An Investigation of Empathy Among Fans and Non-Fans of Violent-Music

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Abstract

Exposure to violent video games is linked to negative outcomes such as reduced empathy for the plight of others. No research has investigated whether violent music exposure has similar effects. The present study investigated whether fans of violent-music show reduced empathic reactions to aggression when compared to non-fans of violent music. 108 participants self-identified as fans of violent heavy/death metal, classical or jazz music (n=36 per group). Participants were presented with a random selection of vignettes that described a primary character's reaction ('aggressor') to a secondary character's irritating action ('instigator'). The aggressor's reaction was non-aggressive, mildly aggressive or strongly aggressive. After reading each vignette, participants rated state empathic concern (other-oriented empathy) and personal distress (self-oriented concern) in response to the aggressor's reaction. They also completed measures of trait empathic concern and personal distress, and a questionnaire about the perceived social functions of music. It was hypothesised that when compared to violent music non-fans, fans would report lower trait empathy and reduced state empathic concern and personal distress in response to the aggressive reactions. As predicted, fans of violent-music reported significantly lower trait empathic concern when compared to classical and jazz fans. However, state empathic concern and personal distress in response to the aggressive reactions did not significantly differ between groups. Finally, social bonding was a stronger motivation for violent music fans to listen to their respective music genre compared to fans of classical music. Results are discussed in light of cognitive and behavioural consequences of desensitisation to media violence and pre-existing individual differences between fans of different musical genres.

Statement of Candidate

I hereby confirm that all material contained in this project are my original authorship and ideas, except where the work of others has been acknowledged or referenced. I also confirm that the work has not been submitted for a higher degree to any other university or institution. The research project was approved by the Macquarie University Human Research Ethics Committee (Approval No. 5201700152).

Signed:

Aimy Slade

Overview

Music is an important part of our lives, occupying a remarkably large proportion of our time and money (Schäfer, Sedlmeier, Städtler, & Huron, 2013; Tagg, 2013). One reason for its popularity is that music has many important functions. One such function is to regulate moods (North, Hargreaves, & O'Neill, 2000). Additionally, music also helps to define a person's social identity and hence the social groups with which they feel most connected (Lonsdale & North, 2009). There is also evidence that identifying with a music in-group can influence how people think and behave towards those who identify with music out-groups (Lonsdale & North, 2009). In view of the powerful role that music plays in people's lives, it is important to consider the short- and long-term psychological effects of music that carries negative and antisocial themes, including the impact of this music on its fans.

A large body of research has examined the potential negative effects of violent media on consumers; however, the study of violent music is a newly developing area. The existing literature on non-musical violent media typically involves violent video games, films and television shows. This research has linked violent media exposure to increases in aggressive thoughts (Anderson & Bushman, 2001), aggressive affect (Saleem, Anderson, & Gentile, 2012) and decreases in prosocial behaviour (Anderson et al., 2010). Exposure to violent video games has also been linked to increases in short- and long-term aggressive behaviour (Anderson et al., 2010; Krahé & Möller, 2010).

Initial studies on violent, aggressive, extreme or 'problem' music, have found mixed evidence of both positive and negative effects on listeners. Some of the positive effects of violent or extreme music which have been reported emphasise the importance of this music in defining identity (Weinstein, 2000) and regulating emotion (Arnett, 1991; Sharman & Dingle, 2015). In contrast, other studies suggest that these styles of music may have negative consequences such as dysphoria (Shafron & Karno, 2013), increases in aggressive behaviour,

and decreases in prosocial behaviour (Coyne & Padilla-Walker, 2015). In view of the contrasting evidence and perspectives on the impact of violent music, research is needed to gain a balanced understanding of the impact of long-term engagement with violent music.

The present investigation was designed to accomplish this goal by comparing fans of violent death metal and heavy metal (henceforth referred to as fans of metal) with two other groups of music fans who do not listen to violent-music: fans of classical and jazz music. The three groups will be compared to determine whether there are differences in trait empathy or state empathic reactions to vignettes describing differing amounts of aggressive behaviour. Additionally, the study will attempt to characterise fans of violent-music and assess whether fans use music differently from non-fans (e.g., in identity or emotion regulation). In order to examine the effects of violent music, it is important to operationally define aggression and violence, and to outline the conditions under which music can be said to exhibit violence.

Definitions of Aggression and Violence

Aggression has been described as any behaviour that aims to cause harm to another person who wishes to avoid being harmed (Anderson & Bushman, 2002). This behaviour excludes harm that is unintended or situations where one does not want to avoid the harm (e.g., masochism, boxing matches). Violence is an instance of aggression where the intended harm is more extreme, such as death (Anderson & Huesmann, 2003). Therefore, not all aggression is violence, but violence is always a type of aggression (Anderson & Bushman, 2002).

Models of Aggression

The General Aggression Model. The General Aggression Model (GAM) integrates several theories of aggression into a more comprehensive model to explain how episodes of aggressive and violent behaviour arise (Anderson & Bushman, 2002). It is also useful for explaining how exposure to violent media can alter a person's cognition and affect in the

process of violent media exposure. The GAM assumes that each 'episode' or cycle through the processes of the GAM involves a continuing social interaction (see Figure 1). It then suggests two input factors: person factors and situation factors. Person factors are enduring characteristics that a person brings to a situation which can include personality traits, values and aggressive scripts. Situational factors are situation-specific and can include contexts that generate frustration and provocation, or cues that encourage individuals to act aggressively, as found for example in violent media. These person and situation input variables can influence a person's present internal state which, in turn, incorporates three main areas: cognition, affect and arousal. To account for the role of cognition in aggression, the GAM proposes that input factors can make aggressive thoughts and scripts more accessible, and therefore more likely to be activated in response to a wide range of situations. Input factors can increase negative affect such as hostility and anger, and they may also result in high arousal, which can make an aggressive action more likely. This information feeds into an appraisal process that can be carried out automatically or in a more controlled reappraisal process. Whether or not an aggressive response occurs will then depend on the individual's present state and other relevant factors, such as their goals. The result of one cycle through the GAM then becomes input information for the next cycle (Anderson & Bushman, 2002).

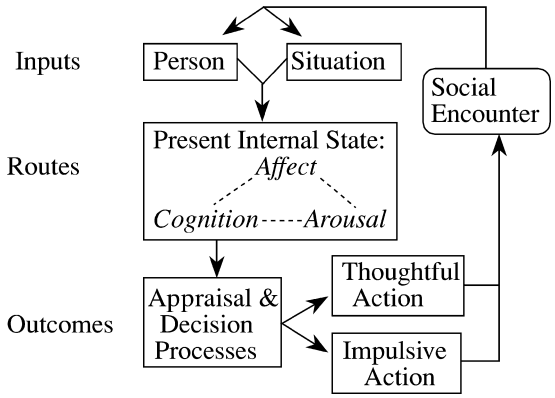

Figure 1. The General Aggression Model (Anderson & Bushman, 2002).

The General Learning Model. The General Learning Model (GLM) was proposed by Buckley and Anderson (2006) as an extension of the GAM. They argued that while the GAM was effective in explaining negative effects of exposure to violent media, it could be expanded to explain how media can have both positive and negative effects. The GLM includes the same processes as the GAM but considers one episode as a learning encounter, from which people can learn behaviours and facts, to the extent that after repeated exposure, the activation of knowledge structures becomes automatic and can result in changes to a person's cognitions and personality. The GLM also places emphasis on the type of input, such as whether a situational input is violent or non-violent, or whether personal input may affect the likelihood that someone will learn from media exposure. In terms of exposure to violent media, some personal input factors (such as gender and being a victim of bullying) may make a person more susceptible to the negative effects of violent media exposure (Buckley & Anderson, 2006).

Violent Music

While there is no established definition of violent music, a characterising feature is its violent content which often includes themes such as murder, suicide, sexual or physical assault and death (Warburton, Roberts, & Christensen, 2014). The sound of violent music genres, such as death and heavy metal, has been described as aggressive and 'growl-like' (Tsai et al., 2010). Little empirical work has examined the role of non-lyrical sounds in contributing to the perception of violent music. However, properties such as low-frequency (August & Anderson, 1987; Morton, 1977), roughness (Arnal, Flinker, Kleinschmidt, Giraud, & Poeppel, 2015), distortion and non-linear sounds (Blumstein & Récapet, 2009; Fitch, Neubauer, & Herzel, 2002) appear to convey aggression in non-musical, animal sounds; these properties may also be perceived as aggressive or violent when present in music, as they are common features of violent music genres such as heavy metal (Berger & Fales, 2005;

Mynett, 2016). Nevertheless, both the lyrical and non-lyrical components are likely important in perceiving music as violent.

Some research has focused on what has been labelled ‘problem music’ or ‘extreme music’, which can encompass some genres of music that can be considered violent such as heavy metal and rap. Although research on problem or extreme music can include violent music, it also includes other genres of music such as rock or electronic/dance music, which may not have violent themes. Typically, these genres are considered together based on factor analyses or because they are each linked to negative outcomes such as delinquency and drug and alcohol abuse (Lozon & Bensimon, 2014). Nevertheless, considering the smaller literature on violent music specifically, studies on problem and extreme music can help shed preliminary light on the effects of listening to violent music.

Metal is a genre of music that is typically considered violent. All subgenres of metal are characterised by distorted guitar sounds, but each subgenre has themes and unique characteristics that distinguish them (Berger & Fales, 2005). Death metal typically involves dark themes characteristic of violent music, such as death, violence, aggression, and Satanism, with vocals that are typically described as ‘growling’ or screaming (Berger & Fales, 2005; Tsai et al., 2010). Heavy metal has been known to explore similar themes; however, it has also been known to explore themes of power, politics and rebelliousness (Gross, 1990; Lozon & Bensimon, 2014). Death metal and heavy metal are some of the more popular metal subgenres; in a survey of fans attending a three-day metal festival in France, one of the five largest metal festivals in Europe, the most popular forms of metal music amongst the festival-goers were heavy metal, death metal and thrash metal (Guibert & Guibert, 2016).

There are negative perceptions of violent genres of music among non-fans, and such genres tend to attract criticism from lobbyist groups and the general community because of

the themes they explore (Walser, 2014). For example, Gross (1990) went as far as to draw comparisons between the heavy metal subculture and cultism. Using data from a national American survey, Bryson (1996) found that heavy metal was the most disliked genre of music among the general public, which was closely followed by rap, and these genres tend to be the most common genres with violent themes. Although this survey was conducted in the early nineties, it reflects past public attitudes to genres such as heavy metal that are likely to persist because heavy metal is still extremely popular today among fans and often incorporated into the category of problem music. In the public domain, music such as rap and heavy metal have been the target of many efforts to censor their content, as they have been considered 'deviant' genres that encourage sexism, aggression and antisocial behaviour (Lynxwiler & Gay, 2000). On a more individual level, musical preference in general also appears to be important in the social judgements people make about others. For instance, North and Hargreaves (1999) found that adolescents believed that another person's music preferences conveyed information about that person's personality and characteristics. Genres of violent music in particular appear to have negative implications to non-fans, which is captured in the idea of metal fans as "proud pariahs" (Weinstein, 2000, p. 138). Despite criticisms, initial studies of violent music have found mixed evidence linking it to both positive and negative effects on its listeners.

There has been some initial research on how violent music affects a person's present internal state. Anderson, Carnagey, and Eubanks (2003) asked non-fans of violent-music to listen to a song with either violent lyrics or non-violent lyrics. Listening to a song with violent lyrics appeared to make aggressive affective states more accessible as participants who listened to the violent song reported greater state hostility than those who listened to the non-violent song. Violent music also increased the accessibility of aggressive thoughts as participants tended to interpret ambiguous words as aggressive after listening to a violent

song, compared to participants who listened to a non-violent song (Anderson et al., 2003). There is also evidence that violent music has the potential to increase arousal in general; fans of heavy metal and non-fans (who had a preference for country music) reported greater state arousal after listening to heavy metal music, compared to fans who listened to country music (Gowensmith & Bloom, 1997). Using a physiological measure, Sharman and Dingle (2015) found that participants who were induced to feel angry experienced increases in their heart rate; the heart rate of participants who sat in silence returned to baseline whereas the heart rate of those who listened to 'extreme' music, such as heavy metal, was maintained. The authors concluded that the heart rate of participants in the music condition remained the same as extreme music is physiologically arousing (Sharman & Dingle, 2015). In summary, there is evidence that violent music has the potential to increase aggressive affect and cognitions, as well as increasing psychological and physiological arousal. The GAM suggests that these factors may make aggressive behaviour more likely (Anderson & Bushman, 2002), a prediction that awaits empirical assessment.

There is also some evidence on violent music that is contrary to the predictions of the GAM and GLM. For example, Gowensmith and Bloom (1997) did not find significant differences in trait anger between fans of heavy metal and non-fans. On the other hand, Shafron and Karno (2013) found that some fans had greater trait anger, but this was not the case for fans of all subgenres. For instance, fans of classic heavy metal, hardcore and screamo reported greater trait anger than fans of the other subgenres, such as death metal and emo[1], which suggests that there may be different effects on fans of different subgenres, or people with different traits may be attracted to different subgenres (Shafron & Karno, 2013). Overall, there is evidence that violent music has the capacity to influence a person's affective

[1] Hardcore, screamo and emo music, similarly to heavy and death metal, explore dark themes such as murder, suicide and self-harm and are typically accompanied by screaming or groaning; these music styles focus on emotions such as anger, depression and angst (Shafron, 2010; Shafron & Karno, 2013).

state, cognitive function, and levels of arousal, as predicted by the GAM and GLM. This suggests that violent genres of music may have similar effects as non-music violent media because violent music appears to impact a person's present internal state in similar ways. However, as stated above, there is also evidence linking violent music to positive functional outcomes for its fans. This literature will now be reviewed.

The Function of Violent Music for its Fans

Many individuals informally self-identify as a fan of a particular genre of music, but in order to compare fans and non-fans experimentally, it is important to operationally define the concept. The concept of passion has previously been used to define fans of other activities, such as sport and video games (Fuster, Chamarro, Carbonell, & Vallerand, 2014; Vallerand et al., 2008). Vallerand et al. (2003) define passion as a proclivity for an activity that people enjoy, consider important, and to which people dedicate a considerable amount of time and energy. They propose a Dualistic Model of Passion which suggests that activities that people are passionate about can become a defining part of their identity. Specifically, they suggest that a passion can be a beneficial or detrimental part of a person's identity. Harmonious passion refers to a type of passion where the person is in control of the activity, it does not dominate their identity and the activity is balanced with other parts of their life. On the other hand, there is obsessive passion, a type of passion that dominates one's identity and clashes with other elements of life in a negative way, including pressures to engage in the activity (e.g., social pressures, the need to experience the emotional or physiological response to it). Vallerand et al. (2003) found empirical support that harmonious and obsessive passion are distinct concepts that are differentially linked to positive and negative emotional outcomes related to the object of passion.

Identity and social bonding. Music generally plays an important role in people's identity (North et al., 2000), and this function appears to be particularly evident for fans of

violent-music. Fans of heavy metal tend not to just casually enjoy heavy metal, but they feel strongly allied with the heavy-metal community and consider this subculture to be an important part of their social identity (Gross, 1990; Weinstein, 2000). For fans of metal, involvement in the subculture is often reflected in style of dress and regularity of concert attendance (Guibert & Guibert, 2016). Lyrics also tend to be very important to fans of heavy metal, and although the lyrics can be difficult to understand initially (Olsen, Thompson, & Giblin, 2017), fans often know the lyrics to their favourite songs as a way of demonstrating their commitment to the heavy metal genre (Weinstein, 2000). In their survey, Guibert and Guibert (2016) found that fans reported they attended metal concerts to enjoy the music without any judgement from others and to meet up with other fans of the music. They also found that festival-goers had generally been fans for a long period of time (on average twelve years). Overall, violent genres of music such as heavy metal seem to function as a defining part of fans' social identity. Therefore, we expect that fans of violent-music will report that violent music is particularly important for self-reflection (identity) and social bonding.

Emotion regulation and self-regulation. Another positive function of violent music that is commonly reported by fans is that violent music helps to relieve them of negative affect such as anger. When asked whether they listened to heavy metal when in a particular mood, 43% of fans reported that they specifically sought it out when they were feeling angry and that they did so because it relieved their anger (Arnett, 1991). Few participants reported that they listened to heavy metal when they were experiencing a positive mood, however, another commonly reported reason for listening to heavy metal was that it could put listeners in a good mood and increase energy levels. Overall, 54% of the fans reported that listening to heavy metal reduced negative affect, usually specific to anger, but also related to stress and anxiety (Arnett, 1991). Sharman and Dingle (2015) investigated 'extreme' music which they defined as music with chaotic and loud sounds, including genres such as heavy metal,

screamo and punk. Consistent with results reported by Arnett (1991), they found that one of the most commonly reported reasons for listening to extreme music was to 'match' feelings of anger and ultimately reduce this negative affect (Sharman & Dingle, 2015). Additionally, Thompson, Geeves, and Olsen (2017) found that violent music was able to induce positive affect amongst fans. Specifically, fans who listened to violent death metal songs experienced significantly greater positive emotions such as wonder, power and peacefulness when compared to non-fans. There appears to be mounting evidence that violent or extreme music may help to relieve fans' aversive emotional states and induce a positive mood.

There is some evidence that extreme music may have a cathartic function. In the same study conducted by Sharman and Dingle (2015), participants were induced to feel angry and then either sat in silence or listened to a song of their own choosing from their personal device. After anger induction, participants experienced increases in state hostility and irritability. State hostility and irritability decreased after listening to extreme music, to a similar extent as participants who observed a period of silence. The authors concluded that extreme music may be similarly effective in processing anger as silence, however, they observed that these results could have been explained by the passage of time. Nevertheless, compared to participants in the silent condition, those who listened to extreme music did not just experience decreases in negative affect, but experienced increases in positive affect such as inspiration and feelings of being active (Sharman & Dingle, 2015). However, only half of the songs participants selected to listen to had violent or aggressive themes; thus, the findings may not be applicable to violent music. Additionally, the results may have reflected the effects of listening to preferred music, rather than the effects of listening to a specific genre or its theme. In another study by Kneer and Rieger (2016), fans and non-fans of heavy metal music were induced to think of their own death and were then asked to listen to either an audiobook or heavy metal music. They found that listening to heavy metal music helped fans

to deal with existential anxiety when induced to think about their own mortality, compared to non-fans in both conditions and fans who listened to an audiobook (Kneer & Rieger, 2016). The current literature suggests that violent music appears to play an important role in emotion regulation and self-regulation for its fans. Therefore, the present study will assess whether violent music has a different function for its fans, relative to the function of non-violent music for violent music non-fans.

Potential negative effects on fans. Thus far, the effect of violent music on non-fans has been reviewed, as well as positive effects for fans of violent-music. Although we predict that there are likely to be a range of positive functions of violent music for its fans, such as increased sense of self-reflection (identity), social bonding, emotion regulation and self-regulation, there is also evidence that violent music may have negative consequences for the emotional wellbeing of its fans. Shafron and Karno (2013) found that fans of heavy metal reported significantly greater anxiety and depression than non-fans. They also examined whether there were differences between fans based on the subgenres they preferred to listen to. Participants who reported listening to emo and hardcore music reported greater depression, while those who listened to classic heavy metal, emo, hardcore and screamo had greater anxiety than fans of the other subgenres. Fans of classic heavy metal, hardcore and screamo also had greater trait anger (Shafron & Karno, 2013). It appears that certain metal subgenres are related to different negative emotional states, however, no conclusions can be made about causality. The negative emotional and mental states could be caused by repeated exposure to violent music, or people with pre-existing emotional and mental problems might gravitate towards violent styles of music, perhaps believing that it might have cathartic effects.

According to Bodner and Bensimon (2016), heavy metal music has a complex effect on the emotional states of fans and non-fans. After exposure to a heavy metal song, *non-fans*

experienced an increase in negative affect and a decrease in positive affect. Although the effect on non-fans would largely be accounted for by listening to a disliked genre of music, this would not account for the effect on fans; fans experienced an increase in positive affect but negative affect remained the same (Bodner & Bensimon, 2016). This pattern of results may suggest that negative affect is not reduced as much as fans may believe; instead, it may be confused for increases in positive affect when, in reality, negative affect remains stable. This interpretation is captured by the concept of affect complexity, which Bodner and Bensimon (2016) define as the idea that positive and negative emotion can be experienced simultaneously; a change in one does not necessarily correspond to a change in the other. Nevertheless, it is likely that after repeated exposure, violent music may result in negative emotional responses from fans relative to non-fans. One such example is emotional desensitisation to real-life violence and general empathic concern for others.

Emotional Desensitisation to Real-Life Violence

The GAM and GLM are also useful in explaining desensitisation effects after repeated exposure to violent media. The GAM and GLM propose that repeated exposure to violent media results in the development of aggression-related knowledge structures, such as aggressive beliefs and attitudes, as well as desensitisation to aggression (Anderson & Bushman, 2002). Desensitisation has been defined as a decrease in physiological and emotional responses to real-life violence (Carnagey, Anderson, & Bushman, 2007). Carnagey et al. (2007) describe how desensitisation can occur. They argue that the first few episodes of exposure to violent media may result in a negative emotional response, for example, fear and anxiety. After repeated exposure, this response is extinguished, resulting in a reduced affective and arousal response (i.e., desensitisation). This then affects the person's present internal state, for example, it may reduce empathetic or sympathetic responses to victims of violence and it may make aggression or violence less salient (Carnagey et al., 2007).

Although no studies have specifically focused on desensitisation and violent music, desensitisation effects have been reported with other forms of violent media, such as violent video games. Carnagey et al. (2007) found that short-term exposure to a violent video game resulted in reduced physiological arousal to video clips of real-life violence, compared to participants who played a non-violent video game. Bartholow, Bushman, and Sestir (2006) asked male undergraduate students who had varying amounts of violent video game exposure to view neutral images (e.g., an image of a towel draped on a table), negative but non-violent images (e.g., an image of the rotting corpse of an animal) and violent images (e.g., a woman held at knife-point). Using EEG, they measured event-related brain potential (ERP), specifically brain activity that has previously been linked with the appraisal and categorisation of emotionally pertinent stimuli. They found that this brain activity decreased as prior violent video game exposure increased. However, there was no relationship with neutral images or negative non-violent images which suggests that people with exposure to violent video games are desensitised specifically to violence (Bartholow et al., 2006). It is therefore important to determine whether exposure to violent music may have similar desensitisation effects. One potential desensitisation effect that is particularly problematic in day-to-day life is a reduction in empathy in response to the plight of others. It is this particular issue that is of primary interest in the present study.

Empathy

Although there is widespread interest in the psychological and neurological basis of human empathy, there is still some debate about how to define it. Batson (2009) discusses eight related but distinct concepts that have been referred to as ‘empathy’. For example, empathy can refer to having knowledge of another person’s thoughts and feelings, but it can also refer to a mental and emotional experience that mimics what another person is thinking and feeling (Batson, 2009). For the purpose of this study, empathy is defined as an emotional

reaction in response to perceiving or understanding another person's internal state; this emotional reaction is usually similar or 'matches' the emotion that the other person is experiencing or is assumed to be experiencing (Eisenberg, Wentzel, & Harris, 1998). State empathy is the situational experience of this emotional reaction at a certain point in time, for example, it can change in response to different social contexts (Nezlek, Feist, Wilson, & Plesko, 2001). Trait empathy is the dispositional tendency or potential of a person to experience this emotional response and is typically cross-situational (Nezlek et al., 2001; Pavey, Greitemeyer, & Sparks, 2012).

It has been argued that empathy can lead to different emotional experiences in response to seeing an unfortunate other (Eisenberg et al., 1998). Two of these empathy-related emotions are empathic concern and personal distress. Empathic concern is considered an "other-oriented" emotion; it is an emotional response to the distress of an unfortunate other where emotion is felt for the other person (Batson, Early, & Salvarani, 1997). Personal distress is a "self-oriented" emotional response to witnessing an unfortunate other; it refers to personal experiences of discomfort in response to another person's difficult situation (Batson et al., 1997). Empathic concern and personal distress are important to distinguish as they can also lead to different actions. Empathic concern typically relates to a desire to relieve the other person's distress whereas personal distress revolves around a desire to alleviate your own discomfort (Batson et al., 1997). Empathic concern and personal distress are typically measured using self-report, and can be assessed at both a state and trait level. One such measure of state empathic concern and personal distress chosen for the present study was used successfully by Negd, Mallan, and Lipp (2011) to measure empathy-related emotions after reading vignettes. This was applicable to the design of the current study which assesses state empathic reactions to vignettes describing differing amounts of aggressive behaviour. Another self-report measure of trait empathy, which was also used in the present study, is the

Interpersonal Reactivity Index (Davis, 1980, 1983) which assesses four factors of empathy, but most relevantly it assesses dispositional tendencies for empathic concern and personal distress.

Changes in empathy have been reported in response to music, however, studies use different definitions of empathy and typically focus on how empathy changes the experience of listening to the music. For example, it has been argued that 'empathising' or adopting the perspective conveyed in music may account for the emotional response to music (Elvers, 2016). There are fewer studies that examine whether music can affect empathy. One such study was conducted by Greitemeyer (2009), who found that participants who listened to prosocial music reported a greater state empathetic response to distressed others, in comparison to participants who listened to neutral music. This raises the question of whether exposure to violent music would have the opposite effect and desensitise fans to the plight of others, thus decreasing empathy. This hypothesis will be investigated in the present study.

The capacity for music to increase or decrease empathy has important psychological and social implications, because empathy is an important predictor of behaviour. Batson and Powell (2003) found that empathy is a significant motivating factor for prosocial behaviour. Prot et al. (2014) conducted a longitudinal study and found that exposure to violent video games predicted reduced prosocial behaviour, whereas exposure to prosocial video games predicted increased prosocial behaviour. Both effects were moderated by empathy, suggesting that long-term exposure to violent video games may result in changes to empathy and can affect the likelihood of prosocial behaviour (Prot et al., 2014). Empathy appears to be a likely mediating factor between violent media exposure and behaviour, and will be investigated here in the context of fans of violent-music.

It is also possible that those with lower trait empathy tend to gravitate towards violent styles of music. A study conducted by Thompson et al. (2017) did not find any differences in

trait empathy between fans and non-fans of violent-music. However, it was not known whether the non-fans of violent-music were passionate fans of another genre of music. Thus, the groups may have differed not just in their penchant for violent music, but in the extent to which they enjoyed music of any genre. This potential confound was controlled in the present study by recruiting three groups of music fans that differed only in the genre they were passionate about. Another study of music and empathy examined whether different music preferences were associated with differences in trait empathic concern (Clark & Giacomantonio, 2013). They found no evidence that music preference were related to significant differences in trait empathy (Clark & Giacomantonio, 2013). However, the study did not isolate preferences for violent music, and preferences for heavy metal were combined with preferences for rock and alternative music, potentially masking differences in empathy among the fans of these three genres.

The Present Study

Considering that persistent exposure to violent media has been associated with desensitisation to situations of aggression or violence, the present study will examine whether violent music fans also show signs of desensitisation to situations with aggression. State empathic concern and personal distress will be measured in response to descriptions of three levels of aggressive behaviour in regular day-to-day contexts. Differences in trait empathy between the different music fan groups will also be assessed.

To our knowledge, no research has examined whether there are differences in state empathic responses to acts of aggression and violence between fans and non-fans of violent-music, and whether there are differences in trait empathy between fans and specific groups of non-fans who are still fans of other music genres. Additionally, although studies have looked at the role of music in the lives of fans of violent-music (for example, in identity), studies have not examined whether music's role is significantly different from non-fans. The present

study will address these gaps in the literature by examining whether fans and non-fans of violent-music have different state empathic responses to descriptions of aggressive behaviour, whether fans and non-fans display differences in trait empathy, and whether fans and non-fans report significant differences in the role that music plays in their lives.

Participants self-identified as fans or non-fans of violent-music. Fans of violent-music identified as a fan of heavy metal or death metal music. Two groups of non-fans identified as fans of either classical music or jazz music, which are both distinctly different genres from heavy and death metal. The participants completed questionnaires rating what role their respective genre plays in their lives in key domains such as identity, mood regulation and social bonding. To further characterise fans and non-fans, participants also rated how passionate they are about their music and whether they have a harmonious or obsessive passion for their respective genres. Participants read a series of vignettes which describe an 'aggressor' responding to an irritating action of an 'instigator' with either a non-aggressive, mildly aggressive or strongly aggressive action. Participants' state empathic reactions (empathic concern and personal distress) to the aggressor's responses were measured, along with the perspective they took while reading the scenarios. Finally, they completed a questionnaire which assessed their trait empathy.

Research Questions

1. Are there differences between fans and non-fans in trait empathy and state empathic reactions to descriptions of aggression?
2. Are there significant differences in the role music plays in the lives of fans and non-fans (e.g., does violent music play a more important role in the identity of fans)?

Hypotheses

1. Fans of violent-music will report lower trait empathic concern and personal distress compared to non-fans.

2. Relative to non-fans, fans of violent-music will report lower state empathic concern and personal distress in response to descriptions of the aggressor's behaviour in the vignettes;
3. Fans of violent-music will report similar state empathic concern and personal distress responses across the three levels of aggressive behaviour (non-aggressive, mildly aggressive, strongly aggressive behaviour);
4. Non-fans of violent-music will report increases in state empathic concern and personal distress as the magnitude of aggression described in the vignettes increases (i.e., from non-aggressive to mildly aggressive and then strongly aggressive).
5. In comparison to non-fans, fans of violent-music will report that violent music is particularly important in terms of self-reflection (identity), social bonding, emotion regulation and self-regulation.

Method

Participants

The participants consisted of 111 Macquarie University students. Sixteen received course credit for their first-year psychology course (PSYC104/PSYC105) while 88 received credit for their second-year cognitive psychology course (PSY246). Seven Macquarie University students were paid 15 dollars for their participation. A total of 108 participants were required overall, split into three groups of 36 self-identified fans. They identified as fans of one of three music genres: heavy or death metal, classical, and jazz. Both the death metal and heavy metal genres were included, because recruiting solely death metal fans would be particularly difficult as they are a relatively small subgroup of music listeners. Classical and jazz music were chosen to compare fans of violent-music to non-fans of violent-music who are nonetheless fans of another genre of music. This recruitment strategy ensured that all participants were fans of music in general, and only differed from each other in the type of

music that they liked. Three participants were excluded from analyses as they had not fully understood the requirements of the study. This resulted in the final 108 participants who were included in analyses (mean age = 21.43, *SD* = 4.97; 72 females, 36 males), with the required 36 participants in each of the fan groups: heavy metal or death metal (mean age = 23.28, *SD* = 7.72; 19 females, 17 males), classical (mean age = 20.56, *SD* = 2.06; 28 females, 8 males) and jazz (mean age = 20.44, *SD* = 2.51; 25 females, 11 males). The study was approved by the Macquarie University Human Research Ethics Committee (reference number: 5201700152).

Measures and Materials

Study presentation. The study was presented on a desktop computer and the measures were administered using the survey software Qualtrics.

Music function questionnaire. A questionnaire of music function was used to assess participants' preference for their respective genre and its role in their lives (Schäfer & Sedlmeier, 2009; Schäfer, Tipandjan, & Sedlmeier, 2012) . The measure was selected for the present study as it provides a succinct measure of the function of music, thus making comparisons between groups more manageable. Participants rated on a Likert scale from 1 (I do not agree at all) to 10 (I totally agree) the extent to which they agreed with a series of statements about their preference and use of their respective genres of music. Six items assessed their preference for their genre (e.g., "I am a passionate listener of this music"). A minor change was made to one of the music preference items ("I often visit concerts or discos to listen to this music"); 'discos' was changed to 'gigs' as discos was not relevant to any of the genres examined in this study. Sixteen statements assessed how participants used music in their lives. Schäfer et al. (2012) assigned these statements to seven different functions of music, including: one item for *background*; one item for *memory prompt*; one item for *diversion*, two items for *emotion regulation*; three items for *self-regulation*; four items for

self-reflection; three items for *social bonding* (see Appendix A). For subscales with more than one item, the scores were averaged so that each subscale was represented by one score.

The measure was developed by Schäfer and Sedlmeier (2009) based on their review of the literature. They later created subscales (Schäfer et al., 2012) by assigning the sixteen items to the broad functions of music outlined by Boer and Fischer (2012). Schäfer et al. (2012) found the measure had adequate internal consistency with an Indian sample ($\alpha = .58$) and good internal consistency with a German sample ($\alpha = .82$). Good internal consistency was also found in the present study ($\alpha = .87$).

Passion Scale. The Passion Scale (Vallerand et al., 2003) was used to assess how passionate the different groups of music listeners were about their respective genres. The questions of the Passion Scale are designed to be modified to reference a specific activity, which has been done previously to investigate passion for teaching, sports and video games (Carbonneau, Vallerand, Fernet, & Guay, 2008; Fuster et al., 2014; Vallerand et al., 2008). In the present study, questions were modified to refer to "music" (e.g., "Listening to this music is a passion for me"; see Appendix B). When thinking of their respective genre of music, participants rated their agreement with 17 statements on a scale from 1 (not agree at all) to 7 (very strongly agree). Five items assess whether the person has a passion (e.g., "Listening to this music is part of who I am"). Six items assess *obsessive passion* (e.g., "If I could, I would only listen to this music") and six items assess *harmonious passion* (e.g., "Listening to this music is well integrated in my life"). Scores were summed for the items within each subscale so that each subscale was represented by one score.

The measure has previously been demonstrated to have good construct validity (Marsh et al., 2013). Previous studies have found good internal consistency of the subscales (harmonious passion: $\alpha = .83$ to $.87$; obsessive passion: $\alpha = .76$ to $.82$) amongst different samples who were passionate about different activities such as sports and teaching

(Carbonneau et al., 2008; Vallerand et al., 2008). Good internal consistency for obsessive (α = .79) and harmonious passion (α = .83) was also found in the present study.

Vignettes. A pool of vignettes was created for the present study, as vignettes are known to be effective triggers of empathic responses (e.g., Funk, Buchman, Jenks, & Bechtoldt, 2003; Negd et al., 2011). Vignettes were developed and then pilot tested for use in the current study (see Appendix C for pilot study information). Each participant read 6 vignettes during the course of the study. These 6 were selected from a pool of 18 vignettes. The vignettes each had a similar word count, style and structure. All characters described in the vignettes were male (conveyed through conventionally male names such as 'Geoff' or masculine pronouns such as 'he'). This feature was included to ensure that the gender of the characters did not influence empathic reactions. Each vignette described a secondary character who makes an irritating action (the instigator) and intentionally disregards the primary character (the aggressor). Overall, there were six different scenarios and each described a different set of characters in different circumstances, and for each scenario there were three variations where the response of the aggressor differed. For each scenario, the aggressor's reaction was manipulated to be either non-aggressive, mildly aggressive or strongly aggressive. For example, in one scenario the instigator plays on his phone during a movie. There were three vignettes for this scenario where the aggressor, Geoff, either acted non-aggressively (Geoff asked the other man to put the phone away), mildly aggressive (Geoff tossed his popcorn at the man) or strongly aggressive (Geoff kicked the other man in the head). This resulted in the overall pool of 18 vignettes (see Appendix D).

Participants were given two blocks of vignettes. In the first block, participants read one example from each of scenarios 1-3 and an example of each of the reactions (non-aggressive, mildly aggressive and strongly aggressive). Similarly, in the second block participants read one vignette from each of scenarios 4-6, one with each of the non-

aggressive, mildly aggressive and strongly aggressive reactions. Presentation of the vignettes was partially counterbalanced so that participants received one of 36 unique combinations of vignettes.

State empathy questionnaire. A 20-item measure (Negd et al., 2011) was used to assess empathy-related emotions (empathic concern and personal distress) after reading each vignette. The measure consists of two subscales, empathic concern and personal distress, with 8 items each. Empathic concern included the emotion adjectives: sympathetic, touched, soft-hearted, compassionate, concerned, tender, moved and sorrowful. Personal distress included: distressed, troubled, uneasy, anxious, worried, upset, disturbed and grieved. Four distractors (cheerful, inspired, confused and motivated) were also included for a total of 20 items (see Appendix E). Participants rated the extent to which they had experienced each of these emotions while reading the previous vignette on a scale from 1 (not at all) to 5 (completely). Responses were averaged for each subscale and were then averaged across the two blocks for each vignette type. Higher scores indicate that the participant experienced that empathy-related emotion to a greater extent.

Their measure was based off an earlier measure used by Batson et al. (1997) and a factor analysis conducted by Batson, Fultz, and Schoenrade (1987) which provided evidence that empathic concern and personal distress are orthogonal factors that are related to different behavioural outcomes; greater personal distress predicts motivation to reduce their own discomfort, whereas empathic concerns appears to increase motivation to reduce another person's distress (Batson et al., 1987). Negd et al. (2011) found that both subscales had good internal consistency: empathic concern (α = .89) and personal distress (α = .93) The subscales were also found to have adequate to good internal consistency in the present study: empathic concern (α = .75 to .84) and personal distress (α = .84 to .92).

Perspective-taking questions. Participants were asked four questions which assessed how justified they believed the aggressor's action to be and whose perspective they took when reading the vignette. After each vignette, the characters in the vignette were assigned a letter (e.g., "In this vignette, there was Character A: Geoff, and Character B: the man on his phone"). Character A referred to the aggressor and Character B referred to the instigator. On a scale from 1 (not at all) to 5 (completely), participants rated to what extent: they felt the action of Character A was justified, they took an objective standpoint (i.e., the extent to which they were neutral and did not take the perspective of either Character A or B), took the perspective of Character A and took the perspective of Character B (see Appendix F). The perspective-taking questions are of interest as perspective taking has been shown to influence empathic responses (Batson et al., 1997; Negd et al., 2011). Therefore, these questions were included to examine whether there were any differences in the perspective that the different fans took.

Interpersonal Reactivity Index. The Interpersonal Reactivity Index (IRI) is a 28-item measure of trait empathy and consists of four subscales: perspective-taking, fantasy, empathic concern and personal distress (Davis, 1980, 1983). This scale was chosen as it measures more enduring empathic tendencies, which are relevant to the state empathy variables examined in the present study. Each subscale consists of seven items; two items of each subscale are reverse-scored except for empathic concern, which has three reverse-scored items (see Appendix G). Participants were asked to rate how well each item describes them on a scale from 0 (does not describe me well) to 4 (describes me very well). After reverse-scoring the relevant items, items within each subscale were summed.

The perspective-taking subscale taps into a person's propensity to adopt the perspective of others (e.g., "I try to look at everybody's side of a disagreement before I make a decision"). The fantasy subscale measures a person's tendency to imagine themselves in the

place of fictional characters (e.g., “I really get involved with the feelings of the characters in a novel”). The empathic concern and personal distress subscales both assess how people tend to respond emotionally to situations. Empathic concern measures “other-oriented” feelings of concern for another person in difficult circumstances (e.g., “I am often quite touched by things that I see happen”). Personal distress assesses “self-oriented” feelings which are focused on the self and the personal experience of discomfort in response to another person’s difficult situation (e.g., “Being in a tense emotional situation scares me”). Higher scores on each of these scales indicates a greater tendency to adopt the perspective of others (perspective-taking), take the perspective of fictional characters (fantasy), experience concern for others in difficult situations (empathic concern) and feel concern for themselves in response to another person’s circumstances (personal distress).

Davis (1983) demonstrated that the measure has good construct validity. For each gender, Davis (1980) examined the internal reliability coefficients of the scale and found that all subscales had adequate internal consistency and were similar for males and females; perspective-taking (males: $\alpha = .75$; females: $\alpha = .78$), fantasy (males: $\alpha = .78$; females: $\alpha = .75$), empathic concern (males: $\alpha = .72$; females: $\alpha = .70$) and personal distress (males: $\alpha = .78$; females: $\alpha = .78$). All of the subscales had adequate to good internal consistency in the present study: fantasy ($\alpha = .76$), perspective-taking ($\alpha = .82$), empathic concern ($\alpha = .81$) and personal distress ($\alpha = .82$).

Procedure

Three groups of participants were recruited: one group identified as fans of death metal or heavy metal. The next two groups broadly identified as fans of jazz and classical music, and also indicated that they were not fans of death metal or heavy metal; no definitions of the music genres were provided to the participants. All participants self-identified as either fans of death and heavy metal, classical or jazz music when they signed

up for the study. These self-identifications were verbally confirmed when the participants arrived for the experimental session. Participants were not told that "empathy" would be assessed, and hence it is unlikely that they altered their responses on the empathy scales to be more socially desirable. Instead, they were told that emotional responses to real-life scenarios would be examined.

After participants provided written and informed consent, they completed the music function questionnaire (Schäfer et al., 2012) and the Passion Scale (Vallerand et al., 2003). They were asked to answer these questions in terms of the genre they identified as a fan of. Next, participants began the first block of vignettes. Vignettes were presented one at a time. After reading each vignette, participants were asked to rate their emotional response to the vignette, which in reality was the state empathy questionnaire (Negd et al., 2011). They then answered the perspective-taking questions before moving onto the next vignette. After participants completed the three vignettes in the first block, participants were given a demographics questionnaire (see Appendix H) to help reduce fatigue effects by engaging with a different task. Once the demographic questions were complete, participants commenced the second block of vignettes. Lastly, participants completed the Interpersonal Reactivity Index (Davis, 1980).

At the completion of the study, participants were provided a verbal and written explanation of the true purpose of the study and were given an opportunity to ask questions and withdraw their consent for their data to be used in the study. All of the participants provided written and informed consent for their data to be used after being debriefed.

Results

Analysis Plan

To assess differences in trait empathy, passion, music preference, and music function between the three fan groups, separate one-way ANOVAs were run with each subscale as a

dependent variable and fan status as a between-subjects factor. To assess short-term empathic reactions, two 3x3 mixed ANOVAs were run; one with state empathic concern[2] as the dependent variable and one with state personal distress as the dependent variable. Fan status was entered as a between-subjects factor and vignette type as a within-subjects factor. Separate mixed ANOVAs were run for each of the justification and perspective-taking questions, with fan status as a between-subjects factor and vignette type as a within-subjects factor.

Prior to statistical analyses, the assumptions of all statistical tests were investigated and data were screened for outliers. All assumptions were met unless otherwise stated. Alpha was set at .05. The Bonferroni correction was applied to pairwise comparisons, either through SPSS or when the SPSS option was unavailable, by manually calculating the new alpha level. Where applicable, this will be stated.

Trait Empathy

The distribution of *fantasy* scores was significantly non-normal for classical fans and the distribution of *perspective-taking* scores for jazz fans was significantly non-normal. Therefore, each of these variables were bootstrapped. *Empathic concern* and *personal distress* satisfied these assumptions and did not require bootstrapping. Bootstrapping is a robust method which provides estimates about the sampling distribution of statistics by resampling the originally obtained sample data (Field, 2013; Singh & Xie, 2008). It was an appropriate procedure for the present data as bootstrapping is robust to violations of assumptions such as normality (Field, 2013). The bootstrapping analyses were run in SPSS following procedures outlined by Field (2013) using 2000 samples. The bias-corrected and

[2] Differences in state empathic concern and personal distress scores between the two blocks of vignettes were also investigated. Most scores had not significantly changed between the two times, however, jazz fans generally had lower state empathic concern in the second block compared to the first. Analyses were run on scores from the first block only, however, this did not change the results. Therefore, the findings reported here reflect analyses run using the average scores between the two blocks.

accelerated bootstrap method was run as it is considered more accurate than the alternative percentile method (Efron & Tibshirani, 1993).

Fantasy did not significantly differ between the different fan groups, $F(2,105) = 1.47$, $p = .235$, $\eta^2_p = .027$. Fans of metal, classical and jazz had a similar tendency to take the perspectives of fictional characters (see Table 1 for means). *Perspective-taking* did not significantly differ between the fan groups, $F(2,105) = .76$, $p = .469$, $\eta^2_p = .014$. Fans of metal, classical and jazz had a similar tendency to take the perspective of others. *Personal distress* also did not significantly differ between the different fan groups, $F(2,105) = 1.45$, $p = .240$, $\eta^2_p = .027$. Fans of metal, classical and jazz had a similar tendency to feel self-oriented distress in response to witnessing another person in difficult circumstances.

Table 1
Means and Standard Deviations for the Trait Empathy Subscales

	Metal Fans	Classical Fans	Jazz Fans
Fantasy			
M	19.50	21.39	20.00
SD	4.39	5.41	4.68
Perspective-Taking			
M	17.92	18.47	19.39
SD	4.61	5.09	5.58
Personal Distress			
M	11.28	12.78	10.67
SD	6.18	5.33	4.64
Empathic Concern			
M	18.61	21.31	21.92
SD	5.22	3.60	4.82

The main effect of fan status was significant for *empathic concern*, $F(2,105) = 5.27$, $p = .007$, $\eta^2_p = .091$, suggesting that empathic concern did differ between the fan groups. To determine which groups differed in empathic concern, all pairwise comparisons were examined with Bonferroni-corrected post-hoc tests in SPSS. When SPSS implements the Bonferroni adjustment, it retains an alpha of .05 but incorporates the adjustment into the calculation (Field, 2013). Therefore, the significance of each pairwise comparison reported

below can be interpreted against the alpha level $p = .05$. Fans of metal had significantly lower empathic concern compared to classical fans ($p = .044$, 95% CI [-5.33, -.06]), as well as fans of jazz ($p = .009$, 95% CI [-5.94, -.67]). There was no significant difference in empathic concern between classical fans and jazz fans ($p = 1.000$, 95% CI [-3.25, 2.03]).

State Empathy-Related Responses

The state empathic concern scores for metal fans did not satisfy the assumption of normality across all of the vignette types, nor did the scores of classical fans for the mildly aggressive vignettes. For state personal distress scores, the scores of metal and classical fans for the non-aggressive and mildly aggressive vignettes, as well as the scores of jazz fans for the strongly aggressive vignettes, did not meet the assumption of normality.

As bootstrapping is not an available option for repeated-measures factors (Field, 2013), each of the state empathic concern and personal distress scores for the non-aggressive, mildly aggressive and strongly aggressive vignettes were log transformed. Considering that the violated assumption of normality seemed to be largely driven by positive skew and a leptokurtic distribution of the non-normal state empathy scores, a log transformation was chosen as it is recommend for positive skew and positive kurtosis (Field, 2013).

Although some of the scores satisfied assumptions, all of the scores required the same transformation to keep them on an equivalent scale (Field, 2013), as analyses examined differences in these scores. Analyses were conducted on the log transformed data, however, raw scores are used in figures for ease of interpretation (see Table 2 for both raw and log transformed means).

State empathic concern. Mauchly's test indicated that the assumption of sphericity was satisfied, $\chi^2(2) = 2.82$, $p = .244$. The main effect of fan status was non-significant, $F(2,105) = 1.32$, $p = .272$, $\eta^2_p = .025$, suggesting that there were no differences in state empathic concern responses between the fans and non-fans. The main effect of vignette type

was significant, $F(2,210) = 20.36$, $p < .001$, $\eta^2_p = .162$, indicating that state empathic concern differed between the different levels of aggressive behaviour described in the vignettes. The interaction was non-significant, $F(4,210) = 1.72$, $p = .148$, $\eta^2_p = .032$.

Table 2
Raw and Log Transformed Means and Standard Deviations for State Empathy Measures

		State Empathic Concern			State Personal Distress		
		Non-Aggressive	Mildly Aggressive	Strongly Aggressive	Non-Aggressive	Mildly Aggressive	Strongly Aggressive
Raw Scores	*M*	1.85	1.66	1.90	1.62	1.92	2.57
	SD	.58	.47	.54	.58	.65	.88
Log Transformed	*M*	.25	.20	.26	.19	.26	.38
	SD	.14	.12	.12	.14	.14	.16

To follow up the significant main effect of vignette type, all pairwise comparisons were run. As SPSS does not facilitate the Bonferroni adjustment for repeated-measures factors, it was calculated by hand and the significance of pairwise comparisons was assessed against the Bonferroni-adjusted alpha of .017 (.05/3).

There was a significant difference between the non-aggressive and mildly aggressive vignettes ($p < .001$, 95% CI [.02, .06]), with greater empathic concern in the non-aggressive compared to the mildly aggressive vignettes. There was also a significant difference between the mildly aggressive and strongly aggressive vignettes ($p < .001$, 95% CI [-.07, -.04]), with greater empathic concern in the strongly aggressive compared to the mildly aggressive vignettes. There was no significant difference between the non-aggressive and strongly aggressive vignettes ($p = .147$, 95% CI [-.03, .01]; see Figure 2).

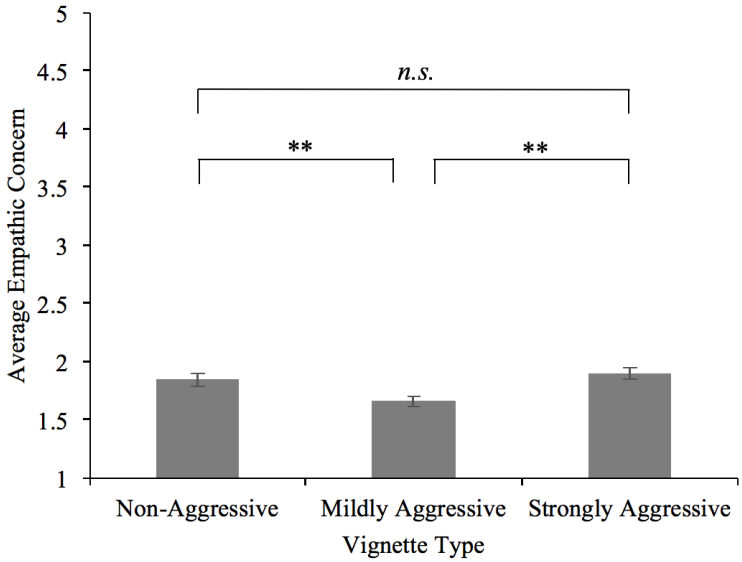

Figure 2. Average empathic concern score (from 1-5) for each of the vignette types. Error bars represent the standard error of the mean. ** $p < .001$

State personal distress. Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(2) = 33.51$, $p < .001$. As the Greenhouse-Geisser estimate was greater than .75 ($\varepsilon = .78$), and values over .75 are considered too conservative (Huynh & Feldt, 1976), Huynh-Feldt corrected tests are reported ($\varepsilon = .81$). The main effect of fan status was non-significant $F(2,105) = 1.45$, $p = .240$, $\eta^2_p = .027$, suggesting that there were no differences in state personal distress responses between the fans and non-fans. The main effect of vignette type was significant, $F(1.62,169.89) = 129.96$, $p < .001$, $\eta^2_p = .553$, indicating that state personal distress differed between the different levels of aggressive behaviour described in the vignettes. The interaction was not significant, $F(3.24,169.89) = .79$, $p = .512$, $\eta^2_p = .015$.

To follow up the significant main effect of vignette type, all pairwise comparisons were run. The significance of pairwise comparisons can be interpreted against the Bonferroni-adjusted alpha of .017. There was a significant difference between the non-aggressive and mildly aggressive vignettes ($p < .001$, 95% CI [-.10, -.05]), with greater personal distress in the mildly aggressive compared to the non-aggressive vignettes. There was significantly greater personal distress in the strongly aggressive compared to the mildly

aggressive vignettes ($p < .001$, 95% CI [-.14, -.10]). There was also a significant difference between the strongly aggressive and non-aggressive vignettes ($p < .001$, 95% CI [-.23, -.17]). Participants reported greater personal distress in the strongly aggressive compared to the non-aggressive vignettes (see Figure 3).

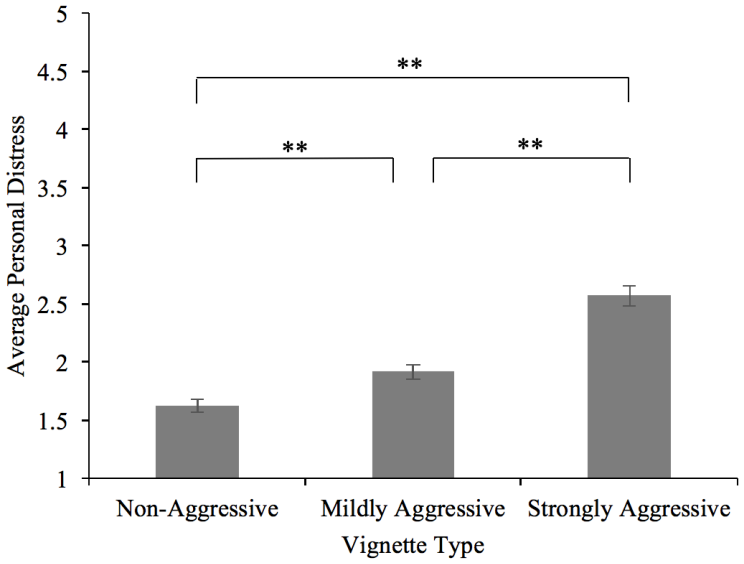

Figure 3. Average personal distress score (from 1-5) for each of the vignette types. Error bars represent the standard error of the mean. ** $p < .001$

Perceived Justification of the Aggressor's Reaction

An analysis was conducted to determine whether the three fans groups differed in how justified they thought the aggressor's reaction was. Mauchly's test indicated that the assumption of sphericity was satisfied, $\chi^2(2) = .76$, $p = .683$. There was no significant main effect of fan status, $F(2,105) = .14$, $p = .872$, $\eta^2_p = .003$, suggesting that metal, classical and jazz fans believed the aggressor's reaction was similarly justified. There was a significant main effect of vignette type, $F(2,210) = 528.64$, $p < .001$, $\eta^2_p = .834$, suggesting that the perceived justification of the aggressor's reaction differed based on the level of aggressive behaviour described in the vignettes. There was no significant interaction between fan status and vignette type, $F(4,210) = .53$, $p = .716$, $\eta^2_p = .010$.

To follow up the significant main effect of vignette type, all pairwise comparisons were run. The Bonferroni correction was calculated manually as SPSS cannot apply the Bonferroni correction with repeated-measures factors. Therefore, significance should be interpreted against the alpha of .017 (.05/3). Participants considered the aggressor's reaction more justified in the non-aggressive compared to the mildly aggressive vignettes ($p < .001$, 95% CI [1.39, 1.77]). Participants also interpreted the reaction as less justified in the strongly aggressive compared to the mildly aggressive vignettes ($p < .001$, 95% CI [1.23, 1.59]) and less justified compared to the non-aggressive vignettes ($p < .001$, 95% CI [2.82, 3.17]; see Table 3 for means).

Participants' Perspective-Taking of the Vignette Characters

Analyses were next conducted to determine whether the three fan groups differed in the perspective they took while reading the vignettes. There were three types of perspective-taking: taking the perspective of the aggressor, taking the perspective of the instigator and taking a neutral perspective (neither the aggressor's or the instigator's perspective). For all following pairwise comparisons, significance should be interpreted against the alpha of .017 (.05/3). The Bonferroni correction was calculated manually as SPSS cannot apply the Bonferroni correction with repeated-measures factors.

Perspective of the aggressor. Mauchly's test indicated that the assumption of sphericity was satisfied, $\chi^2(2) = 3.70$, $p = .158$. There was no significant main effect of fan status, $F(2,105) = 1.31$, $p = .275$, $\eta^2_p = .024$, suggesting that metal, classical and jazz fans took the perspective of the aggressor to a similar extent while reading the vignettes. There was a significant main effect of vignette type, $F(2,210) = 151.67$, $p < .001$, $\eta^2_p = .591$, suggesting that the extent to which participants took the aggressor's perspective differed based on the level of aggressive behaviour described in the vignettes. There was no

significant interaction between fan status and vignette type, $F(4,210) = 2.11$, $p = .080$, $\eta^2_p = .039$.

To follow up the significant main effect of vignette type, all pairwise comparisons were run. Participants took the aggressor's perspective to a greater extent when reading the non-aggressive compared to the mildly aggressive vignettes ($p < .001$, 95% CI [.74, 1.12]). Participants took the aggressor's perspective to a greater extent when reading the mildly aggressive compared to the strongly aggressive vignettes ($p < .001$, 95% CI [.69, 1.10]). Participants took the aggressor's perspective to a lesser extent when reading the strongly aggressive compared to the non-aggressive vignettes ($p < .001$, 95% CI [1.60, 2.05]).

Perspective of the instigator. Mauchly's test indicated that the assumption of sphericity was violated, $\chi^2(2) = 19.39$, $p < .001$. As the Greenhouse-Geisser estimate was greater than .75 ($\varepsilon = .86$) Huynh-Feldt corrected tests are reported ($\varepsilon = .88$).

There was no significant main effect of fan status, $F(2,105) = .05$, $p = .947$, $\eta^2_p = .001$, suggesting that metal, classical and jazz fans adopted the perspective of the instigator while reading the vignettes to a similar extent. There was a significant main effect of vignette type, $F(1.77,185.62) = 42.96$, $p < .001$, $\eta^2_p = .290$, suggesting that the extent to which participants took the instigator's perspective differed based on the level of aggressive behaviour described in the vignettes. There was no significant interaction between fan status and vignette type, $F(3.54,185.62) = .13$, $p = .961$, $\eta^2_p = .002$.

To follow up the significant main effect of vignette type, all pairwise comparisons were run. Participants took the instigator's perspective to a lesser extent when reading the non-aggressive compared to the mildly aggressive vignettes ($p = .005$, 95% CI [-.35, -.07]). Participants took the instigator's perspective to a lesser extent when reading the mildly aggressive compared to the strongly aggressive vignettes ($p < .001$, 95% CI [-.83, -.42]).

Participants took the instigator's perspective to a greater extent when reading the strongly aggressive compared to the non-aggressive vignettes ($p < .001$, 95% CI [-1.04, -.63]).

Table 3
Means and Standard Deviations for the Justification and Perspective-Taking Scores

	Non-Aggressive	Mildly Aggressive	Strongly Aggressive
Justification of Reaction			
M	4.41	2.83	1.42
SD	.64	.87	.60
Aggressor's Perspective			
M	4.09	3.16	2.26
SD	.70	.91	.95
Instigator's Perspective			
M	1.82	2.03	2.66
SD	.73	.77	.99
Neutral Perspective			
M	2.50	2.87	2.93
SD	1.06	.94	1.09

Neutral perspective. Mauchly's test indicated that the assumption of sphericity was satisfied, $\chi^2(2) = 4.32$, $p = .115$. There was no significant main effect of fan status, $F(2,105) = .48$, $p = .619$, $\eta^2_p = .009$, suggesting that metal, classical and jazz fans took a neutral perspective to a similar extent while reading the vignettes. There was a significant main effect of vignette type, $F(2,210) = 11.23$, $p < .001$, $\eta^2_p = .097$, suggesting that the extent to which participants took a neutral perspective differed based on the level of aggressive behaviour described in the vignettes. There was no significant interaction between fan status and vignette type, $F(4,210) = .26$, $p = .901$, $\eta^2_p = .005$.

To follow up the significant main effect of vignette type, all pairwise comparisons were run. Participants took a significantly more neutral perspective in the mildly aggressive compared to the non-aggressive vignettes ($p < .001$, 95% CI [-.54, -.19]). Participants also took a more neutral perspective in the strongly aggressive compared to the non-aggressive vignettes ($p < .001$, 95% CI [-.63, -.22]). There were no significant differences between the mildly and strongly aggressive vignettes ($p = .578$, 95% CI [-.25, .14]).

Function of Music for Fans and Non-Fans of Violent-Music

For six of the music function subscales, the distribution of ratings did not satisfy the assumption of normality, including *background*, *memory prompt*, *diversion*, *emotion regulation*, *self-regulation* and *self-reflection*. Therefore, they were bootstrapped. Ratings for s*ocial bonding* satisfied assumptions and did not require bootstrapping. To follow up any significant main effects, all pairwise comparisons were examined with Bonferroni-corrected post-hoc tests in SPSS. Therefore, the alpha level for pairwise comparisons can be interpreted at $p = .05$.

There was a significant main effect of fan status for *social bonding*, $F(2,105) = 4.15$, $p = .018$, $\eta^2_p = .073$. There was a significant difference between fans of metal and classical ($p = .021$, 95% CI [.12, 1.97]), but no significant differences between metal fans and jazz fans ($p = 1.000$, 95% CI [-.69, 1.17]), or between classical and jazz fans ($p = .110$, 95% CI [-1.73, .12]). Fans of metal reported that metal plays a more important role in social bonding, relative to classical music fans, but not jazz fans.

There was also a significant main effect of fan status for *background*, $F(2,105) = 6.52$, $p = .002$, $\eta^2_p = .110$. Specifically, there was a significant difference between metal and classical fans ($p = .002$, 95% CI [-2.69, -.48]), as well as between metal fans and jazz fans ($p = .035$, 95% CI [-2.27, -.06]). There was no significant difference between classical and jazz fans ($p = 1.000$, 95% CI [-.69, 1.52]). Fans of classical and jazz reported that they enjoy listening to their respective genres as background music relatively more than metal fans (see Table 4 for means).

For *memory prompt*, there were no significant differences between the metal, classical and jazz fans in terms of using their respective genres to reminisce, $F(2,105) = 2.01$, $p = .139$, $\eta^2_p = .037$. For *diversion*, there were no significant differences between the metal, classical and jazz fans in using their respective genres as a means of diversion, $F(2,105) = 1.17$, $p =$

.316, η^2_p = .022. For *emotion regulation*, there were no significant differences between the metal, classical and jazz fans in their use of music for emotion regulation, $F(2,105) = 2.96$, $p = .056$, η^2_p = .053. For *self-regulation*, there were no significant differences between the metal, classical and jazz fans in using their respective genres for self-regulation, $F(2,105) = .50$, $p = .608$, η^2_p = .009. For *self-reflection*, there were no significant differences between the metal, classical and jazz fans in using their respective music genres to self-reflect, $F(2,105) = .69$, $p = .504$, η^2_p = .013.

Table 4
Means and Standard Deviations for the Music Function Subscales

	Metal Fans	Classical Fans	Jazz Fans
Social Bonding			
M	7.13	6.08	6.89
SD	1.69	1.48	1.66
Background			
M	7.11	8.69	8.28
SD	2.41	1.41	1.83
Memory Prompt			
M	7.58	7.81	8.44
SD	2.21	1.85	1.56
Diversion			
M	7.25	7.01	7.56
SD	1.63	1.35	1.54
Emotion Regulation			
M	8.32	7.88	8.63
SD	1.38	1.45	1.08
Self-Regulation			
M	7.58	7.70	7.88
SD	1.48	1.09	1.18
Self-Reflection			
M	7.52	7.16	7.41
SD	1.48	1.15	1.35

Passion and Preference for their Music

Both the Passion Scale and the *preference* subscale of the Music Function Questionnaire were examined to understand how the fans and non-fans of violent-music felt about their respective music genres. To follow up any significant main effects, all pairwise

comparisons were examined with Bonferroni-corrected post-hoc tests in SPSS. Therefore, the alpha level for pairwise comparisons can be interpreted at $p = .05$.

Fans and non-fans of violent-music did not significantly differ in how passionate they were about their respective music genres, $F(2,105) = 1.32$, $p = .272$, $\eta^2_p = .024$. The *harmonious* and *obsessive passion* subscales were also examined to characterise the type of passion the different fans held for their genres. For *harmonious passion*, there was no significant main effect of fan status, $F(2,105) = 1.60$, $p = .207$, $\eta^2_p = .030$, suggesting that fans of metal, classical and jazz had similar levels of harmonious passion for their respective genres. For *obsessive passion*, there was also no significant main effect of fan status, $F(2,105) = .10$, $p = .904$, $\eta^2_p = .002$, suggesting that fans of metal, classical and jazz also had similar levels of obsessive passion. Based on the means, music listeners overall seemed to have a more harmonious passion than obsessive passion for their genre of music (see Table 5 for means).

Table 5
Means and Standard Deviations for the Passion and Music Preference Subscales

	Metal Fans	Classical Fans	Jazz Fans
Passion Criteria			
M	25.78	24.86	27.00
SD	6.21	5.90	4.59
Harmonious Passion			
M	28.11	30.58	30.11
SD	7.11	6.04	5.42
Obsessive Passion			
M	18.22	17.69	17.50
SD	7.11	7.44	6.55
Music Preference			
M	7.29	6.30	6.97
SD	1.64	1.51	1.56

There was a significant difference between the different fan groups in terms of their preference for their respective music genres, $F(2,105) = 3.71$, $p = .028$, $\eta^2_p = .066$. Metal fans had a greater preference for their genre compared to fans of classical music, $p = .026$. There

was no significant difference between fans of metal and jazz, $p = 1.000$, or between fans of classical and jazz, $p = .220$, in terms of their preference for their respective music genres.

Discussion

The main aims of this study were to investigate whether fans of violent-music: (1) have lower trait empathy compared to non-fans and (2) have reduced state empathic reactions to descriptions of aggression compared to non-fans. It was hypothesised that fans would report lower trait empathic concern and personal distress when compared to non-fans. This was partially supported by the results as fans did report lower trait empathic concern compared to non-fans, yet fans and non-fans reported similar trait personal distress. It was also hypothesised that relative to non-fans, fans would report lower state empathic concern and personal distress after reading descriptions of aggressive behaviour. This was not supported by the results as fans and non-fans did not show differences in their state empathic responses to vignettes describing varying amounts of aggressive behaviour. However, state empathic concern and personal distress did differ based on the aggressive content featured in the vignettes, regardless of which genre participants were a fan of. These results will now be discussed in further detail, in addition to the secondary aims of the present study.

Trait Empathy

The results partially supported the hypothesis that fans would report lower trait empathic concern and personal distress than non-fans. It was found that fans of violent-music had significantly lower trait empathic concern than both groups of non-fans. There were no significant differences between the three fan groups in trait personal distress. There were also no significant differences between the fan groups in terms of fantasy or perspective-taking. No hypotheses were made about fantasy or perspective-taking as they were not a primary interest of the study, however, these results suggest that the fans and non-fans were similar in

their tendency to imagine themselves in the place of fictional characters and in their tendency to take the perspective of others.

The finding that trait empathic concern was lower for fans than non-fans of violent-music was entirely consistent with predictions of the GAM, GLM and desensitisation theory (Anderson & Bushman, 2002; Buckley & Anderson, 2006; Carnagey et al., 2007). These theories predict that exposure to violent media, including music, should desensitise individuals to aggressive and violent scenarios, resulting in long-term changes to empathy. However, this finding contrasts with previous studies which used the same measure of trait empathy (the IRI), but observed no differences in trait empathic concern between fans and non-fans of violent-music (Thompson et al., 2017) and violent video game players and controls (Szycik, Mohammadi, Münte, & te Wildt, 2017).

A number of factors may account for these conflicting results. Szycik et al. (2017) examined video gamers, who may not be comparable to music fans, although one would expect exposure to violent games and violent music to have similar outcomes. Perhaps more importantly, Szycik et al. (2017) did not confirm that their control group had equal exposure to other forms of violent media. Thus, it is possible that many individuals in their control group had considerable exposure to violent media, such as violence in popular films and music. Similarly, Thompson et al. (2017) used a general group of non-fans, so the characteristics of these fans was not well understood. For example, non-fans may have included individuals who were not passionate about any genre of music, and passion for music may itself be a predictor of empathy. In short, the control or comparison groups used by Szycik et al. (2017) and Thompson et al. (2017) may not have matched the conditions of the current investigation.

Fans had similar trait personal distress compared to non-fans of violent-music. This finding was surprising, because theories of desensitisation predict that feelings of anxiety and

fear should be extinguished after repeated exposure (Carnagey et al., 2007), and the GAM and GLM predict that repeated exposure to violent media should result in long-term changes to the individual (Anderson & Bushman, 2002; Buckley & Anderson, 2006). Therefore, it was expected that fans of violent-music would have reduced trait tendencies to feel distressed or anxious in response to witnessing an unfortunate other. Nevertheless, the finding was consistent with other research on fans of violent-music (Thompson et al., 2017) and violent video gamers (Szycik et al., 2017), which used the same measure of trait empathy (the IRI) and observed no evidence of reduced trait personal distress between violent media users and non-users.

Overall, the results of the present study suggest that when compared to non-fans, fans of violent-music have a similar trait tendency to feel self-focused concern in response to the plight of others, but a lower trait tendency to feel other-oriented concern in response to witnessing others in distressing circumstances. However, causality cannot be concluded from the present study. That is, it is unknown whether the finding that fans had lower trait empathic concern than non-fans is due to repeated exposure to violent music or if it is a pre-existing trait which tends to attract people to listen to violent genres of music.

State Empathy

State empathic concern and personal distress responses of fans and non-fans. Considering the results of trait empathy, it is interesting that contrary to our hypotheses, there were no differences in state empathic responses between fans and non-fans. We had expected that the state empathic concern and personal distress of fans of violent-music would be similar across vignettes describing non-aggressive, mildly aggressive and strongly aggressive behaviour. Whereas non-fans of violent-music were expected to report increases in state empathic concern and personal distress as the magnitude of aggression described in the vignettes increased. However, there were no significant differences between the fans and

non-fans in state empathic concern or personal distress responses to the vignettes, suggesting that fans of violent-music had similar state empathy responses to descriptions of aggressive behaviour as non-fans.

This finding was similar to a previous video game study which found no difference in state empathic responses to violent illustrations between German violent video gamers and a control group with no violent video game exposure (Szycik et al., 2017). However, the finding that there were no differences between fans and non-fans in state empathy diverged from what was predicted by the GAM and GLM, which propose that repeated exposure to violent stimuli can result in desensitisation to aggression (Anderson & Bushman, 2002; Buckley & Anderson, 2006) and thus reduced empathy-related responses. This result also differed from past studies which link exposure to violent media, such as video games, to desensitised responses to aggressive or violent images and video clips (Bartholow et al., 2006; Carnagey et al., 2007).

It is possible that contrary to the predictions of the GAM and GLM and past evidence on violent video games, fans of violent-music do not show signs of desensitisation to *descriptions* of aggression. The diverging findings of the present study may be accountable to differences in modality between violent music and other forms of violent media such as video games. Violent video games involve both audio (e.g., music and sound effects) and visual components. In comparison, music is typically an auditory modality and can sometimes be accompanied by a visual component, such as a music video. However, Brummert-Lennings and Warburton (2011) found that showing participants a violent music video while they listened to violent music resulted in similar increases in aggression as listening to the violent music on its own. This suggests that the visual component which can accompany music has little effect above and beyond the music itself. Therefore, there appears to be something intrinsically different about violent music compared to other forms of violent media. Perhaps

the way listeners engage with violent music, a mostly auditory modality, differs from how people engage with other forms of multimodal violent media. For example, in violent video games, players can actively make choices which impact on the in-game world and people can identify with the character they play, which is related to feeling immersed in the game (Soutter & Hitchens, 2016). These in-game choices could be aggressive or violent, such as a choice to cause harm to or kill another character. Music has the potential to convey aggression or violence through its lyrics (Gross, 1990; Warburton et al., 2014) and musical sound (Cheng & Tsai, 2016; Huron, Kinney, & Precoda, 2006; Tsai et al., 2010). Additionally, the lyrics of violent music such as heavy metal can hold important meaning to listeners (Weinstein, 2000). However, music listeners likely cannot control or impact music, or even music videos, in the same way as players can actively interact with and control violent elements in video games.

Perhaps a more nuanced and elaborate description of the GAM and GLM is needed to predict and explain all of the potential effects of violent music exposure. Desensitisation theory predicts that exposure to violent media, regardless of modality, should desensitise individuals, altering a person's present internal state (Carnagey et al., 2007). It is also theorised based on the GAM and GLM that greater engagement with violent video games should increase the negative effects of exposure (Brockmyer et al., 2009). The question is whether greater levels of engagement with violent music can also increase negative effects. Perhaps it is more pertinent to examine the type of engagement when examining violent media; for instance, fans may be able to feel as engaged with violent music as much as gamers can with a violent video game, but a person is not able to engage with music in the same way as a video game in terms of the impact and control they have over the violent elements of the stimuli.

Additionally, it is also unclear how violent music can impact the present internal state of fans, as initial research on how violent music influences a person's present internal state has largely focused on non-fans (Anderson et al., 2003). Initial research on fans has looked at the effect of heavy metal on psychological and physiological arousal (Gowensmith & Bloom, 1997; Sharman & Dingle, 2015), however arousal is only one component of the present internal state. There is also mixed evidence about whether violent music may have a positive or negative impact on fans' affective state (Shafron & Karno, 2013; Sharman & Dingle, 2015; Thompson et al., 2017). Overall, the effect of violent music on fans' present internal state in terms of their cognition and affect is still largely unclear, yet these routes are equally important in determining the outcomes of violent media exposure according to the GAM and GLM (Anderson & Bushman, 2002; Buckley & Anderson, 2006).

An alternative explanation for the null-result of state empathic concern and personal distress was that perhaps short, written vignettes were not sufficient to induce strong empathic responses. On a scale from one to five, the highest mean score for empathic concern was 1.90 and for personal distress was 2.57. In comparison to Negd et al. (2011), who used the same measure in response to emotion-inducing vignettes, participants' highest mean score for empathic concern was 3.10 and for personal distress, 3.70. The present study did not examine the same independent variables. However, by comparing the means for empathic concern and personal distress, these data suggest that overall the vignettes in the present study evoked relatively low empathic responses, particularly for empathic concern. Considering that the vignettes appeared to have induced relatively low levels of state empathic responses, perhaps they were insufficient to differentiate fans and non-fans of violent-music. Having stronger empathy-inducing stimuli in the future may result in non-fans reporting greater state empathic concern and personal distress, while fans continue to report low levels of these state empathy responses. This hypothesis awaits further investigation.

Another alternative explanation which may explain the mixed findings of state empathy and desensitisation to aggression or violence is the fact that past studies use a wide variety of stimuli and measures. For example, Szycik et al. (2017) used explicitly violent illustrations and fMRI, Bartholow et al. (2006) used neutral, negative non-violent and violent images and EEG, Carnagey et al. (2007) used video clips of real-life violence and physiological measures. Perhaps the effects of state empathy are subtle and thus difficult to pick up; some measures and methods may be more sensitive than others in detecting these effects. Eisenberg and Miller (1987) found that the type of measure, stimuli and method used to induce empathy influenced the size of its relationship with prosocial behaviour. These authors found that using pictures or vignettes which conveyed the feelings or situation of a hypothetical person were the least effective method, as there was a non-significant relationship between this method and measures of prosocial behaviour. Although Eisenberg and Miller (1987) looked at the relationship between different methods of measuring empathy and prosocial behaviour, vignettes may be a similarly ineffective method of inducing empathy when used with other measures.

In the present study, the vignettes may not have been effective in inducing strong empathic responses because they describe hypothetical people and situations. Therefore, participants may not have been able to engage with hypothetical people and situations, as the vignettes relied on participants' ability to imagine the scenarios. Additionally, relying on participants to imagine the scenarios likely resulted in different interpretations of the situations on an individual level. Overall, the variability in how participants visualised and interpreted the vignettes may have affected state empathy responses. A more reliable way of assessing empathy in future studies is to use video clips with different levels of aggressive behaviour, as this would remove the need for participants to imagine the scenarios.

Interestingly, there was no difference in state empathic concern between fans and non-fans of violent-music, yet significant differences between fans and non-fans in trait empathic concern. Although this result seems counterintuitive, there is evidence that trait empathy is not the only predictor of state empathy. Nezlek et al. (2001) found that a person's level of state empathy on a given day was affected by both trait empathy and situational factors, such as daily mood and the occurrence of social events. Perhaps the influence of situational factors was stronger than the influence of trait empathy on state empathic responses in the present study. Responding to hypothetical scenarios in a laboratory study may have felt too artificial; therefore, participants' responses may have been informed more by situational factors, such as their personal affective state at the time of completing the study, rather than their trait tendencies to empathise.

In summary, although there was no significant difference in state empathic reactions between fans and non-fans of violent-music, there were differences in state empathic reactions based on the level of aggressive behaviour within the vignettes, irrespective of fan group. However, the results for the perceived justification of the aggressor's reaction and the different perspectives participants took will first be discussed as it appears to be important in the interpretation of the state empathy results across all participants, regardless of their fan group.

Perceived justification of the aggressor's response. It was important that the perceived justification of the aggressor's response was consistent across the fan groups. If perceived justification differed, it would have been an experimental confound which could have potentially accounted for differences between the fan groups in state empathic responses to the vignettes. Results show that fans and non-fans were matched on how justified they believed the aggressor's reaction was. However, there were differences in perceived justification based on the level of aggressive behaviour described in the vignettes. As the

magnitude of aggression increased, participants believed that the aggressor's response was less justified when compared to the preceding vignettes with lower or no aggression. Nevertheless, this finding was similar across the three fan groups, so the potential confound was minimised.

Participants' perspective-taking of the vignette characters. It was also important that the extent to which participants took a certain perspective (either the aggressor's perspective, the instigator's perspective or a neutral perspective) was consistent across the fan groups. The rationale for this was that perspective-taking has been demonstrated to influence empathic responses. Specifically, imagining yourself or imagining the feelings of another in a distressing situation tends to evoke greater empathic concern and personal distress than taking an objective perspective (Negd et al., 2011). Therefore, if any differences had been found between the groups in terms of their state empathic reactions to aggression, these results may have been explained by differences between fans and non-fans in terms of whose perspective they took in the vignettes, rather than differences in participants' empathy.

Fans and non-fans were matched regarding the extent to which they took the aggressor's perspective, the instigator's perspective or a neutral perspective. There were differences in perspective-taking among participants, regardless of their fan group, based on the level of aggressive behaviour described in the vignettes. Furthermore, participants reported that they took the perspective of the aggressor to a lesser extent as the aggressor's behaviour became more aggressive compared to the preceding vignettes with lower or no aggression. Participants also reported that they took the perspective of the instigator to a greater extent as the vignettes became more aggressive. Participants also reported that they took a similarly neutral perspective in the mildly and strongly aggressive vignettes, but were more neutral in vignettes featuring the aggressive response compared to the non-aggressive response. Overall, participants, irrespective of their fan groups, tended to take the perspective

of the aggressor when the aggressor acted non-aggressively; however, the participants' perspective-taking shifted more to the instigator, and became more neutral, as the aggressor's behaviour became more aggressive and less justified.

Differences in state empathic concern in response to aggressive behaviour described in the vignettes. We had expected that non-fans would report increases in state empathic concern as the magnitude of aggression described in the vignettes increased. As stated previously, this prediction was partially supported but applied to both fans and non-fans of violent-music. Participants generally had different state empathic responses based on the level of aggressive behaviour described in the vignettes, but this did not vary as a function of the music genre they were a fan of. Specifically, participants experienced greater state empathic concern in the strongly aggressive vignettes compared to the mildly aggressive vignettes. However, state empathic concern was lower in the mildly aggressive vignettes compared to both the non-aggressive and strongly aggressive vignettes (see Figure 2). In summary, participants reported similar levels of state empathic concern between the non-aggressive and strongly aggressive vignettes. This finding diverged from theory based on the GAM and GLM (Anderson & Bushman, 2002; Buckley & Anderson, 2006), as we expected that non-fans who did not have exposure to violent music would experience increased state empathic concern as the magnitude of aggression in the vignettes increased.

The unusual findings for empathic concern may be attributable to the perspectives participants took in each of the vignette types. As mentioned previously, imagining yourself or imagining the feelings of another person in a distressing situation tends to evoke more empathic concern and personal distress than taking an objective perspective (Negd et al., 2011). Participants may have felt more empathic concern in the non-aggressive compared to the mildly aggressive vignettes as they may have sympathised in the non-aggressive vignettes with the frustrating situation the aggressor found themselves in, as the vignettes described

plausible everyday occurrences that the participants may have experienced. They may have reported lower empathic concern in the mildly aggressive compared to the non-aggressive vignettes as they were still taking the aggressor's perspective to a relatively greater extent than the instigator's; however, participants believed the aggressor's reaction was less justified in the mildly aggressive compared to the non-aggressive vignettes. This suggests that once the aggressor started behaving aggressively, their ability to empathise with the aggressor dropped.

Empathic concern in the strongly aggressive vignettes may have been greater in comparison to the mildly aggressive but similar to the non-aggressive vignettes because participants started to take the perspective of the aggressor to a lesser extent and started to take the instigator's perspective to a greater extent in comparison to the mildly aggressive vignettes. The presence of a strongly aggressive action may be capable of inducing strong empathic concern, but could be subdued by the fact that participants still took the aggressor's perspective to some extent. The outcome of this may have been that participants experienced similar levels of state empathic concern in the strongly aggressive vignettes as they did in the non-aggressive vignettes. Overall, it seems likely that perspective-taking was responsible for the unexpected state empathic concern findings. Therefore, instructing participants to take a certain perspective may alter the responses. For example, all vignettes may have biased participants towards taking the aggressor's perspective as the aggressor had a name (e.g., Geoff) as opposed to the anonymous instigator (e.g., "he" or "the man") and each vignette began by describing the aggressor. This is not problematic as it was held constant across all of the vignettes, but instructing participants to take a certain perspective may result in different findings and is an important caveat for future research endeavours.

Differences in state personal distress in response to aggressive behaviour described in the vignettes. It was expected that non-fans would report increases in state

personal distress as the magnitude of aggression described in the vignettes increased. As stated previously, this prediction was supported but applied to both fans and non-fans of violent-music. Irrespective of their fan group, participants experienced increased personal distress in vignettes which described greater aggressive behaviour. Specifically, participants reported greater personal distress in the mildly aggressive vignettes compared to the non-aggressive vignettes (see Figure 3). Participants also experienced greater personal distress in the strongly aggressive vignettes when compared to both the mildly aggressive and the non-aggressive vignettes.

These findings were somewhat consistent with what the GAM and GLM predict for non-fans. The GAM and desensitisation theory suggest that exposure to violent media desensitises fear and anxiety responses to aggression or violence (Anderson & Bushman, 2002; Carnagey et al., 2007). Therefore, we had expected that non-fans, who theoretically should not have desensitised responses to aggression, would have increased personal distress as the magnitude of aggression in the vignettes increased. Contrary to the GAM and desensitisation theory, this also applied to fans of violent-music.

Considering that the differences in state empathic concern may be best explained by perspective-taking and that perspective-taking has similar effects on both state empathic concern and personal distress (Negd et al., 2011), this raises the question of why the state personal distress results did not mirror the state empathic concern results. This may be attributable to the types of situations described in the vignettes. Specifically, it is uncertain how people respond to aggression in terms of their state empathic concern and personal distress. Negd et al. (2011) investigated state empathic responses to emotion-inducing vignettes which largely described a hypothetical character in difficult or sad circumstances. Perhaps perspective-taking can have similar effects on state empathic concern and personal distress, but only in response to certain contexts. In summary, there were no differences in

state empathy based on whether participants were fans or non-fans of violent-music, but there were differences in state empathy based on the aggressive content of the vignettes, regardless of fan group. The results of the secondary aims of the present study will now be discussed; specifically, whether differences were found between fans and non-fans in the function of their respective music genres.

Function of Music for Fans and Non-Fans of Violent-Music

It was hypothesised that fans of violent death or heavy metal would report that their music genre was particularly important for self-reflection (identity), social bonding, emotion regulation and self-regulation. This hypothesis was partially supported, as the only significant hypothesised difference was in social bonding between the metal and classical fans, but not between the metal and jazz fans. There were no other significant hypothesised differences in self-reflection, self-regulation or emotion regulation. The only other significant difference between the fan groups was in their propensity to listen to their respective genres as background music.

Fans of death or heavy metal reported that their music genre played a significantly more important function in social bonding compared to classical music fans. These results for social bonding are consistent with previous research on fans of violent-music. Fans of heavy metal have previously reported that the genre plays an important part in their social identity (Weinstein, 2000). Guibert and Guibert (2016) who surveyed a general group of metal fans at a metal festival found that fans commonly reported attending concerts in order to meet other fans of metal. Violent music seems to play a particularly important function in social bonding for fans of violent-music. However, jazz fans reported that jazz music was similarly important in terms of social bonding in comparison to metal and classical fans and their respective genres. Perhaps jazz music falls somewhere between metal and jazz in terms of

social bonding. Metal may be a genre that is enjoyed more in a group whereas classical may be enjoyed on a relatively more personal level while jazz may be a mix of both.

Interestingly, there were no significant differences between fans and non-fans of violent-music in terms of using their respective genres for self-reflection, self-regulation or emotion regulation. As past research has suggested, violent death or heavy metal was important in identity, emotion regulation and self-regulation based on the overall high scores for these subscales in the present study (Arnett, 1991; Gross, 1990; Guibert & Guibert, 2016; Sharman & Dingle, 2015). However, it appears that these are not unique functions of metal as the classical and jazz fans rated these areas as similarly important. Although there were no differences between fans and non-fans of violent-music in emotion regulation, there may still be differences in the type of emotion relieved. For example, past research on fans of violent-music has found that fans tend to use violent music to regulate negative affect and anger in particular (Arnett, 1991; Sharman & Dingle, 2015). It is unclear whether violent music non-fans use their genres to process similar types of affect.

Fans of classical and jazz reported that they enjoy listening to their respective genres as background music more than fans of metal. No specific hypotheses were made about this subscale as it was not of primary interest to the study. This finding may reflect that fans of violent-music are less likely to listen to death or heavy metal as background music because it is a salient stimulus and they tend to engage with it more actively. There is some evidence that fans of metal tend to actively engage with the genre. For example, fans tend to know the lyrics to their favourite metal songs to demonstrate their commitment to heavy metal music (Weinstein, 2000). Fans would likely have to seek out the lyrics to their favourite songs as the lyrics can be difficult to understand (Olsen et al., 2017).

Passion and Preference for their Music

It was important that the fans and non-fans of violent-music felt similarly passionate about their respective music genres. This was because passion may be an important way of defining a fan and it was important that the different fan groups were similarly passionate about music, only differing in the genre that they were a fan of. However, it was unknown whether fans and non-fans would have different levels of obsessive and harmonious passion for their genres and was therefore considered exploratory.

Metal, classical and jazz fans were matched on how passionate they were about their respective genres of music. The fans of violent-music also had similar levels of obsessive and harmonious passion to non-fans. Generally, all of the fan groups seemed to have a more harmonious than obsessive passion for their respective music genres. The participants' preference for their music genres did significantly differ. Fans of death or heavy metal had a stronger preference for their music genre compared to classical music fans. There were no differences in music preference between the metal and jazz fans, or between the classical and jazz fans for their respective music genres.

Although there were significant differences in music preference, preference was considered subsidiary to passion in defining fans. This was because passion has been linked to the outcomes of engaging in an activity that one is passionate about; for instance, harmonious passion has been linked to more positive outcomes and obsessive passion has been linked with negative outcomes (Vallerand et al., 2003). The Passion Scale could potentially be used in future studies to help understand why some fans have positive outcomes and some have negative outcomes of engaging with violent music. Preference for music and passion for music were never considered synonymous in the present study, which is why the recruitment process required *fans* of certain styles of music, rather than those with

a *preference* for certain styles of music. Although preference was helpful to understand the sample of the present study, passion was of most interest.

Methodological Strengths and Limitations

While some methodological strengths and limitations have already been noted, there are further strengths and limitations of the present study that warrant discussion. One strength of the study was that it compared fans with two specific groups of non-fans, who were still fans of other music genres. As stated previously, studies of fans of violent-music, such as Thompson et al. (2017), have used a general group of non-fans who were not required to be music fans in general. The present study recruited three groups who were matched in terms of how passionate they were about their music, and differed only in the genre they were passionate about. It was also important to use specific groups of non-fans as it is uncertain whether it is justified to include all other music listeners in one group of non-fans as long as they are not fans of violent-music. There may be differences between fans and non-fans of violent-music, but there may also be differences between different groups of non-fans. For example, in the present study social bonding played a significantly greater function for metal fans in comparison to classical but not jazz fans; the composition of the non-fan group could affect whether significant differences are found between fans and non-fans of violent-music.

Making quantitative comparisons between fans and non-fans of violent-music was also beneficial for understanding differences in music functions between the groups. Past research on the function of violent music has tended to be more qualitative (Arnett, 1991) or has looked only at fans (Sharman & Dingle, 2015) which revealed a lot of invaluable information for understanding how and why fans engage with violent music and created a basis for further research. However, past research has not made comparisons with fans of other music genres and therefore, has not been able to determine whether fans of violent-music use music in a significantly different way compared to non-fans. The current research

has supplemented more qualitative research by comparing whether fans use their music genre differently from specific groups of non-fans.

Certain methodological limitations were also encountered in the course of the study. Firstly, although passion was considered an important criterion for defining 'a fan' of a music genre, participants' preference for their respective music genres differed. Additionally, there were unequal numbers of male and females in each of the fan groups. Ideally, these factors would be matched across the different fan groups in case music preference and gender had any effect on the results. Another limitation arises in terms of interpreting the results of the present study; the results are generalisable to university psychology students who are fans of death and heavy metal, but it is uncertain whether the results would apply to other violent genres such as rap. Additionally, it is unknown whether results would differ with a community sample of death and heavy metal fans who represent a broader socio-economic range.

Heavy metal often includes violent themes but can also include other themes such as power and rebelliousness (Gross, 1990; Lozon & Bensimon, 2014). Recruiting solely death metal fans would ensure that fans listen to metal with violent themes. However, due to time constraints and difficulties in recruiting solely death metal fans (e.g., smaller numbers in the population, possible reluctance to sign up due to perceived stigma of being labelled a "death metal fan"), heavy metal fans were also recruited. It is also difficult to recruit fans of violent genres of music without explicitly using the word 'violent' and is therefore impractical in studies such as the present one, which use deception. There does seem to be considerable overlap as fans of metal tend to list multiple preferred subgenres (Guibert & Guibert, 2016). Nevertheless, if practical, future studies of fans of violent-music should take this into consideration.

Implications and Future Directions

The findings that fans of violent-music had lower trait empathic concern could have important implications for prosocial behaviour. Empathic concern has previously been found to be an important motivating factor in helping others (Batson et al., 1997; Batson et al., 1987; Batson & Powell, 2003). However, as stated previously, it is uncertain whether violent music exposure results in reduced empathic concern or if people with lower empathic concern gravitate to violent music. A longitudinal study would be beneficial to determine causality.

Results of the present study suggest that fans of violent-music have no differences in state empathic responses compared to non-fans. As the vignettes in the present study appeared to evoke relatively low levels of state empathic concern and personal distress, perhaps describing different levels of aggressive behaviour *and* the consequences of that behaviour would have evoked stronger state empathic responses. However, this would have added another variable which could have been responsible for any differences found in empathic responses. Manipulating only the level of aggressive behaviour was the most straightforward approach for interpreting any potential effects. Another method that could be used to assess state empathy is to use video clips instead of written vignettes. Having video clips would control for any differences in how participants visualised the scenarios.

Although the present study has made important contributions to understanding differences between fans and non-fans in terms of the functions of their respective music genres, there are further questions regarding differences in music function between fans and non-fans of violent-music. The present study looked at whether the use of violent music for fans to regulate emotion in general was significantly different from non-fans. Other studies have looked at what emotions fans of violent-music want to regulate, such as anger (Arnett, 1991), and whether it seems to be effective in processing this affect (Sharman & Dingle,

2015). Although in the present study we found that fans rated emotion regulation as similarly important to non-fans, there may still be differences in the type of emotion fans and non-fans use music to process (e.g., anger vs. sadness). Future studies could combine these approaches and examine whether fans use violent music to process significantly different types of affect from non-fans.

Another interesting possibility for future studies is to examine whether obsessive and harmonious passion can predict different outcomes for fans of violent-music. The Passion Scale (Vallerand et al., 2003) was used in the present study to characterise the different fan groups. However, in the process of validating the scale, it was found that harmonious passion was linked to more positive outcomes, such as increased positive affect, and obsessive passion was linked with negative outcomes, such as increased negative affect (Vallerand et al., 2003). It would be interesting to examine if passion can predict positive or negative outcomes for fans of violent-music based on whether their passion is more harmonious or obsessive. Passion could potentially explain mixed evidence on violent music as some studies report positive outcomes of violent music for fans; for example Arnett (1991) and Sharman and Dingle (2015) report benefits for fans in terms of regulating negative emotions while studies such as Shafron and Karno (2013) found evidence of increased emotional dysphoria for fans of heavy metal.

Conclusion

The present study compared fans of violent death or heavy metal with two specific groups of non-fans. These non-fans were fans of classical or jazz music. The current study assessed short-term empathic reactions in response to vignettes describing different levels of aggressive behaviour and differences in trait empathy between fans and non-fans using self-report questionnaires. Whether fans and non-fans of violent-music reported different functions of their respective music genres was also assessed using a self-report questionnaire.

The results indicated differences between fans and non-fans of violent-music in trait empathic concern, but not in their level of trait personal distress. Specifically, fans reported lower trait empathic concern than both classical and jazz fans, suggesting that fans of violent-music are less disposed to feeling other-oriented concern than non-fans. However, further research is required to determine causality as it is unknown whether exposure to violent media results in changes to trait empathic concern or whether lower empathic concern is a pre-existing trait in listeners who are drawn to violent music. No differences were found between fans and non-fans in their state empathic reactions to descriptions of aggression. Further, the study found some differences in the function of music between fans and non-fans of violent-music. Fans reported that violent music played a significantly more important function in social bonding in comparison to classical, but not jazz. No differences were found between fans and non-fans in identity, emotion regulation or self-regulation. This suggests that these may not be unique functions of violent music and may be general functions of music for fans of all genres.

This investigation makes a significant contribution to the relatively smaller literature on violent music, particularly in the context of fans of violent-music. The study has helped to characterise fans and understand potential effects on their state empathic reactions and trait empathy. Although no differences were observed in state empathic responses, the finding that fans had lower trait empathic concern may have important implications for behaviour as empathy is a likely mediator of prosocial behaviour (Batson & Powell, 2003). This has been found to be the case with other forms of violent media such as violent video games (Prot et al., 2014) and an initial longitudinal study found evidence that exposure to music with aggressive themes was linked to reduced prosocial behaviour among American adolescents (Coyne & Padilla-Walker, 2015). However, further research is required to determine whether explicitly violent music also has the potential to reduce prosocial behaviour using other

samples. Overall, the smaller body of literature on violent music should continue to be expanded, particularly in terms of the effect that violent music may have on fans. Although the effect of violent music on non-fans can be useful, it is essential to understand the effect that it may have on fans who have greater exposure.

References

Anderson, C. A., & Bushman, B. J. (2001). Effects of violent video games on aggressive behavior, aggressive cognition, aggressive affect, physiological arousal, and prosocial behavior: A meta-analytic review of the scientific literature. *Psychological Science, 12*, 353-359. doi:10.1111/1467-9280.00366

Anderson, C. A., & Bushman, B. J. (2002). Human aggression. *Annual Review of Psychology, 53*, 27-51. doi:10.1146/annurev.psych.53.100901.135231

Anderson, C. A., Carnagey, N. L., & Eubanks, J. (2003). Exposure to violent media: The effects of songs with violent lyrics on aggressive thoughts and feelings. *Journal of personality and social psychology, 84*, 960-971. doi:10.1037/0022-3514.84.5.960

Anderson, C. A., & Huesmann, L. R. (2003). Human aggression: A social-cognitive view. In M. A. Hogg & J. Cooper (Eds.), *The Sage handbook of social psychology*. Thousand Oaks, CA: Sage Publications.

Anderson, C. A., Shibuya, A., Ihori, N., Swing, E. L., Bushman, B. J., Sakamoto, A., . . . Saleem, M. (2010). Violent video game effects on aggression, empathy, and prosocial behavior in eastern and western countries: A meta-analytic review. *Psychological Bulletin, 136*, 151-173. doi:10.1037/a0018251

Arnal, L. H., Flinker, A., Kleinschmidt, A., Giraud, A.-L., & Poeppel, D. (2015). Human screams occupy a privileged niche in the communication soundscape. *Current Biology, 25*, 2051-2056. doi:10.1016/j.cub.2015.06.043

Arnett, J. (1991). Adolescents and heavy metal music: From the mouths of metalheads. *Youth & Society, 23*, 76-98. doi:10.1177/0044118X91023001004

August, P. V., & Anderson, J. G. T. (1987). Mammal sounds and motivation-structural rules: A test of the hypothesis. *Journal of Mammalogy, 68*, 1-9. doi:10.2307/1381039

Bartholow, B. D., Bushman, B. J., & Sestir, M. A. (2006). Chronic violent video game exposure and desensitization to violence: Behavioral and event-related brain potential data. *Journal of Experimental Social Psychology, 42*, 532-539. doi:10.1016/j.jesp.2005.08.006

Batson, C. D. (2009). These things called empathy: Eight related but distinct phenomena. In J. Decety & W. Ickes (Eds.), *The social neuroscience of empathy* (pp. 3-15). Cambridge, MA: MIT Press.

Batson, C. D., Early, S., & Salvarani, G. (1997). Perspective taking: Imagining how another feels versus imaging how you would feel. *Personality and Social Psychology Bulletin, 23*, 751-758. doi:10.1177/0146167297237008

Batson, C. D., Fultz, J., & Schoenrade, P. A. (1987). Distress and empathy: Two qualitatively distinct vicarious emotions with different motivational consequences. *Journal of Personality, 55*, 19-39. doi:10.1111/j.1467-6494.1987.tb00426.x

Batson, C. D., & Powell, A. A. (2003). Altruism and Prosocial Behavior. In I. B. Weiner, T. Millon, & M. J. Lerner (Eds.), *Handbook of Psychology: Personality and Social Psychology*. New Jersey, NJ: John Wiley & Sons, Inc.

Berger, H. M., & Fales, C. (2005). "Heaviness" in the perception of heavy metal guitar timbres: The match of perceptual and acoustic features over time. In P. D. Greene & T. Porcello (Eds.), *Wired for sound: Engineering and technologies in sonic cultures* (pp. 181-197). Middletown, CT: Wesleyan University Press.

Blumstein, D. T., & Récapet, C. (2009). The sound of arousal: The addition of novel non-linearities increases responsiveness in marmot alarm calls. *Ethology, 115*, 1074–1081. doi:10.1111/j.1439-0310.2009.01691.x

Bodner, E., & Bensimon, M. (2016). The impact of disfavoured music on affect complexity in young adults. *Psychology of Music, 44*, 864-879. doi:10.1177/0305735615594492

Boer, D., & Fischer, R. (2012). Towards a holistic model of functions of music listening across cultures: A culturally decentred qualitative approach. *Psychology of Music, 40*, 179-200. doi:10.1177/0305735610381885

Brockmyer, J. H., Fox, C. M., Curtiss, K. A., McBroom, E., Burkhart, K. M., & Pidruzny, J. N. (2009). The development of the Game Engagement Questionnaire: A measure of engagement in video game-playing. *Journal of Experimental Social Psychology, 45*, 624-634. doi:10.1016/j.jesp.2009.02.016

Brummert-Lennings, H. I., & Warburton, W. A. (2011). The effect of auditory versus visual violent media exposure on aggressive behaviour: The role of song lyrics, video clips and musical tone. *Journal of Experimental Social Psychology, 47*, 794-799. doi:10.1016/j.jesp.2011.02.006

Bryson, B. (1996). "Anything but heavy metal": Symbolic exclusion and musical dislikes. *American Sociological Review, 61*, 884-899. doi:10.2307/2096459

Buckley, K. E., & Anderson, C. A. (2006). A theoretical model of the effects and consequences of playing video games. In P. Vorderer & J. Bryant (Eds.), *Playing Video Games - Motives, Responses, and Consequences* (pp. 363-378). Mahwah, NJ: LEA.

Carbonneau, N. m., Vallerand, R. J., Fernet, C., & Guay, F. (2008). The role of passion for teaching in intrapersonal and interpersonal outcomes. *Journal of Educational Psychology, 100*, 977-987. doi:10.1037/a0012545

Carnagey, N. L., Anderson, C. A., & Bushman, B. J. (2007). The effect of video game violence on physiological desensitization to real-life violence. *Journal of Experimental Social Psychology, 43*, 489-496. doi:10.1016/j.jesp.2006.05.003

Cheng, T. H., & Tsai, C. G. (2016). Female listeners' autonomic responses to dramatic shifts between loud and soft music/sound passages: A study of heavy metal songs. *Frontiers in Psychology, 7*, 1-11. doi:10.3389/fpsyg.2016.00182

Clark, S. S., & Giacomantonio, S. G. (2013). Music preferences and empathy: Toward predicting prosocial behavior. *Psychomusicology: Music, Mind, and Brain, 23*, 177-186. doi:10.1037/a0034882

Coyne, S. M., & Padilla-Walker, L. M. (2015). Sex, violence, & rock n' roll: Longitudinal effects of music on aggression, sex, and prosocial behavior during adolescence. *Journal of Adolescence, 41*, 96-104. doi:10.1016/j.adolescence.2015.03.002

Davis, M. H. (1980). A multidimensional approach to individual differences in empathy. *JSAS Catalog of Selected Documents in Psychology, 10*, 85-100.

Davis, M. H. (1983). Measuring individual differences in empathy: Evidence for a multidimensional approach. *Journal of personality and social psychology, 44*, 113-126. doi:10.1037/0022-3514.44.1.113

Efron, B., & Tibshirani, R. J. (1993). *An introduction to the bootstrap*. New York: Chapman & Hall.

Eisenberg, N., & Miller, P. A. (1987). The relation of empathy to prosocial and related behaviors. *Psychological Bulletin, 101*, 91-119. doi:10.1037/0033-2909.101.1.91

Eisenberg, N., Wentzel, N., Michelle, & Harris, J. D. (1998). The role of emotionality and regulation in empathy-related responding. *School Psychology Review, 27*, 506-521.

Elvers, P. (2016). Songs for the ego: Theorizing musical self-enhancement *Frontiers in Psychology, 7*, 1-11. doi:10.3389/fpsyg.2016.00002

Field, A. (2013). *Discovering statistics using IBM SPSS Statistics*. Los Angeles: Sage.

Fitch, W. T., Neubauer, J., & Herzel, H. (2002). Calls out of chaos: The adaptive significance of nonlinear phenomena in mammalian vocal production. *Animal Behaviour, 63*, 407-418. doi:10.1006/anbe.2001.1912

Funk, J. B., Buchman, D. D., Jenks, J., & Bechtoldt, H. (2003). Playing violent video games, desensitization, and moral evaluation in children. *Applied Developmental Psychology, 24*, 413-436. doi:10.1016/S0193-3973(03)00073-X

Fuster, H., Chamarro, A., Carbonell, X., & Vallerand, R. J. (2014). Relationship between passion and motivation for gaming in players of massively multiplayer online role-playing games. *Cyberpsychology, behavior and social networking, 17*, 292-297. doi:10.1089/cyber.2013.0349

Gowensmith, W. N., & Bloom, L. J. (1997). The effects of heavy metal music on arousal and anger. *Journal of Music Therapy, 34*, 33-45. doi:10.1093/jmt/34.1.33

Greitemeyer, T. (2009). Effects of songs with prosocial lyrics on prosocial thoughts, affect, and behavior. *Journal of Experimental Social Psychology, 45*, 186-190. doi:10.1016/j.jesp.2008.08.003

Gross, R. L. (1990). Heavy metal music: A new subculture in American society. *The Journal of Popular Culture, 24*, 119-130. doi:10.1111/j.0022-3840.1990.11984163.x

Guibert, C., & Guibert, G. (2016). The social characteristics of the contemporary metalhead: The Hellfest survey. In A. R. Brown, K. Spracklen, K. Kahn-Harris, & N. W. R. Scott (Eds.), *Global metal music and culture: Current directions in metal studies* (pp. 167-189). New York, NY: Routledge.

Huron, D., Kinney, D., & Precoda, K. (2006). Influence of pitch height on the perception of submissiveness and threat in musical passages. *Empirical Musicology Review, 1*, 170-177. Retrieved from http://emusicology.org/

Huynh, H., & Feldt, L. S. (1976). Estimation of the Box correction for degrees of freedom from sample data in randomized block and split-plot designs. *Journal of Educational Statistics, 1*, 69-82. doi:10.2307/1164736

Kneer, J., & Rieger, D. (2016). The memory remains: How heavy metal fans buffer against the fear of death. *Psychology of Popular Media Culture, 5*, 258-272. doi:10.1037/ppm0000072

Krahé, B., & Möller, I. (2010). Longitudinal effects of media violence on aggression and empathy among German adolescents. *Journal of Applied Developmental Psychology, 31*, 401-409. doi:10.1016/j.appdev.2010.07.003

Lonsdale, A. J., & North, A. C. (2009). Musical taste and ingroup favouritism. *Group Processes and Intergroup Relations, 12*, 319-327. doi:10.1177/1368430209102842

Lozon, J., & Bensimon, M. (2014). Music misuse: A review of the personal and collective roles of "problem music". *Aggression and Violent Behaviour, 19*, 207-218. doi:10.1016/j.avb.2014.04.003

Lynxwiler, J., & Gay, D. (2000). Moral boundaries and deviant music: Public attitudes toward heavy metal and rap. *Deviant Behavior, 21*, 63-85. doi:10.1080/016396200266388

Marsh, H. W., Vallerand, R. J., Lafrenière, M.-A. K., Parker, P., Morin, A. J. S., Carbonneau, N. m., . . . Paquet, Y. (2013). Passion: Does one scale fit all? Construct validity of two-factor passion scale and psychometric invariance over different activities and languages. *Psychological Assessment, 25*, 1-14. doi:10.1037/a0032573

Morton, E. S. (1977). On the occurrence and significance of motivation-structural rules in some bird and mammal sounds. *The American Naturalist, 111*, 855-869. doi:10.1086/283219

Mynett, M. (2016). The distortion paradox: Analyzing contemporary metal production. In A. R. Brown, K. Spracklen, K. Kahn-Harris, & N. W. R. Scott (Eds.), *Global metal music and culture: Current directions in metal studies* (pp. 68-86). New York, NY: Routledge.

Negd, M., Mallan, K. M., & Lipp, O. V. (2011). The role of anxiety and perspective-taking strategy on affective empathic responses. *Behaviour Research and Therapy, 49*, 852-857. doi:10.1016/j.brat.2011.09.008

Nezlek, J. B., Feist, G. J., Wilson, F. C., & Plesko, R. M. (2001). Day-to-day variability in empathy as a function of daily events and mood. *Journal of Research in Personality, 35*, 401-423. doi:10.1006/jrpe.2001.2332

North, A. C., & Hargreaves, D. J. (1999). Music and adolescent identity. *Music Education Research, 1*, 75-92. doi:10.1080/1461380990010107

North, A. C., Hargreaves, D. J., & O'Neill, S. A. (2000). The importance of music to adolescents. *Brilish Joumat of Educational Psychology, 70*, 255-272. doi:10.1348/000709900158083

Olsen, K. N., Thompson, W. F., & Giblin, I. (2017). *Listener expertise enhances intelligibility of vocalisations in 'Death Metal' music*. Manuscript submitted for publication.

Pavey, L., Greitemeyer, T., & Sparks, P. (2012). "I help because I want to, not because you tell me to": Empathy increases autonomously motivated helping. *Personality and Social Psychology Bulletin, 38*, 681-689. doi:10.1177/0146167211435940

Prot, S., Gentile, D. A., Anderson, C. A., Suzuki, K., Swing, E., Lim, K. M., . . . Lam, B. C. P. (2014). Long-term relations among prosocial-media use, empathy, and prosocial behavior. *Psychological Science, 25*, 358-368. doi:10.1177/0956797613503854

Saleem, M., Anderson, C. A., & Gentile, D. A. (2012). Effects of prosocial, neutral, and violent video games on college students' affect. *Aggressive Behavior, 38*, 263-271. doi:10.1002/ab.21427

Schäfer, T., & Sedlmeier, P. (2009). From the functions of music to music preference. *Psychology of Music, 37*, 279-300. doi:10.1177/0305735608097247

Schäfer, T., Sedlmeier, P., Städtler, C., & Huron, D. (2013). The psychological functions of music listening. *Frontiers in Psychology, 4*, 1-33. doi:10.3389/fpsyg.2013.00511

Schäfer, T., Tipandjan, A., & Sedlmeier, P. (2012). The functions of music and their relationship to music preference in India and Germany. *International Journal of Psychology, 47*, 370-380. doi:10.1080/00207594.2012.688133

Shafron, G. R. (2010). The science and psychology behind music and emotion. *Journal of Young Investigators, 20*, 1-21. Retrieved from http://www.jyi.org/

Shafron, G. R., & Karno, M. P. (2013). Heavy metal music and emotional dysphoria among listeners. *Psychology of Popular Media Culture, 2*, 74-85. doi:10.1037/a0031722

Sharman, L., & Dingle, G. A. (2015). Extreme metal music and anger processing. *Frontiers in Human Neuroscience, 9*, 1-11. doi:10.3389/fnhum.2015.00272

Singh, K., & Xie, M. (2008). *Bootstrap: A statistical method*. Unpublished manuscript, Department of Statistics and Biostatistics, Rutgers University, New Jersey, United States.

Soutter, A. R. B., & Hitchens, M. (2016). The relationship between character identification and flow state within video games. *Computers in Human Behavior, 55*, 1030-1038. doi:10.1016/j.chb.2015.11.012

Szycik, G. R., Mohammadi, B., Münte, T. F., & te Wildt, B. T. (2017). Lack of evidence that neural empathic responses are blunted in excessive users of violent video games: An fMRI study. *Frontiers in Psychology, 8*, 1-8. doi:10.3389/fpsyg.2017.00174

Tagg, P. (2013). *Music's meanings: A modern musicology for non-musos*. Larchmont, NY: Mass Media Music Scholar's Press.

Thompson, W. F., Geeves, A. M., & Olsen, K. N. (2017). *Who enjoys listening to violent music and why?* Manuscript submitted for publication.

Tsai, C. G., Wang, L. C., Wang, S. F., Shau, Y. W., Hsiao, T. Y., & Auhagen, W. (2010). Aggressiveness of the growl-like timbre: Acoustic characteristics, musical implications and biomechanical mechanisms. *Music Perception, 27*, 209-221. doi:10.1525/MP.2010.27.3.209

Vallerand, R. J., Blanchard, C., Mageau, G. A., Koestner, R., Ratelle, C., Léonard, M., . . . Marsolais, J. (2003). Les passions de l'âme: On obsessive and harmonious passion. *Journal of personality and social psychology, 85*, 756-767. doi:10.1037/0022-3514.85.4.756

Vallerand, R. J., Ntoumanis, N., Philippe, F. L., Lavigne, G. v. L., Carbonneau, N. m., Bonneville, A., . . . Maliha, G. (2008). On passion and sports fans: A look at football. *Journal of Sports Sciences, 26*, 1279-1293. doi:10.1080/02640410802123185

Walser, R. (2014). *Running with the devil: Power, gender, and madness in heavy metal music* (2nd ed.). Middletown, USA: Wesleyan University Press.

Warburton, W. A., Roberts, D. F., & Christensen, P. G. (2014). The effects of violent and antisocial music on children and adolescents. In D. Gentile (Ed.), *Media violence and children* (2nd ed.). Westport, CT: Praeger.

Weinstein, D. (2000). *Heavy metal: The music and its culture*. New York, NY: Da Capo Press.

Appendix A: Music Function Questionnaire (Schäfer, Tipandjan, & Sedlmeier, 2012)

Please think of your favourite genre of music and rate how much you agree with the following statements.

1	2	3	4	5	6	7	8	9	10
I do not agree at all									I totally agree

Function Subscale	Item
Background	Is what I like to listen to as background music
Memory Prompt	Enables me to reminisce
Diversion	Is what I like to listen to when I'm dancing
	Is music I can appreciate as art
Emotion Regulation	Is able to put me in a good mood
	Can make me feel ecstatic
Self-Regulation	Can help me chill and tune out
	Helps me forget my problems and worries
	Supplies me with important or interesting information
Self-Reflection	Enables me to experiment with different sides of my personality
	Enables me to better understand my thoughts and feelings
	Expresses my values
	Helps me express my identity
Social Bonding	Helps me feel close to others
	Can help me meet people
	Enables me to identify with the artists
Music Preference	I like this music
	I could not live without this music
	I spent a lot of money to purchase this music
	I am a passionate listener of this music
	I often visit concerts or gigs to listen to this music
	I just need this music

Appendix B: Passion Scale (Vallerand et al., 2003)

While thinking of Death Metal/Heavy Metal Music; OR Classical Music; OR Jazz Music and using the scale below, please indicate your level of agreement with each item.

Not Agree at All 1	Very Slightly Agree 2	Slightly Agree 3	Moderately Agree 4	Mostly Agree 5	Strongly Agree 6	Very Strongly Agree 7

1. Listening to this music is in harmony with the other activities in my life.	1	2	3	4	5	6	7
2. I have difficulties controlling my urge to listen to this music.	1	2	3	4	5	6	7
3. The new things that I discover with this music allow me to appreciate it even more.	1	2	3	4	5	6	7
4. I have almost an obsessive feeling for listening to this music.	1	2	3	4	5	6	7
5. Listening to this music reflects the qualities I like about myself.	1	2	3	4	5	6	7
6. Listening to this music allows me to live a variety of experiences.	1	2	3	4	5	6	7
7. Listening to this music is the only thing that really turns me on.	1	2	3	4	5	6	7
8. Listening to this music is well integrated in my life.	1	2	3	4	5	6	7
9. If I could, I would only listen to this music.	1	2	3	4	5	6	7
10. Listening to this music is in harmony with other things that are part of me.	1	2	3	4	5	6	7
11. Listening to this music is so exciting that I sometimes lose control over it.	1	2	3	4	5	6	7
12. I have the impression that listening to this music controls me.	1	2	3	4	5	6	7
13. I spend a lot of time listening to this music.	1	2	3	4	5	6	7
14. I love listening to this music.	1	2	3	4	5	6	7
15. Listening to this music is important for me.	1	2	3	4	5	6	7
16. Listening to this music is a passion for me.	1	2	3	4	5	6	7
17. Listening to this music is part of who I am	1	2	3	4	5	6	7

CODIFICATION

# 2, 4, 7, 9, 11, 12	**Obsessive Passion**
# 1, 3, 5, 6, 8, 10	**Harmonious Passion**
# 13 à 17	**Passion Criteria**

Appendix C: Pilot Study for the Development of the Vignettes

Rationale

Vignettes were the most straightforward method to provide participants with multiple examples of aggressive behaviour. It was decided that the aggression levels of the vignettes would be a within-subjects factor as manipulating it as a between-subjects factor would require too many participants than was practical; particularly considering that there were three music fan groups and that fans of death and heavy metal can be difficult to recruit. Therefore, it was important that vignettes were similar to each other. To achieve this, a series of vignettes were created and piloted tested to decide which vignettes would be presented to participants. The criteria for selecting the final vignettes was predetermined:

1. The action of the instigator will be similarly irritating across the final six scenarios.
2. For the non-aggressive vignettes, participants will rate the aggressiveness of the aggressor's reaction between 1 and 2 on the Likert scale (where 1 is "not aggressive"), mildly aggressive vignettes will be rated between 3 and 4 (where 3 is "mildly aggressive") and strongly aggressive will be rated between 4.5 and 5 (where 5 is "strongly aggressive").

It was decided that the mildly aggressive vignettes did not have to be the midpoint between the non-aggressive and strongly aggressive vignettes, so long as they were still a distinct category.

Method

Participants. Seven fellow researchers from Macquarie University's staff and students were asked to assist with piloting the study stimuli. The researchers were blind to the study's conditions.

Materials. A pool of vignettes was developed by the researchers. The vignettes were all similar in word length and style. They were designed so that all the vignettes described a primary character (the aggressor) responding to a situation where a secondary character (the instigator) behaves in a way that is mildly irritating but would not normally provoke someone to act aggressively. Overall, there were eight scenarios that were included in the pilot study. For each of the eight scenarios there were three variations where the aggressor's reaction differed. The aggressor's reaction was manipulated to be either: (1) non-aggressive, (2) mildly aggressive or (3) strongly aggressive. For example, one scenario described Geoff reacting to a man using a phone in the cinema. There were three variations of this scenario where Geoff responded with either a non-aggressive, mildly aggressive or strongly aggressive response.

Having three variations of the same scenario, where only the reaction differed, was considered preferable to having one vignette to represent each level of aggressive behaviour. It was preferable because each vignette would have described a different situation, which could have accounted for any differences in short-term empathic responses rather than the aggressive responses to the scenario.

Participants were asked to rate how irritating the action of the instigator was on a 5-point Likert scale from 1 (not irritating) to 5 (severely irritating) and then how aggressive the aggressor's reaction was on a scale from 1 (not aggressive) to 5 (strongly aggressive).

Procedure. The three variations of each scenario were presented together so that participants could read and compare them to each other. Participants then rated how irritating the instigator's action was and then rated the aggressiveness of the aggressor's reaction for each of the three variations. After providing their ratings of the vignettes, the participants were asked for any general feedback on the vignettes. The purpose of the vignettes was then discussed and any extra feedback after this discussion was also noted.

Results

Participants appeared to find the instigator's action to be similarly irritating across all of the scenarios except for scenario 7, where the action was perceived as more irritating (see Table 1).

Table 1
Means and Standard Deviations of Irritation Scores

	Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
M	2.14	2.86	2.43	2.43	2.14	2.43	3.71	2.71
SD	.69	.69	.79	.79	.90	.54	.49	.76

In line with the selection criteria for the vignettes, participants rated all of the non-aggressive vignettes between 1 and 2, which suggested that the aggressor's reaction was generally perceived as non-aggressive (see Table 2).

Table 2
Means and Standard Deviations of Aggression Scores

		Scenario 1	Scenario 2	Scenario 3	Scenario 4	Scenario 5	Scenario 6	Scenario 7	Scenario 8
Non-Aggressive									
	Mean	1	1	1.14	1.71	1	1	1.43	1
	SD	.00	.00	.38	1.50	.00	.00	1.13	.00
Mildly Aggressive									
	Mean	4.14	3.71	4.14	4	4.57	3.86	3.57	4.29
	SD	.90	.76	.69	.82	.54	.90	1.27	.76
Strongly Aggressive									
	Mean	5	5	4.71	5	5	4.86	5	5
	SD	.00	.00	.49	.00	.00	.38	.00	.00

Ratings for the strongly aggressive vignettes were also in accordance with the selection criteria as ratings for all of the scenarios fell between 4.5 and 5. However, the rating indicated that the vignettes that were intended to be 'mildly aggressive' were problematic as

only scenarios 2, 6 and 7 fell between the selection criteria of 3 and 4. For the other mildly aggressive vignettes, many had similar ratings to the strongly aggressive vignettes.

Conclusion

As a result of the pilot study, scenarios 1-6 were selected as the final stimuli as the action of the instigator was rated as similarly irritating. Based on the feedback of the participants, changes were made to make the "mildly aggressive" vignettes milder and to make them more distinct from the strongly aggressive vignettes. These changes were made based on suggestions from the participants, who gave examples of things that they would have considered more mildly aggressive. It was also suggested that the intentionality of the instigators should be controlled for. As a result, the vignettes were edited so that the instigators were all aware of the action they took and deliberately ignored the aggressor. Scenario 7 and 8 were excluded because the instigator's action in scenario 7 was considered more irritating than the other scenarios and scenario 8 required major changes in order to make the action of the instigator intentional.

Appendix D: Final Vignettes

Scenario 1

Non-Aggressive

Rhys was doing his monthly grocery shop at the local supermarket. Rhys only had one more thing on his shopping list, which was his favourite cereal that he ate each morning. There was only a little left in the box at home. Halfway along the aisle a man had stopped to grab some groceries. Rhys continued down the aisle and realised that the other man had stopped his trolley in the way of the cereal boxes. Rhys waited for him to move but the man intentionally ignored him. After a moment, Rhys asked him politely if he could move.

Mildly Aggressive

Rhys was doing his monthly grocery shop at the local supermarket. Rhys only had one more thing on his shopping list, which was his favourite cereal that he ate each morning. There was only a little left in the box at home. Halfway along the aisle a man had stopped to grab some groceries. Rhys continued down the aisle and realised that the other man had stopped his trolley in the way of the cereal boxes. Rhys waited for him to move but the man intentionally ignored him. After a moment, Rhys shoved past him.

Strongly Aggressive

Rhys was doing his monthly grocery shop at the local supermarket. Rhys only had one more thing on his shopping list, which was his favourite cereal that he ate each morning. There was only a little left in the box at home. Halfway along the aisle a man had stopped to grab some groceries. Rhys continued down the aisle and realised that the other man had stopped his trolley in the way of the cereal boxes. Rhys waited for him to move but the man intentionally ignored him. After a moment, Rhys punched him in the back of the head.

Scenario 2

Non-Aggressive

Geoff arrived early at the local cinema and bought himself a ticket. He also bought a drink and a bucket of popcorn. He walked into the correct cinema and found his seat. When the lights dimmed and the ads began to play, Geoff noticed a man playing around on his phone. Geoff was annoyed because the bright light of the screen kept catching his eye. When the ads

finished and the movie began to play, the man still did not put his phone away. Geoff leaned over and politely asked him if he could put his phone away.

Mildly Aggressive

Geoff arrived early at the local cinema and bought himself a ticket. He also bought a drink and a bucket of popcorn. He walked into the correct cinema and found his seat. When the lights dimmed and the ads began to play, Geoff noticed a man playing around on his phone. Geoff was annoyed because the bright light of the screen kept catching his eye. When the ads finished and the movie began to play, the man still did not put his phone away. Geoff stood up and tossed his popcorn at the back of the man's head.

Strongly Aggressive

Geoff arrived early at the local cinema and bought himself a ticket. He also bought a drink and a bucket of popcorn. He walked into the correct cinema and found his seat. When the lights dimmed and the ads began to play, Geoff noticed a man playing around on his phone. Geoff was annoyed because the bright light of the screen kept catching his eye. When the ads finished and the movie began to play, the man still did not put his phone away. Geoff lifted his foot and kicked the man in the back of the head.

Scenario 3

Non-Aggressive

Greg was playing a game on his phone while standing at the bus stop. The traffic was busy because it was peak hour and it had been raining all day. While Greg's head was down, he felt something brush along the top of his head. When he looked up, he saw a man walking past with his umbrella up. The material of the umbrella had brushed his head. The man had noticed what he had done but walked off quickly. Greg shook his head at the man as he walked away and went back to playing on his phone.

Mildly Aggressive

Greg was playing on his phone while waiting at the bus stop. The traffic was busy because it was peak hour and it had been raining all day. While Greg's head was down, he felt something brush along the top of his head. When he looked up, he saw a man walking past with his umbrella up. The material of the umbrella had brushed his head. The man had

noticed what he had done but walked off quickly. Greg muttered some insults at the man under his breath.

Strongly Aggressive

Greg was playing on his phone while waiting at the bus stop. The traffic was busy because it was peak hour and it had been raining all day. While Greg's head was down, he felt something brush along the top of his head. When he looked up, he saw a man walking past with his umbrella up. The material of the umbrella had brushed his head. The man had noticed what he had done but walked off quickly. Greg ran up behind the man and kicked his legs out from under him so that he fell to the ground.

Scenario 4

Non-Aggressive

John was walking to an appointment. He had parked his car five minutes away as the office he was heading to was on a main street with no parking. He had left plenty of time to get to the appointment because it was always uncertain how long it would take to park. As he had some extra time, John stopped to buy a coffee before continuing to the appointment. As John walked along the main street, another man passed John from behind and bumped John's arm with his satchel bag. The man noticed what had happened but continued walking. In response, John sighed and continued walking.

Mildly Aggressive

John was walking to an appointment. He had parked his car five minutes away as the office he was heading to was on a main street with no parking. He had left plenty of time to get to the appointment because it was always uncertain how long it would take to park. As he had some extra time, John stopped to buy a coffee before continuing to the appointment. As John walked along the main street, another man passed John from behind and bumped John's arm with his satchel bag. The man noticed what had happened but continued walking. In response, John muttered insults at the man.

Strongly Aggressive

John was walking to an appointment. He had parked his car five minutes away as the office he was heading to was on a main street with no parking. He had left plenty of time to get to the appointment because it was always uncertain how long it would take to park. As he had

some extra time, John stopped to buy a coffee before continuing to the appointment. As John walked along the main street, another man passed John from behind and bumped John's arm with his satchel bag. The man noticed what had happened but continued walking. In response, John threw his hot coffee all over the back of the man's head.

Scenario 5

Non-Aggressive

Ryan arrived at the gym after work as he was getting into shape for a triathlon. The gym was a small, independent gym but it was conveniently located between work and home. Ryan hadn't previously been a member but his friends had recommended it as they were also training there. Ryan headed over to the exercise bikes. When he got there, all the bikes were in use. However, one man was sitting on an exercise bike while talking to the person next to him. The man saw Ryan but didn't move. Ryan went up to the man and politely asked him if he was using the bike and if he could move.

Mildly Aggressive

Ryan arrived at the gym after work as he was getting into shape for a triathlon. The gym was a small, independent gym but it was conveniently located between work and home. Ryan hadn't previously been a member but his friends had recommended it as they were also training there. Ryan headed over to the exercise bikes. When he got there, all the bikes were in use. However, one man was sitting on an exercise bike while talking to the person next to him. The man saw Ryan but didn't move. Ryan stood in front of the man and glared at him menacingly.

Strongly Aggressive

Ryan arrived at the gym after work as he was getting into shape for a triathlon. The gym was a small, independent gym but it was conveniently located between work and home. Ryan hadn't previously been a member but his friends had recommended it as they were also training there. Ryan headed over to the exercise bikes. When he got there, all the bikes were in use. However, one man was sitting on an exercise bike while talking to the person next to him. The man saw Ryan but didn't move. Ryan went up to the man and punched him in the face.

Scenario 6

Non-Aggressive

Liam arrived at work and reverse parked into one of the spaces, as they were very narrow and difficult to get out of. Liam grabbed his bag but before he could get out of the car, another man pulled into the parking space next to him. Liam waited while he parked and when he had finished, tried to get out of the car. However, the other car was parked too closely and Liam would have to squeeze out. The man noticed the situation but he ignored Liam. Liam put his arm out through his window and politely waved at the man.

Mildly Aggressive

Liam arrived at work and reverse parked into one of the spaces as they were very narrow and difficult to get out of. Liam grabbed his bag but before he could get out of the car, another man pulled into the parking space next to him. Liam waited while he parked and when he had finished, tried to get out of the car. However, the other car was parked too closely and Liam would have to squeeze out. The man noticed the situation but he ignored Liam. Liam started yelling at the man to make him move.

Strongly Aggressive

Liam arrived at work and reverse parked into one of the spaces as they were very narrow and difficult to get out of. Liam grabbed his bag but before he could get out of the car, another man pulled into the parking space next to him. Liam waited while he parked and when he had finished, tried to get out of the car. However, the other car was parked too closely and Liam would have to squeeze out. The man noticed the situation but he ignored Liam. Liam opened his door and slammed it multiple times into the other man's car.

Appendix E: State Empathy Questionnaire (Negd, Mallan, & Lipp, 2011)

Please rate to what extent you experienced each of the following emotions while reading the previous scenario.

1	2	3	4	5
not at all	very little	somewhat	very much	completely

Empathic concern

1. Sympathetic
2. Touched
3. Soft-hearted
4. Compassionate
5. Concerned
6. Tender
7. Moved
8. Sorrowful

Personal distress

1. Distressed
2. Troubled
3. Uneasy
4. Anxious
5. Worried
6. Upset
7. Disturbed
8. Grieved

Distractors

1. Cheerful
2. Inspired
3. Confused
4. Motivated

Appendix F: Perspective-Taking and Justification Questions

In this vignette there was:

Character A: e.g. Geoff

Character B: e.g. the man on his phone in the cinema

To what extent do you feel the action of Character A was justified?

1	2	3	4	5
not at all	very little	somewhat	very much	completely

To what extent do you feel that you took an objective standpoint (i.e. did not take the perspective of either Character A or B)?

1	2	3	4	5
not at all	very little	somewhat	very much	completely

To what extent did you take the perspective of Character A?

1	2	3	4	5
not at all	very little	somewhat	very much	completely

To what extent did you take the perspective of Character B?

1	2	3	4	5
not at all	very little	somewhat	very much	completely

Appendix G: Interpersonal Reactivity Index (Davis, 1980)

The following statements inquire about your thoughts and feelings in a variety of situations. For each item, indicate how well it describes you by choosing the appropriate number on the scale at the top of the page: 0, 1, 2, 3, or 4. When you have decided on your answer, fill in the letter on the answer sheet next to the item number. READ EACH ITEM CAREFULLY BEFORE RESPONDING. Answer as honestly as you can. Thank you.

ANSWER SCALE:

0	1	2	3	4
DOES NOT DESCRIBE ME WELL				DESCRIBES ME VERY WELL

1. I daydream and fantasize, with some regularity, about things that might happen to me.
2. I often have tender, concerned feelings for people less fortunate than me.
3. I sometimes find it difficult to see things from the "other guy's" point of view.
4. Sometimes I don't feel very sorry for other people when they are having problems.
5. I really get involved with the feelings of the characters in a novel.
6. In emergency situations, I feel apprehensive and ill-at-ease.
7. I am usually objective when I watch a movie or play, and I don't often get completely caught up in it.
8. I try to look at everybody's side of a disagreement before I make a decision.
9. When I see someone being taken advantage of, I feel kind of protective towards them.
10. I sometimes feel helpless when I am in the middle of a very emotional situation.
11. I sometimes try to understand my friends better by imagining how things look from their perspective.
12. Becoming extremely involved in a good book or movie is somewhat rare for me.
13. When I see someone get hurt, I tend to remain calm.
14. Other people's misfortunes do not usually disturb me a great deal.
15. If I'm sure I'm right about something, I don't waste much time listening to other people's arguments.
16. After seeing a play or movie, I have felt as though I were one of the characters.
17. Being in a tense emotional situation scares me.

18. When I see someone being treated unfairly, I sometimes don't feel very much pity for them.
19. I am usually pretty effective in dealing with emergencies.
20. I am often quite touched by things that I see happen.
21. I believe that there are two sides to every question and try to look at them both.
22. I would describe myself as a pretty soft-hearted person.
23. When I watch a good movie, I can very easily put myself in the place of a leading character.
24. I tend to lose control during emergencies.
25. When I'm upset at someone, I usually try to "put myself in his shoes" for a while.
26. When I am reading an interesting story or novel, I imagine how I would feel if the events in the story were happening to me.
27. When I see someone who badly needs help in an emergency, I go to pieces.
28. Before criticizing somebody, I try to imagine how I would feel if I were in their place.

Appendix H: Demographics Questionnaire

1. What is your age? _____
2. What is your sex? F M
3. Is English your first language? Yes No
4. Please list the languages you speak.
   _____
5. Have you been diagnosed with hearing problems/deficits? Yes No

   If yes, please list the problems/difficulties and in which ear(s) _____
   _____
6. Do you suspect you have hearing problems/deficits? Yes No

   If yes, please list the problems/difficulties and in which ear(s) _____
   _____
7. What is the highest level of education you have achieved or are currently undertaking?

   High school Tafe Undergraduate Post Graduate
8. Do you listen to music? Yes No
9. Approximately how much time do you spend listening to music daily? _____
10. What is your favourite type of music? _____
11. If you have had formal lessons please answer the following:

Instrument	Private lessons (Years)	Classroom setting (Years)	Highest level achieved	Age started

12. If you have ever taught yourself how to play an instrument answer the following: Without formal lessons

Instrument	How long played?