of the Interpersonal Reactivity Indices, suggesting that fans and non-fans had similar reactions to and understandings of the experiences of others. The lack of any group difference in IRI measures is somewhat surprising, given that fans derived pleasure from Death Metal music in spite of its explicitly violent lyrical content. One interpretation is that fans employ a psychological distancing strategy when encountering violent content in music (Menninghaus et al., 2017), but have normal empathic abilities during non-artistic experiences. In other words, fans may frame their engagement with Death Metal music as an aesthetic experience that can be distinguished from real-life circumstances of violence.



Fans and non-fans differed in the degree to which they used music for different mood regulation strategies. Compared with non-fans, fans were more likely to report that they engaged in musical activities (of any kind) for the purposes of entertainment, revival, discharge, and emotional experience. However, because our fan and non-fan groups were not matched for their degree of enthusiasm for music, it is possible that such differences partly reflect a higher overall 'passion' for music by fans than non-fans, rather than mood regulation strategies that are unique to this group (Vallerand et al., 2003). Moreover, the pattern of ratings of different mood regulation strategies was similar in the two groups, with overall ratings somewhat higher across categories for fans and non-fans. Future research may resolve this ambiguity by comparing the mood regulation strategies for fans of distinct genres of music, such as jazz, classical, heavy metal, and dance music.

Fans of Death Metal extracted numerous positive emotional effects from the music, including power and joy, with few or no negative emotional reactions. In contrast, non-fans experienced mainly negative emotions such as tension, fear, and anger following exposure to violent music. Indeed, non-fans reported none of the positive experiences reported by fans, and examination of Figure 5 highlights the remarkable differences in the emotional experiences of these two groups to this music. One of the most striking differences in the emotional responses of fans and non-fans was the strong experience of power reported by fans. Power is often conceived with respect to social structure and may be transformed into a psychological experience characterized by a sense of control over one's circumstances (Galinsky, Gruenfeld, & Magee, 2003). Research suggests that music has a unique capacity to induce feelings of power (Gabrielsson, 2010), especially if it emphasizes low-frequency spectral information (Hsu et al., 2015). The strong experience of power reported by fans implies that the emotion is highly desirable, and attainment of this experience, coupled with a strongly positive emotional valence (joy), may be a primary motivation for engaging with

this genre of music. Although more research is needed to understand the set of personal and contextual conditions that promote positive responses to violent music, our exploratory modelling suggests that such experiences are associated with factors such as personality, empathic capacity, and mood regulation strategies.

Results from emotion ratings in the quantitative phase of the research were reinforced by a summative content analysis of participant descriptions in the qualitative phase of the investigation. When given the opportunity to expand upon their experiences of listening to Death Metal music, fans predominantly listed positive experiences relating to stimulation and empowerment, whereas non-fans reported negative experiences such as confusion, disgust, and irritation. The range of emotional experiences reported by fans and non-fans in both the quantitative and qualitative phases of the survey suggest that the classification of Death Metal music as “violent” does not capture the complex set of experiences associated with this genre.

It should be acknowledged that the qualitative phase was preceded by the quantitative phase in which participants rated explicit emotion terms. In rating pre-selected emotion terms during the quantitative questions, it is possible that participants were primed to contemplate those same experiences while responding to the qualitative phase of the investigation. However, such priming should not make it more likely that participants would report one emotion as more prevalent than any other emotion, and several questions in the qualitative phase of the survey had no parallel in the quantitative phase. Moreover, descriptions by participants contained numerous emotion and aesthetic labels that were not represented in the quantitative phase of the research, such as enthusiastic, sick, disgusted, curious, intrigued, triumphant, and amused. Such idiosyncratic descriptions suggest that participants reported genuine experiences, and were not merely drawing from the set of terms that they had been exposed to in the quantitative phase of the research.

What can explain the apparent dissociation between the explicitly violent content of the music and the complex emotional responses to that music? According to Schubert (1996), emotional responses to music with negative emotional connotations can be positive if listeners appraise that the music is not a genuine threat to one's wellbeing. Interpreting a stimulus as an aesthetic or artistic phenomenon may trigger a dissociation of perceived and felt emotion, thereby permitting the experience of positive emotions. Along similar lines, the Distancing-Embracing Model suggests that the enjoyment of negative emotions in artistic contexts derives from two components: a process of psychological distancing which is enabled by the lack of real-world consequences, and a process of psychological embracing whereby factors such as meaning construction and aesthetic virtue transform induced negative emotions into pleasure and appreciation (Menninghaus et al., 2017).

Such explanations account for individuals who report positive emotional and aesthetic experiences after listening to music with negative connotations. However, they do not account well for listeners who embrace negative emotional states in artistic contexts as a critical part of their aesthetic appreciation. Huron (2011) argued that many people who listen to sad music report feeling "genuine sadness", which suggests that listeners extract benefits from negative emotions in response to music. Such benefits may include detail-oriented thinking and reduced stereotyping (Clore & Huntsinger, 2007), and a narrowing of attentional scope (Gable, Poole & Harmon-Jones, 2015). Thus, certain negative emotional states may be adaptive and sought instinctively (Huron, 2011).

Interestingly, fans in our investigation reported mainly positive experiences to Death Metal music, in spite of the aggressive themes conveyed by that music, a finding that is compatible with mechanisms of dissociation or psychological distancing. Non-fans, in contrast, were left with feelings of tension, anger and fear. One interpretation of this difference in experience is that fans conceptualized the violent themes as non-threatening

aesthetic stimuli and hence were able to dissociate their emotional responses from the violent connotations, whereas non-fans were unable or unwilling to engage in such psychological distancing.

A related possibility is that fans and non-fans attended to different qualities of the music, with fans focusing their attention on textures that are energetic and empowering (e.g., rhythm, tempo, textural density), and non-fans focusing on the aggressive qualities of the music (distortion, lyrical depictions of violence). Although this possibility awaits future investigation, recent evidence suggests that the lyrical content of Death Metal music, which is the most important source of violent content, is more intelligible to fans than to non-fans (Olsen, Thompson, & Giblin, in press). Presumably, fans are familiar with the vocal effects employed, and thus are better able to selectively attend to the linguistic content from the dense and distorted musical textures.

A limitation of the present study is its reliance on self-report, which may be susceptible to response biases. The distinct emotional responses reported by fans and non-fans may partially reflect differences in how these two groups responded to the demand characteristics of the task, with non-fans exaggerating ratings of negative emotions such as anger and fear, and fans declaring that they experienced positive emotional states. According to this interpretation, participants may have responded in a manner that they assumed was expected of them, given the likely experimental hypotheses. Related to this idea, fans and non-fans may have differed in how they assessed the social desirability of their responses. Whereas it would be socially desirable for non-fans to report negative feelings towards violence, it may be socially desirable for fans to affirm their commitment to the Death Metal subculture by reporting only positive experiences.

However, the convergence of evidence from multiple quantitative and qualitative measures, and the enthusiasm with which fans embrace this musical genre, suggest that the

dramatic differences in emotional and aesthetic responses between fans and non-fans were genuine. Our interpretation of the current findings is that individuals with particular personality traits and music-listening motivations gravitate towards or away from aggressive and violent musical styles, and their preference or dislike for this form of music and the associated subculture fuels their emotional responses to the music. As argued by Eerola, et al. (2018), emotional responses are also dependent on biological, psychosocial, and cultural factors, whereby each level of explanation contributes to experience in a specific but interconnected manner.

At the biological level, aggressive music characterized by high amplitude, fast tempo, and high levels of distortion may lead to the release of hormones and neurochemicals such as cortisol and epinephrine (Chanda & Levitin, 2013), which may then trigger or amplify experiences of power reported by fans, and experiences of tension, fear and anger reported by non-fans. Participation in aggressive and violent music can also be understood within an evolutionary framework, as an instance of adaptive activities designed to promote group cohesion for aggressive collective activities such as hunting, or as an intimidation display (Jordania, 2011; Quignard, 2016; Volcler, 2013).

At a psychosocial level, engaging with violent music may function as a mechanism for mood regulation, for example to process and discharge feelings of anger, or as a source of distraction. Such functions may help listeners to either avoid or confront difficult feelings, thereby enhancing wellbeing. The extremely aggressive and violent lyrical content may also function to sharpen the boundary between in-group members and outsiders, simultaneously attracting fans while vehemently and violently repelling non-fans. Such a strongly articulated group boundary may help to heighten feelings of identity and belonging among the Death Metal community.

At a cultural level, fans understand Death Metal music in contrast to their understanding of commercial genres such as glam and pop metal, and their emotional and aesthetic experiences are bound up with this cultural understanding. According to Hanlon (2006), fans of Death Metal appreciate this music as an alternative to the “impersonal, conformist, superficial, and numbing realities of commercialism” (p. 33). Unlike the standard verse-chorus structure of most popular music, Death Metal music also disrupts traditional conventions, in some cases by exhibiting a paratactic sequence of loosely related segments that encourage episodic listening rather than the extraction of an overall narrative (Phillipov, 2012). Finally, Death Metal lyrics – with their explicit depictions of violence – may be appreciated by fans precisely for their representation of forbidden themes, which may bring relief from the abiding prohibitions and censorships in society at large.

These three levels of analysis also highlight the importance of initial predispositions and learning for understanding the unique experiences of fans of violent music. Personal predispositions and motivations for music listening help to explain why some individuals are drawn towards aggressive music in the first place. At an early stage of exposure to this music, psychophysical attributes of sound may dominate perceptions and experience, with features such as high amplitude, rapid tempo, and non-linearities triggering basic arousal responses. Long-term exposure to this music, in turn, should lead to increasing sensitivity to genre-specific emotional signals, permitting the construction of complex emotional experiences (Thompson & Balkwill, 2010). Thus, fans are differentiated from non-fans both by their sensitivity to psychophysical and genre-specific emotional signals, and how they differentially attend to and weight the various emotional signals available. Building on this framework to achieve a multi-level, integrative understanding of the popularity of violent music is a challenge that awaits future research.

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## Author Contributions

W. F. Thompson developed the study concept and preliminary design. All authors contributed to the final design. A. M. Geeves coordinated testing and data collection. K. N. Olsen and W.F. Thompson performed quantitative data analysis and A. M. Geeves performed qualitative data analysis. All authors contributed to data interpretation and manuscript preparation, and all authors approved the final version of the manuscript.

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Table 1

*Demographic Information*

Participant Group	<i>n</i>	Male   Female	Group Means ( <i>SD</i> )	
			Age	Years of Training
Fans				
Lyrics	25	16   9	23.56 (6.34)	6.12 (7.73)
No Lyrics	23	12   11	23.91 (7.02)	6.22 (7.50)
Non-Fans				
Lyrics	48	6   42	20.40 (3.20)	2.81 (4.25)
No Lyrics	49	10   39	21.39 (5.39)	2.69 (4.18)

*Note.* ‘Years of Training’ refers to years of formal instrumental music training



Table 2

*Item Reliability Coefficients (Cronbach's Alpha) for Each Measure Based on the Current Data and Previously Published Alpha Levels*

Scale Set	Scale Item	Estimated Alpha	Published Alpha
BFI	Extraversion	.72	.86
	Agreeableness	.65	.79
	Conscientiousness	.59	.82
	Neuroticism	.75	.87
	Openness	.77	.83
IRI	Perspective Taking	.75	.73
	Fantasy	.81	.79
	Empathic Concern	.75	.71
	Personal Distress	.82	.76
B-MMR	Entertainment	.90	.81
	Revival	.87	.80
	Strong Sensation	.92	.81
	Diversion	.88	.73
	Discharge	.90	.84
	Emotion Experience	.91	.84
	Solace	.93	.85
PANAS Time 1	Positive Affect	.92	.89
	Negative Affect	.90	.85
PANAS Time 2	Positive Affect	.94	.89
	Negative Affect	.91	.85

*Note.* BFI = Big Five Inventory; IRI = Interpersonal Reactivity Index; B-MMR = Revised Brief Music in Mood Regulation Scale; PANAS = Positive and Negative Affect Schedule.

Previously determined alphas: BFI = John, Naumann, & Soto (2008); IRI = Davis (1980); B-MMR = Saarikallio (2012); PANAS = Watson, Clark, & Tellegen (1988).

Table 3

*Summary of Means and Significant Main Effects for Fans and Non-Fans, Collapsed Across Lyric Conditions and Sex*

Scale Set	Items	Group Means ( <i>SEM</i> )		<i>F</i>	<i>p</i>	$\eta^2_p$
		Fans	Non-Fans			
Categorical						
	Power	3.93 (.23)	1.58 (.09)	93.19	<.001	.405
	Joy	3.58 (.23)	1.41 (.08)	86.62	<.001	.387
	Peace	2.73 (.20)	1.26 (.07)	56.35	<.001	.291
	Wonder	2.51 (.20)	1.37 (.09)	32.68	<.001	.193
	Nostalgia	2.38 (.19)	1.35 (.08)	28.88	<.001	.174
	Transcendence	2.37 (.20)	1.38 (.09)	23.98	<.001	.149
	Tension	2.36 (.19)	3.51 (.20)	8.27	=.005	.057
	Anger	2.17 (.19)	2.87 (.19)	4.20	=.042	.030
	Fear	1.91 (.17)	2.95 (.20)	6.00	=.016	.042
	Sadness	1.89 (.17)	1.73 (.12)	1.29	>.250	.009
Overall						
	Engagement	4.18 (.19)	2.27 (.15)	47.79	<.001	.259
	Enjoyment	4.35 (.19)	1.61 (.10)	145.15	<.001	.514
	Evoked Emotions	4.08 (.19)	3.00 (.17)	19.30	<.001	.123
3D Affect						
	Positive Valence	3.66 (.24)	1.32 (.07)	105.21	<.001	.434
	Negative Valence	2.37 (.21)	4.12 (.20)	25.78	<.001	.158
	High Energy	3.91 (.22)	2.40 (.15)	19.67	<.001	.126
	Low Energy	1.82 (.15)	1.52 (.10)	.82	>.250	.006
	Low Tension	3.01 (.21)	1.33 (.08)	58.87	<.001	.301

*Note.* SEM = standard error of the mean;  $\eta^2_p$  = partial eta squared; ‘GEMS’ = Geneva Emotional Music Scale; ‘3D Affect’ = Three-dimensional model of affect (Schimmack & Grob, 2000); For each scale, listeners rated how they felt when listening to each excerpt of music. A rating of 1 = ‘does not describe my reaction’ and a rating of 7 = ‘describes my reaction very well’.

Table 4

*Summary of Means and Significant Main Effects for Lyrics and No Lyrics Conditions, Collapsed Across Fan Conditions and Sex*

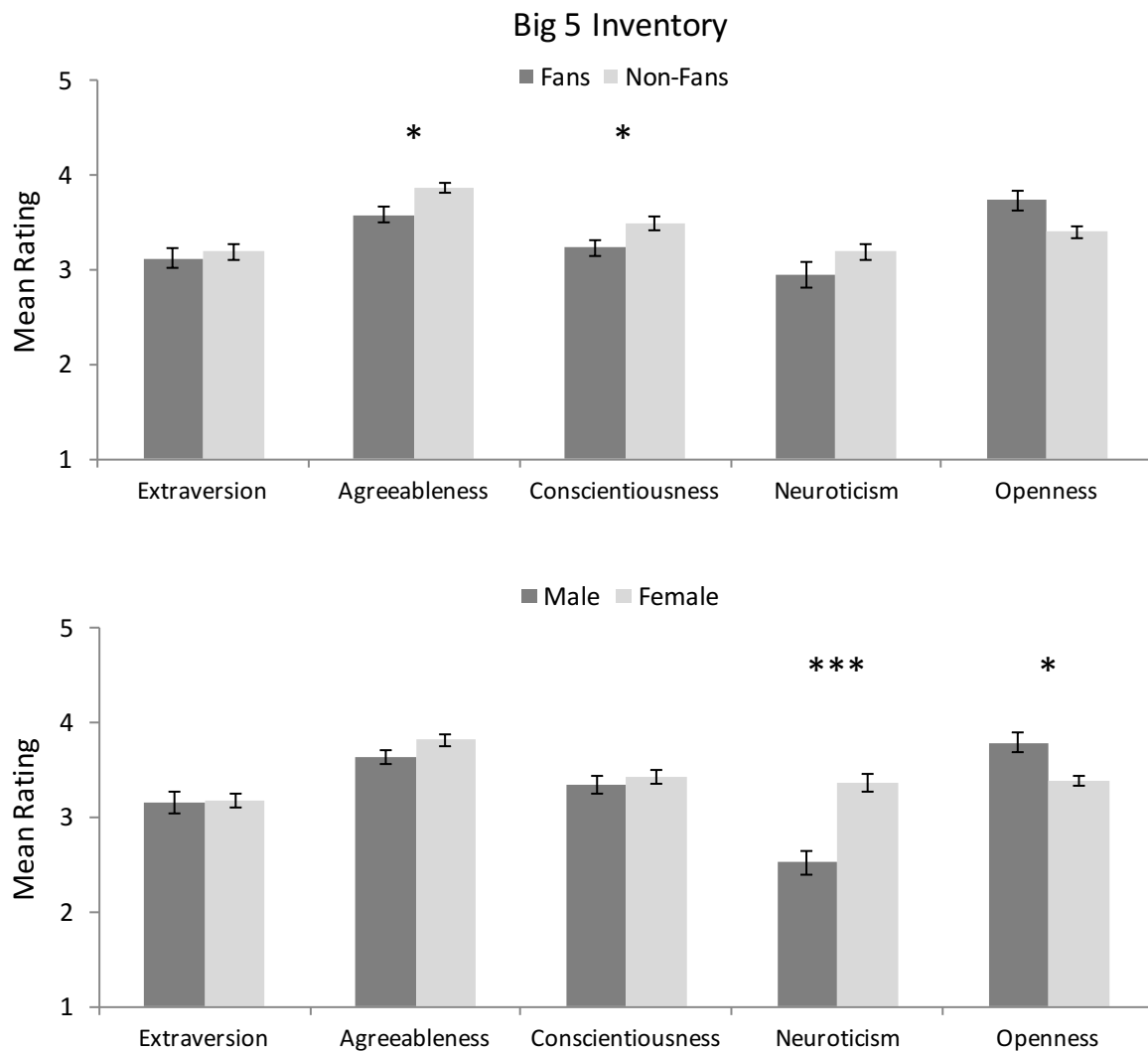
Scale Set	Items	Group Means ( <i>SEM</i> )		<i>F</i>	<i>p</i>	$\eta^2_p$
		Lyrics	No Lyrics			
Categorical						
	Power	2.22 (.18)	2.50 (.20)	1.93	=.168	.014
	Joy	1.92 (.17)	2.34 (.19)	5.15	=.025	.036
	Peace	1.59 (.13)	1.90 (.15)	4.03	=.047	.029
	Wonder	1.52 (.11)	1.97 (.16)	3.86	=.051	.027
	Nostalgia	1.59 (.12)	1.79 (.14)	1.05	>.250	.008
	Transcendence	1.57 (.13)	1.85 (.14)	.86	>.250	.006
	Tension	3.37 (.21)	2.88 (.22)	3.65	=.058	.026
	Anger	2.67 (.19)	2.60 (.22)	.86	>.250	.006
	Fear	2.80 (.19)	2.41 (.22)	2.64	=.107	.019
	Sadness	1.91 (.14)	1.65 (.13)	.17	>.250	.001
Overall						
	Engagement	2.61 (.17)	3.20 (.21)	7.73	=.006	.053
	Enjoyment	2.36 (.19)	2.68 (.21)	2.22	=.139	.016
	Evoked Emotions	3.40 (.19)	3.32 (.20)	.33	>.250	.002
3D Affect						
	Positive Valence	1.90 (.17)	2.29 (.19)	4.94	=.028	.035
	Negative Valence	3.76 (.23)	3.32 (.24)	3.64	=.059	.026
	High Energy	2.92 (.19)	2.89 (.21)	.24	>.250	.002
	Low Energy	1.57 (.13)	1.67 (.12)	.01	>.250	.000
	Low Tension	1.73 (.14)	2.05 (.17)	5.33	=.022	.037

*Note.* SEM = standard error of the mean;  $\eta^2_p$  = partial eta squared; ‘GEMS’ = Geneva Emotional Music Scale; ‘3D Affect’ = Three-Dimensional Model of Affect (Schimmack & Grob, 2000); For each scale, listeners rated how they felt when listening to each excerpt of music. A rating of 1 = ‘does not describe my reaction’ and a rating of 7 = ‘describes my reaction very well’.

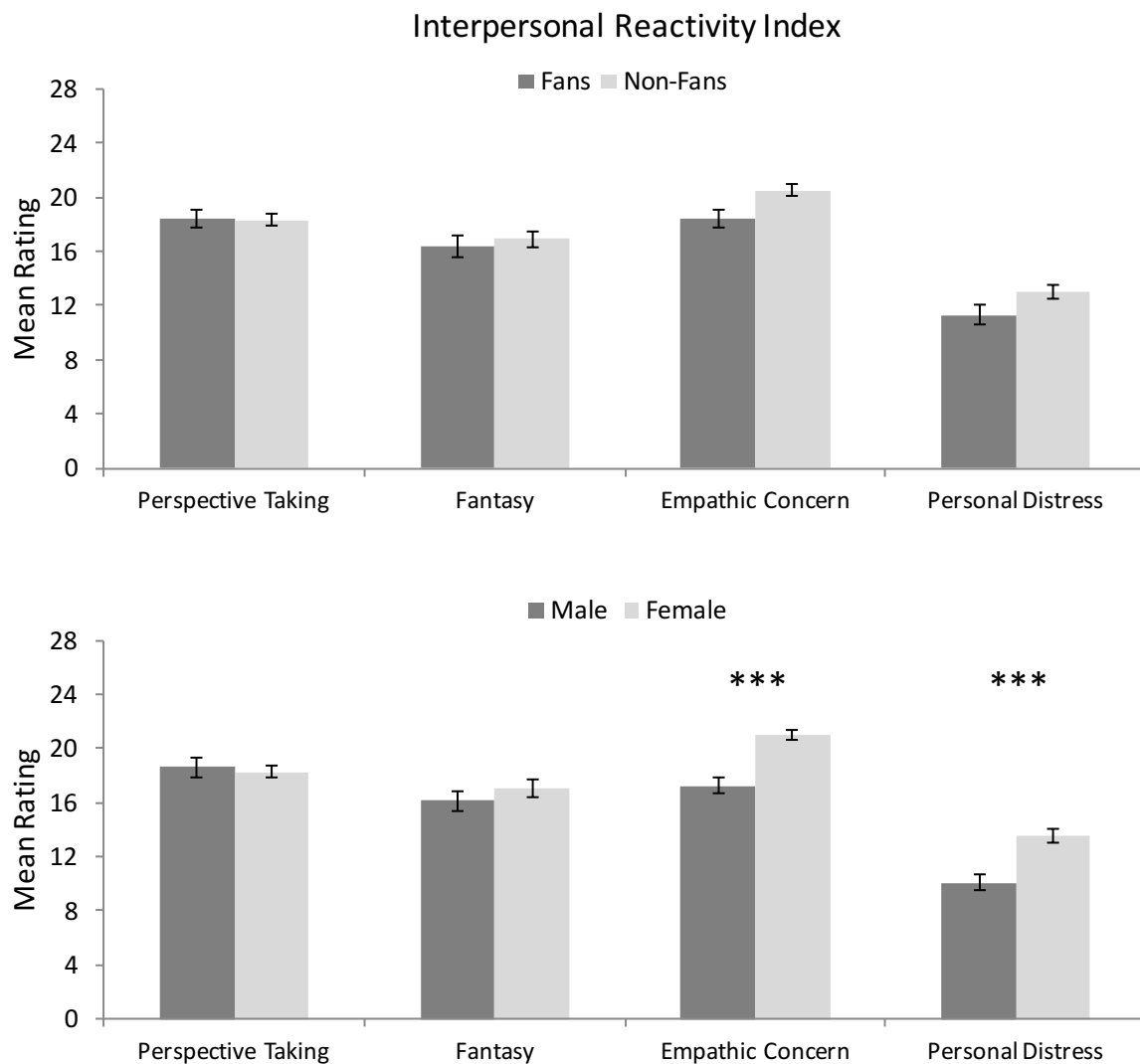
Table 5

*Emotions Experienced During Trials as Identified by Fans and Non-fans of Death Metal**Music*

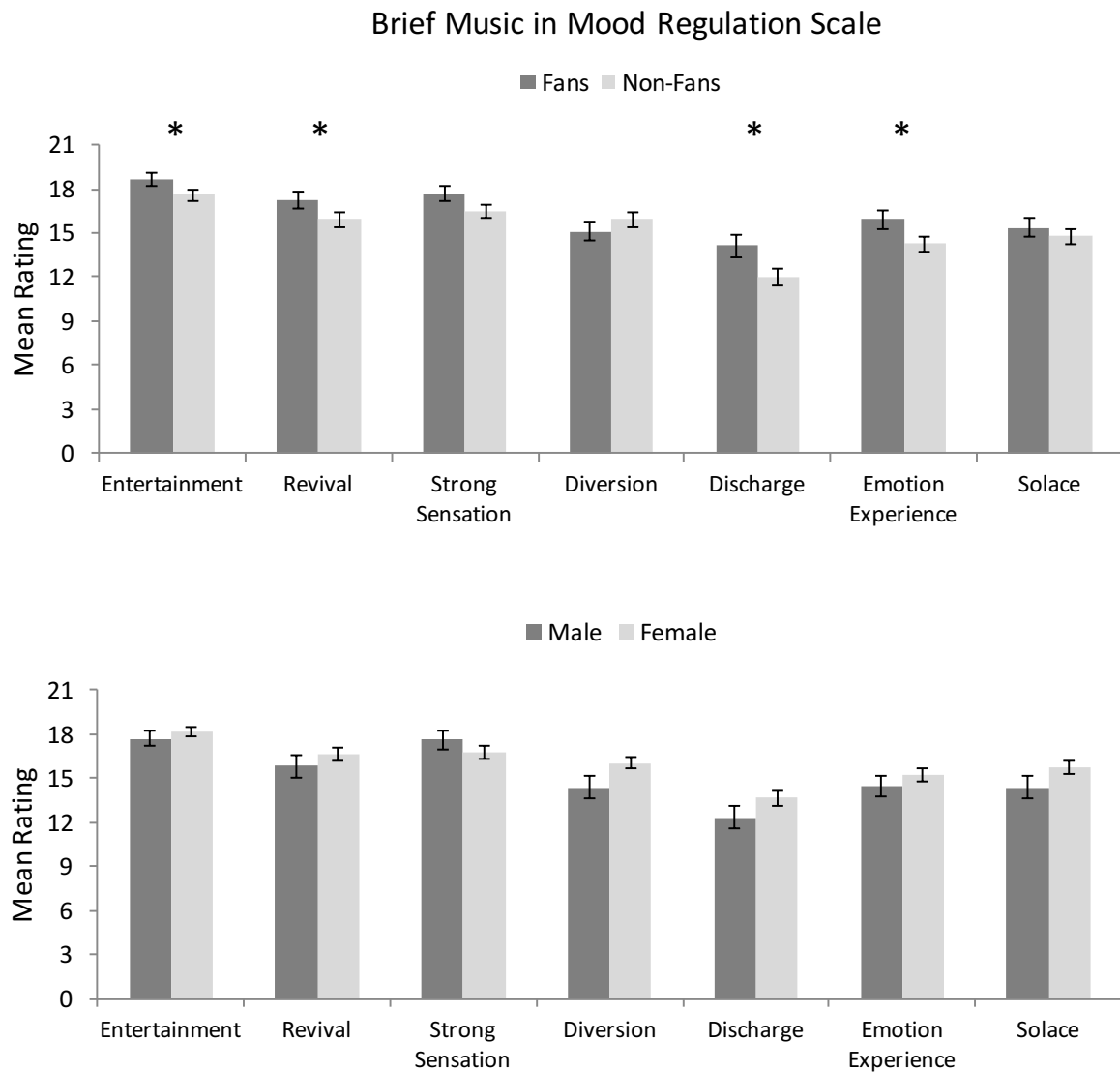
Group	Valence	Theme	<i>N</i>	Examples of adjective/s used
Fans	Positive	Stimulation	28	Energetic, Enthusiastic, Excited, Active
		Strength	21	Determined, Powerful, Inspired, Triumphant
		Happiness	11	Happy, Joyful, Cheerful
		Interest	3	Curious, Intrigued
		Stress Reduction	2	Relaxed, At Ease
			<u>65</u>	
	Negative	Anger	8	Angry, Annoyed
		Fear	7	Anxious, Fearful, Apprehensive
			<u>15</u>	
	Non-Fans	Negative	Anger	49
Distress			45	Tense, Stressed, Disturbed, Confused
Fear			20	Scared, Nervous, Anxious
Boredom			13	Bored
Disgust			13	Disgusted, Sick
			<u>140</u>	
Positive		Stimulation	10	Energetic, Motivated, Excited
		Interest	6	Curious
		Amusement	3	Amused
			<u>19</u>	



*Figure 1.* Group mean ratings from fans and non-fans and males and females for the personality dimensions in the Big 5 personality inventory. Error bars report standard error of the mean. \* $p \leq .05$ , \*\*\*  $p < .001$ .



*Figure 2.* Group mean ratings from fans and non-fans and males and females for the four dimensions of empathy captured in the Interpersonal Reactivity Index. The index ranges from a score of 0-28 – the greater the score, the greater the empathic capacity. Error bars report standard error of the mean. \*\*\*  $p \leq .001$ .



*Figure 3.* Group mean ratings from fans and non-fans and males and females for the seven music-in-mood regulation strategies captured by the Brief Music in Mood Regulation Scale (B-MMR). The scale ranges from a score of 0-21 – the greater the score, the greater the use of each particular mood-regulation strategy. Error bars report standard error of the mean. \*  $p < .05$ .

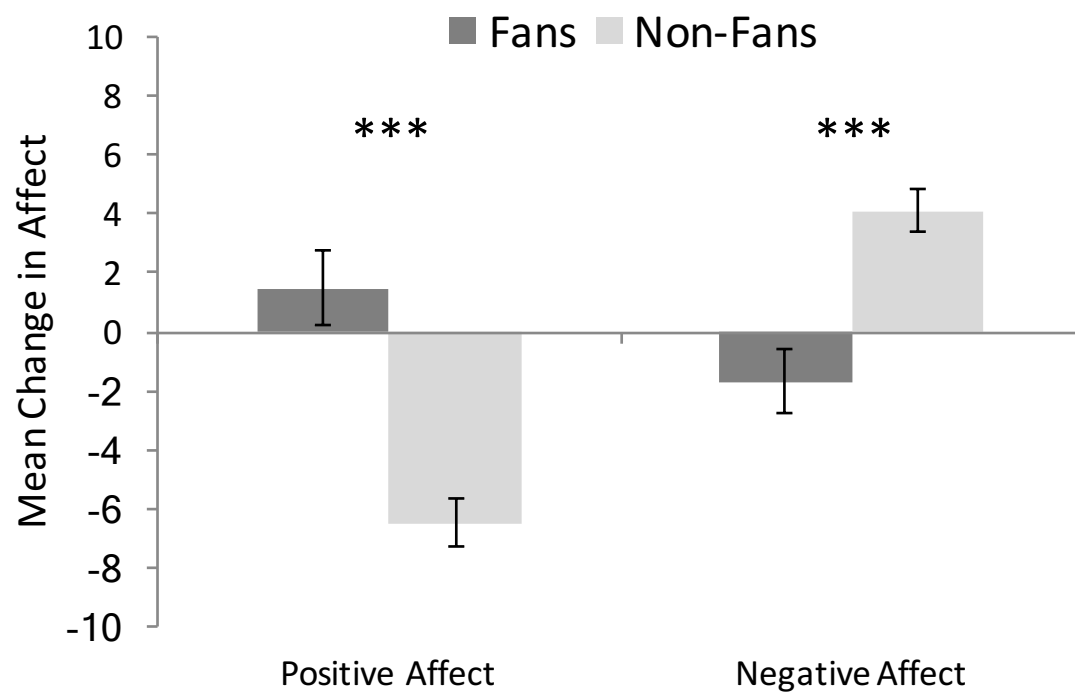
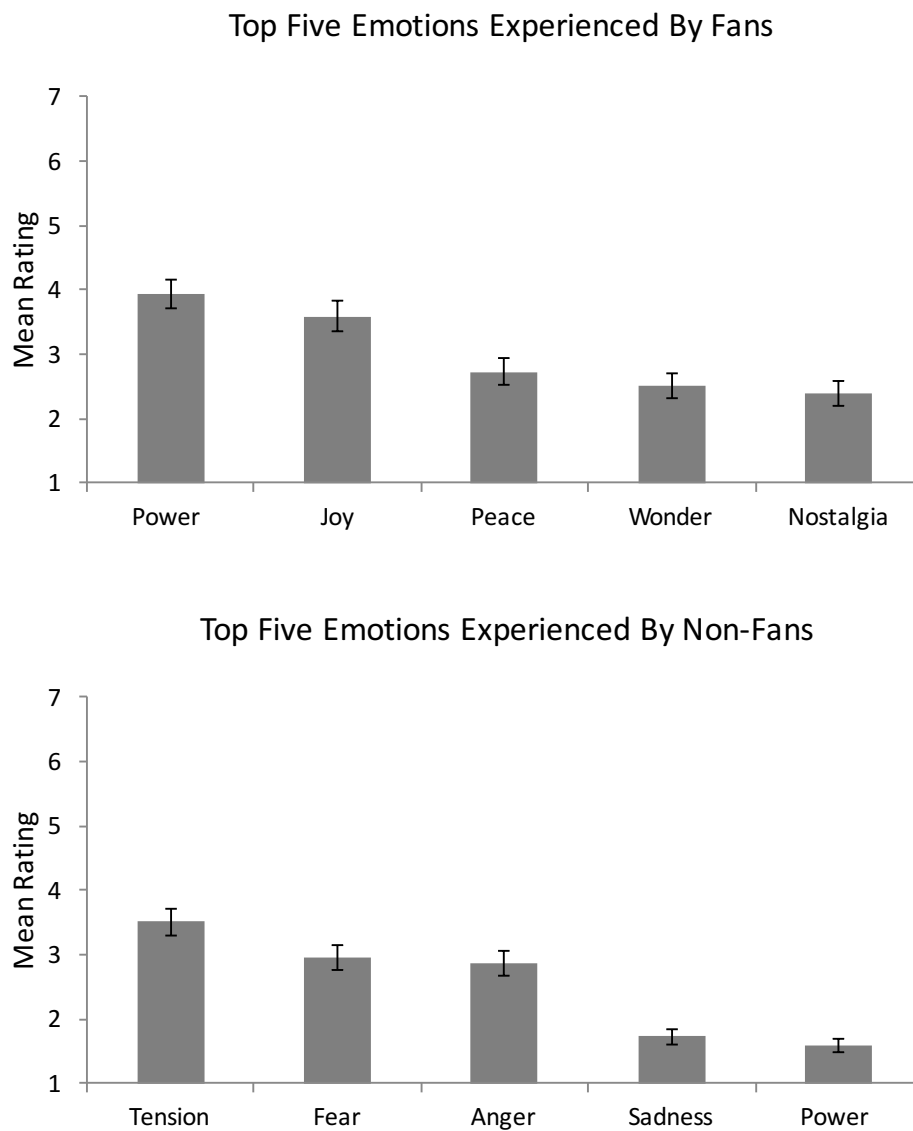


Figure 4. Reports changes in positive and negative affect between pre- and post-tests of the Positive and Negative Affect Scale (PANAS) for fans and non-fans. Higher scores indicate greater experience of positive/negative affect with a maximum score of  $\pm 10$ . Error bars report standard error of the mean. \*\*\*  $p < .001$ .





*Figure 5.* Reports the five highest rated emotions experienced by fans of Death Metal music (top panel) and non-fans (bottom panel) when listening to four excerpts of violent Death Metal. The scale ranges from a score of 1-7 – the greater the score, the greater the strength of emotion.