Psychosocial risks and benefits of exposure to heavy metal music with aggressive themes: Current theory and evidence

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Abstract
Concerns have been raised that prolonged exposure to heavy metal music with aggressive themes can increase the risk of aggression, anger, antisocial behaviour, substance use, suicidal ideation, anxiety and depression in community and psychiatric populations. Although research often relies on correlational evidence for which causal inferences are not possible, it is often claimed that music with aggressive themes can cause psychological and behavioural problems. This narrative review of theory and evidence suggests the issues are more complicated, and that fans typically derive a range of emotional and social benefits from listening to heavy metal music, including improved mood, identity formation, and peer affiliation. In contrast, non-fans of heavy metal music — who are often used as participants in experimental research on this topic — invariably report negative psychological experiences. Our review considers a comprehensive set of empirical findings that inform clinical strategies designed to identify fans for whom heavy metal music may confer psychological and behavioural risks, and those for whom this music may confer psychosocial benefits.

Keywords Aggression · Emotion · Heavy metal · Identity · Media violence · Mood · Music psychology · Music perception · Narrative review

Music plays an important role across all stages of human development (Thompson and Olsen, 2021). Mental health practitioners (e.g., music therapists, psychologists) and researchers recognise that music listening preferences and behaviours are important to social and emotional wellbeing for adolescents and young adults (F. Baker & Bor, 2008; McFerran, 2016; McFerran et al., 2016) and can support neurological functions (Brancatisano et al., 2020). A body of research spanning more than 30 years has aimed to elucidate the nature of these relationships. However, with the emergence of music genres that contain aggressive lyrical themes such as rap and heavy metal music, researchers have

considered the possibility that some forms of music engagement may have negative consequences (e.g., St. Lawrence & Joyner, 1991; Warburton, 2012). Such genres often explore aggressive and violent antisocial themes, leading to media reports of moral panic by community groups, parents, and politicians (Walser, 2013). At the heart of such concerns is the possibility that music with aggressive themes might negatively impact upon the behaviour and mental health of adolescents and young adults.

Heavy metal music with aggressive themes has been identified as a potential risk factor for *externalising* behaviours (characterised by aggression and antisocial behaviour), *internalising* behaviours (characterised by depression and anxiety), and unhealthy behaviours such as substance use and self-harm (Bodner & Bensimon, 2015; McFerran et al., 2016; Miranda, 2013). Such concerns are also evident within other domains of media violence, such as violent video games (e.g., APA, 2015; Anderson et al., 2010; Greitemeyer and Mügge, 2014). However, despite numerous claims that engagement with violent media can lead to negative outcomes, meta-analyses (and especially those focused on preregistered studies) suggest that such risks are modest at best (e.g., Drummond et al., 2020; Ferguson, 2015; Ferguson et al., 2020; Hilgard et al., 2019; Przybylski & Weinstein, 2019).

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There is also limited evidence to justify serious concerns about the negative impact of prolonged exposure to heavy metal, yet such concerns persist and have influenced social attitudes and policy decision-making at political and institutional levels. In some cases, there have been calls for certain music groups to be banned entirely (for discussions of music censorship, see Chastagner, 1999; Cooper, 2011; Hines & McFerran, 2014; Peters, 2019; Savage, 2018; Wright, 2000; for the perspectives of fans, see Hines & McFerran, 2014). Despite these public concerns, many adolescents and young adults report that music enhances their social and emotional wellbeing, including music with aggressive themes (McFerran & Saarikallio, 2014; McFerran et al., 2015; North et al., 2000; Olsen & Thompson, 2021; Thompson et al., 2019). The need for increased understanding of how listeners use music in their daily lives is particularly important, as music-use can have both detrimental and enhancing effects on wellbeing and mental health (Loxton et al., 2016; Lozon & Bensimon, 2014; McFerran et al., 2016; Miranda, 2013; Olsen et al., 2022). The present narrative literature review evaluates and synthesises existing research findings on the risks and benefits of engaging with heavy metal music with aggressive themes. The review is grounded within the field of music psychology and aims to ensure that clinical decision-making (e.g., discouraging or encouraging listening) is informed by empirical evidence.

Defining Heavy Metal Music

Heavy metal developed as a genre in the late 1960s and 1970s, with bands including Deep Purple, Black Sabbath, and Led Zeppelin fundamental to its emergence (Walser, 2013). Heavy metal music, and later offshoots such as thrash metal, grindcore, and death metal, is often characterised by energetic high intensity sounds, distorted electric guitars and bass, screamed or growled vocals and powerful drums (Brown et al., 2016; Olsen et al., 2018; Walser, 2013). It has been observed that many sounds featured in this music are acoustically similar to biological threat signals such as screams, growls, and other attributes observed in animal calls designed to communicate fear and aggression, including looming or high intensity sounds, high event density, extreme spectral centroids (low or high), and non-linearities (for relevant discussions, see Blumstein et al., 2010; Huron, 2015; Ma & Thompson, 2015; Ollivier, et al., 2019; Schäfer et al., 2015). In extreme subgenres of heavy metal such as death metal and black metal, lyrical themes often focus on violence, death, suicide, alienation, fear, misogyny, dystopian futures, the occult, mysticism and the supernatural.

Not all heavy metal music features aggressive or violent lyrics. Indeed, many heavy metal songs address prosocial issues of politics, religion, the environment, global inequality and imbalances of power (Brown et al., 2016; Walser, 2013). The diversity of themes in heavy metal makes it impossible to generalise findings from specific songs to the entire genre. With this in mind, our review critically evaluates investigations of the psychosocial outcomes of engaging with heavy metal music, but with specific focus on the impact of heavy metal music that features explicitly aggressive themes.

The potential for heavy metal music to influence mental health and problem-behaviours is taken seriously by policy makers, mental health professionals and researchers (C. Baker & Brown, 2016). Correlational links between heavy metal music and suicide have driven policy decisions, and some mental health and correctional institutions have restricted access to such music (see Hines & McFerran, 2014; Rosenbaum & Prinsky, 1991 for discussions). Acts of violence within the heavy metal community (e.g., assault, rape, murder) have also shaped attitudes towards this music (e.g., see Phillipov, 2011, for a discussion about violence within the Norwegian Black Metal community). Such policy responses and concerns may be misguided, however, given that causation cannot be inferred from correlational evidence. Yet negative attitudes towards heavy metal music persist and have even been shown to influence diagnostic decisions about hypothetical patients who listen to this music. Rosenbaum and Prinsky (1991) reported that 83% of representatives from mental health facilities recommended a young male be hospitalised based on a vignette describing him as an affiliate of heavy metal music culture with an unconventional appearance, despite assurances that he did not consume alcohol or drugs, was not suicidal, depressed or violent, and showed no neglect of schoolwork. Negative attitudes towards heavy metal music have implications for the treatment of fans in social, institutional, and mental health settings, so it is imperative that empirical evidence informs clinical practice. Before our review of the empirical evidence is presented, relevant theoretical models will first be discussed.

Theoretical Perspectives

Several theoretical models are relevant to research on the impact of engaging with aggressive or violent media, with some emphasizing neurological and psychosocial benefits, and others focused on risks. Theoretical models of motivation such as *Self Determination Theory* (SDT; Przybylski et al, 2010) and *Mood Management Theory* (MMT; Zillman, 1988) provide insight into the mechanisms underlying responses to violent media. Applied to music engagement, SDT and MMT both contend that consumers actively select and respond to music to satisfy psychological needs and motivational goals. These goals include adaptive outcomes

such as managing one's moods (MMT) and feelings of pleasure (hedonic concerns), along with deeper (eudaimonic) levels of processing that include grappling with questions such as self-actualization, self-efficacy, and life's purpose (SDT) (Oliver & Raney, 2011). For these models, the psychological impact of media is not passively predetermined by the mere presence of aggressive content; instead, an active decision to engage with certain media must be understood as an adaptation to individual circumstances that can provide a pathway to psychological health and wellbeing (Kneer, 2016; Warburton & Braunstein, 2012). The theories also explain why fans of heavy metal music with aggressive themes rarely experience anger or display aggression towards others after listening to this music, but instead often report positive experiences of empowerment, joy, peacefulness, wonder, and social connectedness (e.g., Thompson et al., 2019; Olsen et al., 2022; see also, Thompson & Olsen, 2018). Conversely, when non-fans are required to listen to music they dislike, the experience is unlikely to satisfy their psychological needs and motivational goals.

Models of the therapeutic potential of music, such as the *Therapeutic Music Capacities Model* (TMCM; Brancatisano et al., 2020), explain how music engagement can yield positive outcomes that may be exploited in music-based therapies. The TMCM identifies numerous design features of music that trigger key processes relevant to mental and physical health, including those associated with attention, movement, emotion, sense of self, timing, and social connection. Models that focus on music and the self (e.g., Baird & Thompson, 2018; Thompson, et al., in press) or on the social benefits of music (Elvers, 2016; Schäfer & Eerola, 2020) further clarify why fans experience benefits when listening to their preferred music, whereas non-fans experience no such benefits when listening to the same music. When non-fans are obliged to listen to music they did not choose and do not like, it may conflict with their sense of identity and fail to convey a sense of community, resulting in unpleasant emotional responses such as tension, anger and fear (Olsen et al., 2022).

Models of aggression can also help to identify conditions under which negative consequences of music engagement might occur, and hence can inform strategies for minimizing negative outcomes. However, such models are less informative about the positive psychosocial outcomes that have been observed for fans of violently-themed music. Anderson and Bushman's (2002, 2018) *General Aggression Model* (GAM) was developed to explain the relationship between exposure to an aggressive-related stimulus (such as media violence) and subsequent aggressive behaviour (see also, Barlett & Anderson, 2013). The model proposes that individual variables (e.g., genetic predisposition, prior learning, beliefs, attitudes, gender, mood, trait aggression) and situational variables (e.g., violent media exposure) combine to influence

an individual's internal state (physiological arousal, affect, cognition) and behaviour (Anderson & Bushman, 2002; Barlett & Anderson, 2013; Greitemeyer, 2009). The GAM has been used as a framework to explain how exposure to music with violent themes might lead to increased aggression (e.g., Anderson et al., 2003; Brummert-Lennings & Warburton, 2011; Fischer & Greitemeyer, 2006; Mast & McAndrew, 2011). However, the model's assumptions and validity have been questioned, and it provides little detail on the complex interactions between environmental factors and genetic, neurobiological, neuroendocrine, and other biological underpinnings of aggressive behaviour (Devilly et al., 2021; Ferguson & Dyck, 2012). More critically, because the GAM is exclusively focused on aggressive outcomes, it is not equipped to account for the way individuals actively engage with music to confer a range of beneficial or otherwise non-aggressive outcomes. Unlike non-fans, fans actively seek out their favourite music to fulfil psychosocial goals, and they typically report positive experiences from this music engagement (Thompson et al., 2019). Aggression may also occur following exposure to music with aggressive themes, but the evidence reviewed here suggests that such an outcome is rare.

Methodological Approach

The narrative literature review drew upon protocols for search strategies outlined in the Preferred Reporting Items for Systematic Reviews and Meta-Analyses Protocols (PRISMA-P; Moher et al., 2015; Shamseer et al., 2015). PsycINFO, Scopus and Google Scholar databases were used to identify research investigating the associations between heavy metal music listening and externalising, internalising and unhealthy behaviours including aggression, anger, substance use, anxiety, depression and suicide. Inclusion criteria also incorporated individual factors such as personality, gender[1] and emotion regulation styles that potentially moderate the relationships between heavy metal music and wellbeing. Finally, the review considered evidence of the ways in which young people use music to improve their wellbeing, and how heavy metal fans may benefit from listening to their preferred genre.

Literature searches in all databases identified relevant articles by scanning titles, abstracts and keywords. For

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[1] We employ the term gender to distinguish between males, females, and non-binary participants even when referring to research in which the original authors used the term 'sex'. We adopt this approach because we assume participants were asked to select a gender label at the time of participation, rather than to indicate a label they might have been assigned at birth based on their biological features (i.e., sex).

example, one search strategy in SCOPUS that was limited to peer-reviewed articles is as follows: TITLE-ABS-KEY ("heavy metal music") AND ("aggression" OR "anger" OR "antisocial" OR "substance use" OR "drugs" OR "anxiety" OR "depression" OR "suicide" OR "personality" OR "gender" OR "sex" OR "emotion regulation" OR "wellbeing" OR "well-being") AND (LIMIT-TO (DOCTYPE, "ar")). Publication year was not restricted and included articles available up until August, 2021. Once search strategies were implemented, we assessed titles and abstracts to gauge suitability to the overarching research synthesis aim and excluded articles that did not meet the criteria. In addition to articles deemed relevant from such search strategies, we also assessed relevant articles from reference lists of published work and authors' personal reference databases. In total, 101 empirical studies were incorporated into the narrative literature review.

Anger and Aggression: From Affect to Cognition and Behaviour

The lyrical themes of heavy metal music sometimes depict acts of aggression, violence and misogyny, so researchers have investigated whether exposure to such music might lead to increases in anger, aggressive cognitions, and aggressive/antisocial behaviours. Anger and aggression are distinct outcomes. Anger is a feeling or emotion, whereas aggression refers to a behaviour or action that is hostile or violent, such as physical assault, verbal threats, or self-harm. Violent media may sometimes induce anger without inducing behaviour that is aggressive.

Anger The relationship between listening to heavy metal music and levels of anger is likely influenced by (1) music listening preferences, that is, if the listener is a fan or non-fan of the music, and (2) stereotypes/implicit biases. Labbé et al. (2007) administered a stress-induction procedure to participants who then listened to self-selected music, classical music, heavy metal music, or sat in silence. Listening to self-selected or classical music resulted in increased relaxation, whereas listening to heavy metal music resulted in increased anger with no benefit to relaxation. Without knowing listeners' musical inclinations or their level of enjoyment while listening to the music, it is unclear whether these outcomes occurred because heavy metal music is inherently harmful, or because most participants in the study did not like these music selections.

Negative stereotypes are also likely to influence anger experienced after listening to music. For instance, a cohort of primarily Caucasian students reported lower levels of anger after listening to experimenter-selected heavy metal music than after listening to rap music (Ballard & Coates,

1995). The authors surmised that listeners may have been more familiar with rock music more generally, and that higher ratings of anger following rap music might reflect an implicit bias against the predominantly African American rap culture of the time. This interpretation suggests that the elicitation of stereotypes associated with any music genre can sometimes account for affective experiences during music listening (Susino & Schubert, 2019a, 2019b). Negative stereotypes may also account for higher levels of anger after listening to heavy metal music than after listening to other genres, given that non-fans may hold negative attitudes about this genre.

When recruiting fans of heavy metal music, researchers have not observed a consistent relationship between listening and increased anger. In one of the earliest qualitative studies of young male listeners of heavy metal music aged 14–20 years (Arnett, 1991a), two-thirds who reported listening to their preferred music when feeling angry indicated that the music helped them release anger and feel calmer. Only 6% of fans self-reported that listening to heavy metal music increased their anger and aggressive behaviours. Other research suggests that young- and older-adult heavy metal fans report similar levels of trait anger to fans of other genres (i.e., alternative, adult contemporary, dance/soul, country, rap) (Rubin et al., 2001; Shafron & Karno, 2013). Furthermore, heavy metal fans do not report experiencing more state negative affect (e.g., anger, sadness, stress) than non-fans after listening to their preferred genres (McFerran et al., 2015).

The importance of considering fan-status is further highlighted in a study by Gowensmith and Bloom (1997), who found that when heavy metal and country music fans listened to their preferred genre, self-reported levels of anger did not differ from one another. However, fans who listened to their non-preferred genre reported higher levels of anger than those who listened to their preferred genre. Given that heavy metal fans are the cohort most likely to self-select music from this genre, research on this group of listeners is most relevant to any assessment of the risks and benefits of this music. Sharman and Dingle (2015) recruited fans of extreme metal music to examine the effects of listening to self-selected music on affect and physiological arousal (e.g., heart rate). After an anger induction, fans reported increased hostility, irritability and stress, but following a subsequent period of music listening or silence, these states decreased. Fans who listened to music (versus silence) following the anger induction reported increased positive affect (e.g., feelings of being active and inspired). Given the experimental design, however, it is difficult to disentangle the relative contributions of music listening in general, listening to familiar and preferred music, and listening to heavy metal music specifically. However, the findings confirm that listening to metal music does not make angry fans angrier, which is

consistent with qualitative reports from fans (Saarikallio, 2011; Saarikallio & Erkkilä, 2007; Thompson et al., 2019).

Aggressive Cognitions Research has also explored the relationship between listening to heavy metal music with violent lyrics on aggressive cognitions. For instance, exposure to misogynistic and misandrist lyrics (vs. neutral lyrics) across a range of genres including heavy metal resulted in an increase in aggressive cognitions towards the opposite sex (Fischer & Greitemeyer, 2006). Furthermore, a group of undergraduate participants who were not screened for fandom reported increased state hostility and greater access to aggressive thoughts after listening to a heavy metal song with violent lyrics, compared to participants who listened to a heavy metal song with non-violent lyrics (Anderson et al., 2003). A powerful feature of this investigation is that it controlled music genre, used multiple exemplars of violent and nonviolent songs across multiple experiments, and examined the moderating effects of trait hostility.

Anderson et al. (2003) measured participants' access to aggressive thoughts by using linguistic tasks such as participant ratings of similarity between aggressive and ambiguous word pairs (Exp 2), reading response times when presented with aggressive or non-aggressive words (Exp 3), and a commonly used word completion task (Exps 4–5). Word completion tasks, for example, require participants to 'fill in the blank' for words that could be completed to yield either an aggressive or neutral word (e.g., explode vs explore). A higher frequency of aggressive word completions after exposure to violent media suggests increased access to aggressive thoughts caused by the preceding stimulus. Although such priming effects are predictable, it is difficult to generalize these measures to the incidence of aggressive cognitions by music listeners outside of laboratory conditions. Indeed, in the renowned legal case of Brown versus Entertainment Merchants Association (2011), the Supreme Court (USA) concluded that measures of aggressive cognitions in laboratory settings are unlikely to reflect real-world aggressive cognitions that predict aggressive behaviour, such as planning to enact harm towards others (Ferguson, 2013).

It also remains to be determined whether increased state hostility and aggressive cognitions would occur (even in laboratory conditions) for participants who regularly and enthusiastically listen to music with violent lyrical themes (i.e., fans of music with violent themes), or whether such findings were driven by participants who find the presence of violent lyrics aversive to begin with. Indeed, research suggests that when non-fans listen to heavy metal subgenres with extremely violent themes (e.g., death metal), they experience negative outcomes, whereas fans listening to that same music experience positive outcomes (Thompson et al., 2019), especially in cases where fans' passion for

death metal is harmoniously intertwined into their day-to-day lives (Olsen et al, 2022).

Aggressive and Antisocial Behaviour Although fans of heavy metal do not always report greater feelings of anger than fans of other genres of music, their propensity to act aggressively may still be elevated. Rubin et al. (2001) found that heavy metal fans reported more aggression and disregard for women than fans of other genres (except for rap music), even when self-esteem and anger were controlled. Studies of adolescents aged 12–16 years also showed a trend towards increased aggressive behaviour in fans of rock music including heavy metal than in fans of other genres (e.g., pop, dance, hip-hop, jazz, classical) (Mulder et al., 2007; ter Bogt et al., 2013). Collapsing genres (e.g., heavy metal, punk) into a broad "rock" category may have obscured differences between fans of those genres. Nonetheless, the self-report data warrant corroboration using experimental methods that evaluate causal links between heavy metal music listening and acts of aggression.

Bodner and Bensimon (2015) reported higher levels of delinquency among adult fans of so-called 'problem music' (i.e., heavy metal, alternative rock, hip-hop, rap, punk, house and trance) than fans of 'non-problem music' (i.e., other genres). Similarly, Schwartz and Fouts (2003) reported that adolescent listeners of 'heavy' music (defined as tough, wild, loud, protesting, violent, fast and guitar-based) were more tough-minded and assertive in their relationships, less concerned about the feelings and reactions of others, and were less confident in their ability to succeed academically than listeners of 'light' music (i.e., quiet, romantic, sad, peaceful, tender, good-natured and serious). In addition, listeners of heavy music were more pessimistic, moody, sensitive and dissatisfied, and had greater difficulties in their family relationships compared to listeners of both light and 'eclectic' music (i.e., both heavy and light). They were also more likely to be impulsive, to disrespect individuals and societal norms, to disregard others' rights and to be concerned about peer acceptance. Examining heavy metal fans specifically, Took and Weiss (1994) found that fans had poorer school grades and more school-based problems than non-fans. These studies suggest a relationship between music listening preferences and problematic behaviours. However, the nature of these relationships remains unclear, with little known about whether music listening has a direct or indirect effect on behaviour (i.e., via mediating variables), or whether predisposing factors (e.g., poor family relationships) drive listeners towards particular genres.

In an effort to explore the emerging relationship between music and externalising behaviours such as aggression and delinquency over time, Selfhout et al. (2008) collected self-report data from adolescents aged 11–18 years at two intervals, twelve months apart. Adolescent males with a

preference for heavy metal music exhibited more externalising behaviours at the second measurement time-point relative to the first time-point, whereas preferences for heavy metal did not predict externalising behaviours reported at the first time-point. The authors adopted a psychosocial model to argue that the lyrical content of these genres activates antisocial schemas that then promote externalising behaviours. They further argued that these behaviours are modelled by peer groups affiliated with these genres, and that adolescents adopt these behaviours to conform to group norms. In another longitudinal study, adolescents who listened to heavy metal music with aggressive themes demonstrated increases in aggressive behaviour and decreases in prosocial behaviour over a 12-month period when controlling for initial levels of these variables (Coyne & Padilla-Walker, 2015). Together, these studies provide evidence that listening to heavy metal music with aggressive themes plays a role in the development of subsequent externalising behaviours, perhaps through psychosocial mechanisms.

The studies reported thus far have relied on correlational designs, and therefore are unable to address the question of whether listening to heavy metal music with aggressive themes plays a causal role in increasing aggression and antisocial behaviours. However, there have been a number of studies that have examined the causal relationship between exposure to music with violent lyrics and aggressive behaviour. For instance, male participants who listened to heavy metal music with violent lyrics demonstrated increased aggressive behaviour in a 'hot sauce' paradigm (i.e., placing more hot sauce in a cup of water expected to be given to another student) than those who listened to heavy metal without violent lyrics or no music at all (Mast & McAndrew, 2011). This effect remains regardless of whether or not the music is accompanied by violent imagery (Brummert-Lennings & Warburton, 2011). While not exclusive to heavy metal music but also applicable to rock and rap music, sexually aggressive and misogynistic song lyrics, relative to neutral lyrics, have also been shown to increase men's aggressive behaviours towards women using the 'hot sauce' paradigm (Fischer & Greitemeyer, 2006). These studies make an important contribution as they explore the role that lyrics play in eliciting aggressive behaviours, and they begin to highlight potential mechanisms through which music exposure increases aggression. However, as participants were not specifically screened for their liking of the musical genres, it is difficult to draw strong conclusions about whether exposure to heavy metal music as a genre elicits aggressive behaviours in listeners who consider themselves heavy metal fans.

In sum, correlational research suggests that aggression, delinquency, and disrespect toward societal norms and women are broadly associated with heavy metal music, although causal inferences are difficult to infer from such data. Aggressive behaviour has nevertheless been causally linked to heavy metal with aggressive themes when musical preferences are not controlled (i.e., separating the experience of fans versus non-fans) (Brummert-Lennings & Warburton, 2011; Mast & McAndrew, 2011). Thus, it is difficult to draw strong conclusions about the psychological risks of this music for those people who enjoy it. Ideally, such findings should be replicated for a sample of participants who explicitly self-identify as fans of this music. Indeed, fans of heavy metal music are not angrier than other fan-groups, and preference for intense music genres such as heavy metal does not contribute to the prediction of aggressive tendencies beyond factors such as age, gender, and psychiatric symptoms (Merz et al., 2021). It is possible that some fans of heavy metal may use this music to help regulate the anger they do experience (Arnett, 1991a; Sharman & Dingle, 2015; Thompson et al., 2019; Thompson & Olsen, 2018) – a possibility that will be discussed later.

More generally, existing evidence of negative outcomes following engagement with heavy metal music should be interpreted cautiously given: (a) research on the topic is in its infancy; (b) existing research has rarely restricted observations to fans of the music; and (c) challenges of interpretation. These challenges include interpreting correlational data, identifying valid dependent measures, generalising beyond experimental settings, interpreting small effect sizes, the presence of publication bias, and *p*-hacking (Ferguson, 2013, 2018, 2020).

Anxiety and Depression

Internalising disorders characterised by anxiety and depression have also been the subject of research, and the findings are somewhat inconsistent. A survey of young adults in Australia revealed that heavy metal fans reported higher levels of overall psychological distress than non-fans, as measured by the Kessler Psychological Distress Scale, K10 (McFerran et al., 2015). After controlling for age and gender, adult heavy metal/hard rock fans have also reported higher levels of anxiety and depression than non-fans (Shafron & Karno, 2013). Liking of rock music more broadly (e.g., heavy metal, alternative, punk, hard rock and gothic) has also been associated with higher levels of anxiety, depression, and problem behaviour, more incidences of self-harm, and lower levels of positive emotion (Mulder et al., 2007; Stratton & Zalanowski, 1997; ter Bogt et al., 2017).

Conversely, there is some evidence that preferences for heavy metal music among college students are not associated with depression (Lester & Whipple, 1996). Indeed, fans report using this music to buffer against the fear of death and death-related thoughts (Kneer & Rieger, 2016). Recours et al. (2009) drew conclusions about the levels of anxiety and depression among a group of heavy metal fans

aged 13–44 years based on cut-off scores indicating clinical levels of mental disorder. They concluded that the percentage of fans with scores above the cut-off for anxiety (15.58%) and depression (3.43%) were comparable or lower than rates evident in the general population. However, this conclusion was based on a descriptive comparison with no statistical inferences. Another study comparing 145 young-adult fans of heavy metal, rap, or classical music reported no significant differences in depressive symptoms between fan groups. However, the magnitude of depressive symptoms experienced in each fan group was a significant predictor of negative emotional responses to their preferred music (e.g., sadness, tension, anger, and fear) (Powell et al., 2021). There is also some evidence that at least among non-fans, listening to unfamiliar heavy metal (versus rap music) in a single exposure session does not lead to elevated levels of suicidal ideation or anxiety (Ballard & Coates, 1995). However, it is difficult to conceive that relatively brief exposure to an unfamiliar song is likely to drive any measurable changes, particularly in a non-clinical cohort.

Although there is some inconsistency within the literature, there is certainly evidence that heavy metal fans show a vulnerability to anxiety and depression (see F. Baker & Bor, 2008 for a further review) that extends across cultures (e.g., Ekinci et al., 2012). However, the mechanisms that underlie the relationship are unclear because the research relies on cross-sectional and self-report approaches (Hughes et al., 2018). While it is possible that listeners experiencing distress are drawn to genres that match and potentially validate their emotions (e.g. C. Baker & Brown, 2016; McFerran et al., 2015; Schwartz & Fouts, 2003; Stratton & Zalanowski, 1997), there is to date no experimental evidence that examines the long-term effects on fans of listening to heavy metal music.

Suicide

Some sub-genres of heavy metal music such as depressive suicidal black metal contain overt descriptions of violence against the self, and perhaps not surprisingly have been characterised and investigated as risk-factors for suicide and self-harm (Coggins, 2019; Hughes et al., 2018; Martin et al., 1993). An early and politically influential study used an indirect approach to assess the relationship between heavy metal music listening and suicide. Stack et al. (1994) accessed subscription rates to Metal Edge magazine and correlated these with suicide rates across the United States. When controlling for possible confounds (e.g., marital status of parents, financial strain, migration status and race), rates of subscription to the heavy metal magazine across 50 states made a small but unique contribution to the prediction of suicide rates among 15 to 24-year-olds (but not 25 to 34-year-olds).

Stack and colleagues argued that the aggressive themes in some heavy metal music may cultivate suicidal tendencies among at-risk adolescents. However, as magazine subscriptions acted as a proxy for heavy metal listening preferences, it is not clear whether similar results would have emerged using direct measures. Nonetheless, Stack (1998) adopted another indirect approach and analysed data taken from a large-scale social survey that obtained information about music preferences and levels of suicide acceptability, measured by rates of approval and disapproval of suicide. While there was a significant positive relationship between heavy metal fandom and acceptability of suicide, this relationship disappeared when church attendance was controlled. It was concluded that heavy metal fans have greater levels of suicide acceptability as a consequence of low religiosity.

Adopting a more direct approach, high school students who identified as fans of heavy metal reported more thoughts of suicide and provided fewer reasons for living when compared to non-fans (Scheel & Westefeld, 1999). Conversely, Lester and Whipple (1996) found that while college students' preferences for heavy metal music were associated with past suicidal ideation, they were not associated with current suicidal ideation or past suicidal threats or attempts. Therefore, it may be that current suicidal ideation among fans is characteristic of a younger cohort. Despite this proposition, Lacourse et al. (2001) found no association between preferences for heavy metal music and suicidal behaviours in a cohort of high school students when controlling for common risk factors of suicide such as age, powerlessness, isolation, meaninglessness, and substance use. Furthermore, an online survey of over 900 adult participants revealed that suicidal ideation was not associated with liking of heavy metal music (Till et al., 2016). Similarly, a retrospective study of middle-aged adults who were heavy metal fans and/or musicians in the 1980s revealed that while heavy metal fans and musicians had experienced a greater number of aversive childhood experiences and used more alcohol in early adulthood than did age-matched non-fans, the groups did not differ in suicide attempt rates (Howe et al., 2015). In addition, heavy metal fans and musicians reported higher levels of happiness during their youth and lower levels of regret than the non-fan comparisons. They also reported lower rates of work absenteeism due to physical and mental health problems and underwent lower rates of psychological treatment. Of course, retrospective studies are vulnerable to biases driven by inaccurate recall and misreporting, and the findings may represent a cohort effect. However, they do highlight that the longer-term outlook for fans is not necessarily one of concern. Overall, there does not appear to be a consistent relationship between listening to heavy metal music and suicidal behaviour, but more research within both non-clinical and clinical populations is needed to determine

whether mental health may act as a moderating factor (see C. Baker & Brown, 2016 for further discussion).

Substance Use

There is some evidence that heavy metal musicians consume alcohol more frequently than classical musicians (Butkovic & Dopudj, 2017), but the relationship between substance use and listening to heavy metal music is unclear. Some reports have indicated a positive association between substance use and liking of heavy metal music (Arnett, 1991b; Lacourse et al., 2001), although this has been shown to be moderated by trait levels of sensation seeking (Arnett, 1991b). Conversely, in studies of adolescents and university students, fans of genres such as punk/hardcore, techno/hardhouse, reggae and Turkish folk music were shown to have a stronger link to substance use than fans of heavy metal (Altun et al., 2018; Mulder et al., 2009). Such relationships are often moderated by perceived peer substance use (Mulder et al., 2009, 2010).

In Australia, rates of illicit drug use have also been associated with genre preferences (Lim et al., 2008). A cross-sectional questionnaire of 939 young people 16 to 29 years-of-age attending a day-long music festival revealed that nearly half of all respondents had used an illicit drug within the previous month. Rates of drug use were highest among those liking rap and dance/house with 70% and 55% of respondents having used illicit drugs within the previous month, respectively. Fifty-one percent of heavy metal fans reported using illicit drugs within the same period. The lowest rates were among those who liked alternative music (42%) and pop music (29%). Together, these findings suggest that although other genres (e.g., techno, dance, punk, reggae, rap) may predict greater levels of substance use than heavy metal, a relatively large proportion of these heavy metal fans did report using illicit drugs. Indeed, these reported numbers are higher than societal norms. For example, in a study of more than 20,000 Australian teenagers, only a small percentage used illegal drugs (Guerin & White, 2020). In the 2019 Australian National Drug Strategy survey ($N = 22,000+$), only 16% of Australians had used any illegal drug in the past 12 months (Australian Institute of Health Welfare, 2020). Thus, drug use reported by heavy metal fans is roughly three times the Australian national average.

Psychiatric Populations

Despite concerns about the effects of heavy metal music on externalising, internalising and unhealthy behaviours, there has been little research examining these variables within inpatient psychiatric populations. In an early study conducted in an inpatient psychiatric unit, adolescent males admitted for substance use, conduct disorder and/or depression reported their music-listening preferences (Weidinger & Demi, 1991). Of particular interest was the association between exposure to negative lyrical themes, problem behaviours and mental health (e.g., aggression, defiance, drug use, depression, suicide attempts). A greater number of problem behaviours were evident in those who listened to music with negative lyrics, and in those who primarily listened to heavy metal music over other genres. Consequently, the authors recommended that the practice at the time of restricting music listening in psychiatric units be retained.

Similarly, adolescents aged between 14–17 years old who were admitted to an inpatient substance abuse treatment program demonstrated particular profiles of music listening, mental health diagnoses and drug use preferences (Doak, 2003). While there was no relationship between music and drug use preferences, there were significant correlations between preferred genres and diagnosis, with rap, heavy metal and techno associated with depression, and rap and techno associated with oppositional defiant disorder. Interestingly, adolescents gave similar reasons for using music and drugs; namely, to relax, improve mood, escape reality and to focus. However, the role of music in promoting adaptive self-regulation or maintaining a maladaptive distress-addiction cycle was unclear.

In an experimental study, a female inpatient cohort experiencing severe depression was presented with 45-min of experimenter-selected hard rock or pop music over 14 sessions (Esfandiari & Mansouri, 2014). Although they were not necessarily fans of these genres (music preferences were not reported), patients in both listening groups reported significantly decreased levels of depression, whereas those in the non-intervention control group demonstrated no decrease in symptoms. Thus, listening to the hard rock music (albeit not exclusively heavy metal) certainly did not worsen symptoms; rather, it seemed to exert some benefit. As no details about the control group were provided, it is not possible to assess the fairness of the comparison. However, it is highly likely that the experimental groups benefited from a shared listening experience, irrespective of the genre. Nonetheless, the study provides an experimental method that could potentially inform future research, particularly with at-risk fans.

Heavy metal music continues to provide a framework for new programs such as the online peer support 'Heavy Metal Therapy' project (Quinn, 2019), which through its accompanying website (https://heavymetaltherapy.co.uk/) has published numerous anecdotes describing how heavy metal music has helped fans overcome difficult life challenges such as bullying, bereavement, anxiety, and lack of confidence (Blott, 2021). Unfortunately, the effects of heavy metal music on mental health in psychiatric populations is highly under-researched within the field of clinical

psychology, and given that this genre of music has been banned in some settings (Weidinger & Demi, 1991), empirical evidence is required in order to inform both clinical and policy-based decisions.

Gender Differences

Gender differences are an understudied but important area to investigate in the context of heavy metal music, especially research employing experimental designs. A self-report study conducted with Australian high school students revealed that compared to the liking of pop music, liking of rock and heavy metal music was associated with suicidal ideation, self-harm, depression, drug use, delinquency and poor family functioning (Martin et al., 1993). Importantly, there were substantial gender differences among these findings. Both male and female school students who liked rock/ heavy metal reported lower perceived family closeness and higher rates of delinquency, risk taking and drug-use, compared to those who liked pop. However, relative to female students who liked pop, only female students who liked rock/heavy metal reported greater rates of family separation, lower levels of parental involvement, and higher levels of suicidal ideation, self-harm, and depression. These results suggest that females who listen to rock/heavy metal music represent a particularly vulnerable cohort, and their fandom may be considered a risk factor for poor mental health, self-harm, and suicidal behaviours. Conversely, as the authors suggested, males may benefit from the desirability of rock/ heavy metal group membership, thus protecting them from suicide risk.

A study of high school students aged 14–18 years demonstrated a positive relationship between liking of heavy metal music and suicide risk in the female sample only, with higher levels of liking associated with increased risk (Lacourse et al., 2001). Female high school students also demonstrated increased levels of powerlessness, normlessness, and meaninglessness as a function of increased liking of heavy metal music. However, when a number of variables were controlled, including age, powerlessness, parental negligence, normlessness, and substance use, the relationship between liking of heavy metal music and suicide risk disappeared. Thus, it is apparent that other social and familial factors play a greater role in suicide risk. Indeed, one study reported that the relationship between heavy metal fandom and depression in adolescent females was only observed if female fans affiliated with peers who were also depressed (Miranda & Claes, 2009). As the authors argued, it may be that adolescent females' affiliation with depressed peers leads to co-rumination that is maintained through the negative lyrical content of heavy metal music.

These studies highlight the possibility that research collapsing across gender may obscure important findings. Furthermore, a greater understanding of the experience of male and female fans of different subgenres of heavy metal is needed to help avoid unwittingly stereotyping gendered experiences for fans across the umbrella of heavy metal sub-genres. For example, the experience of male and female fans of different genres of heavy metal are not likely to be the same when fans of the relatively 'dark' and violent death metal or black metal sub-genres are compared with fans of symphonic metal or post-metal sub-genres. Such a nuanced approach to understanding gender differences across the plethora of heavy metal sub-genres awaits systematic empirical investigation.

Personality Traits

Sensation Seeking In addition to gender, personality traits have also been considered as possible moderating factors in the relationship between heavy metal music listening and externalising behaviours (characterised by aggression and delinquency, for example) and internalising behaviours (characterised by depression and anxiety). In an early study investigating personality and externalising behaviours among adolescents, self-report measures revealed that males and females who were fans of heavy metal music had higher levels of trait sensation seeking and engaged in more reckless behaviour than non-fans (Arnett, 1991b). Male fans reported more incidents of speeding, drink driving, casual sex and substance use than male non-fans, whereas female fans reported more shoplifting, vandalism, and unsafe sex than female non-fans. While male fans and non-fans were not different in terms of levels of self-esteem, female fans exhibited significantly lower self-esteem than non-fans. However, many of the behavioural differences between the fan and non-fan groups were moderated by levels of sensation seeking; it was not necessarily the heavy metal music that drove these behaviours.

Correlational analyses have also revealed relationships between music preferences, substance use and sensation seeking in adulthood (ages 18–44 years) (Oberle & Garcia, 2015). Participants were categorised according to the frequency with which they listened to various genres of music (e.g., pop, rap, country, classical, heavy metal) and these categories correlated with profiles of substance use. Specifically, rap/hip-hop, electronica/dance, and heavy metal categories were positively correlated with alcohol and marijuana use. However, when sensation seeking was controlled, neither heavy metal or electronica/dance retained an association with alcohol or marijuana use. Thus, sensation seeking was a better predictor of substance use than music-listening preferences.

The Big Five Personality Traits Adult fans of heavy metal, alternative rock, hip-hop, rap, punk, house, and trance (so called 'problem music') have been found to be no different from fans of other genres ('non-problem music') in terms of extraversion, neuroticism, openness to experience, conscientiousness, and agreeableness (Bodner & Bensimon, 2015). Similarly, Butkovic and Dopudj (2017) explored personality traits among male heavy metal musicians and classical musicians and found no differences across the Big Five personality domains. Rather than seeking retrospective reports about listening practices, Swami et al. (2013) presented contemporary heavy metal songs to participants who were not necessarily fans of the genre. The relationships between ratings of liking for the songs, personality traits and a number of other variables were examined (e.g., need for uniqueness, attitudes towards authority, self-esteem and religiosity). In terms of personality traits, greater overall liking for the songs was only associated with higher levels of Openness to Experience. However, greater liking indicated, albeit weakly, more negative attitudes towards authority, lower self-esteem, lower religiosity, and a greater need for uniqueness. The authors suggested that those with anti-authority attitudes that included religious authority are drawn to heavy metal because its lyrical content depicts these attitudes. However, these finding cannot definitively inform knowledge about personality traits of self-identified fans, and again, drawing conclusions should be tempered.

In a study more applicable to heavy metal fans, Thompson et al. (2019) found that fans of death metal, a sub-genre of heavy metal characterised by extremely violent lyrical themes, had slightly lower levels of conscientiousness and agreeableness than non-fans. Two possible explanations for this finding were proposed: (1) the violent themes depicted in the music are incompatible with high levels of these traits, and these listeners are repelled by the music, and (2) exposure to violent lyrics desensitises listeners, causing subtle personality changes. However, the authors caution that the large overlap in levels of these traits across fan and non-fan groups suggests subtle trends, rather than clear distinctions between groups. Interestingly, despite the violent nature of the lyrics, the study revealed no differences between fans and non-fans in terms of state empathic capacity (cf. Slade et al., 2021). There is also now evidence that fans and non-fans do not show differences in sensitivity to acts of violence viewed in pictures (Sun et al., 2019). As Thompson et al. (2019) explain, fans may distance themselves from the violence depicted in the music as they draw a boundary between aesthetics and non-artistic experiences. As a result, long-term exposure to violent themes in music may not lead to desensitisation to violence, and thus, fans' empathic response to viewing violence is similar to non-fans of violent music.

While there is evidence to suggest that sensation seeking partially explains the problem behaviours associated with heavy metal music fandom, further research is required to establish the presence of distinct personality profiles among fans of heavy metal. Indeed, this endeavour will allow researchers to examine the moderating role that personality profiles play in the relationship between heavy metal music listening and wellbeing, and will support the establishment of developmental models using longitudinal approaches.

Social and Emotional Goals

Typically, research has focused on negative outcomes, including psychopathology, antisocial behaviour, substance use and suicide risk, but there have been a number of studies designed to investigate the positive or protective aspects of listening to heavy metal music (C. Baker & Brown, 2016). In fact, adolescents and young adults are not passive consumers of music. Rather, they choose music in order to achieve a range of goals (McFerran & Saarikallio, 2014; McFerran et al., 2015; Papinczak et al., 2015). Broadly, these goals can be conceived as socially or emotionally driven (Laiho, 2004; Miranda, 2013; Schäfer and Eerola, 2020).

Sense of Belonging and Identity Through Heavy Metal Music Generally, music appears to influence social development by shaping identity and facilitating autonomy from the family (Lozon & Bensimon, 2014), fostering peer affiliation (Lozon & Bensimon, 2014; North et al., 2000), developing community (e.g. Chadborn et al., 2018), managing group dynamics, and allowing for the rehearsal of social roles (Hines & McFerran, 2014; Miranda, 2013; North & Hargreaves, 1999; North et al., 2000). Young adults have also reported using their fan-status to communicate information about their demographics, social status and personal characteristics (North & Hargreaves, 1999). While liking of heavy metal is associated with low levels of conformity to mainstream culture (Bonneville-Roussy & Rust, 2018), an interview-based study of young male listeners of heavy metal music aged 14–20 years revealed that fans have a strong affiliation with their music-based culture (Arnett, 1991a). Nearly 60% of fans considered music as a means of fostering social connections, highlighting the role that heavy metal plays in solidifying social and cultural identity. Moreover, adult fans have reported using heavy metal to explore themes of religion, death and politics, and to provide insight into their social identity and individuality (Hines & McFerran, 2014). Others have suggested that identification with heavy metal music and solidarity with other fans can facilitate emotional strength and survival in the face of adversity (C. Baker & Brown, 2016). A retrospective study offers support for this proposition, revealing that identifying with a non-mainstream subculture may act to protect vulnerable youths against mental health concerns by supporting

identity development and autonomy (Howe et al., 2015). Furthermore, young Australian heavy metal fans provided qualitative reports that revealed how a sense of belonging and identification with metal culture can act as a protective factor against marginalisation and difficult social environments (e.g., ostracism, bullying) (Rowe & Guerin, 2018).

Interestingly, other research has indicated that fans of rock music, which included heavy metal among other genres such as rock, alternative, gothic and punk, feel consoled via lyrics and the music itself, rather than through connections with fans and artists (ter Bogt et al., 2017). In fact, others have argued that the lyrical themes in heavy metal music provide fans with a sense that they are not alone in their emotional experience, and that this provides feelings of increased comradery and connectedness, and reduced levels of shame (C. Baker & Brown, 2016; Schwartz & Fouts, 2003). Thus, a sense of connectedness appears to emerge from heavy metal music listening through affiliating with other fans or artists, and/or connecting to the messages communicated in the lyrical content. Of course, the circumstances or individual factors that give rise to the positive or negative associations within this particular sub-culture are unclear. Nevertheless, social goals are worthy of consideration, especially when working with young people in clinical settings.

Regulating Mood and Emotion with Heavy Metal Music Music's influence on wellbeing is realised through emotion regulation (McFerran et al., 2015; Randall et al., 2014; Saarikallio & Erkkilä, 2007), coping styles (Miranda & Claes, 2009; Semenza, 2018), and personality and motivation factors (Miranda, 2013; Thompson et al., 2019). Broadly, 'music-in-mood regulation strategies' involve the use of music to distract, reinforce, express or simply explore and work through emotions or mood states (Saarikallio, 2008, 2011, 2012). Consequently, adolescents have reported that music listening helps them feel happier, more relaxed, less bored, more connected and understood, and more confident (e.g. McFerran et al., 2015; Miranda, 2013). Music also provides solace, with two-thirds of listeners reporting that they use music to experience comfort and consolation, to reduce stress and increase emotional and psychological wellbeing, particularly when experiencing depression and/or anxiety (ter Bogt et al., 2017).

Qualitative reports provided by fans of heavy metal clearly demonstrate that listeners use music to vent their emotions to improve a negative mood (Arnett, 1991a; Hines & McFerran, 2014; Saarikallio & Erkkilä, 2007; Thompson et al., 2019) or to enhance an existing positive mood (Scheel & Westefeld, 1999). Moreover, male fans have reported that listening to heavy metal music validates their emotions, particularly sadness and anger, and that the music helps them engage with and regulate these feelings, while increasing energy, motivation, and feelings of power and

self-confidence (Hines & McFerran, 2014). Indeed, the more adolescent males listen to heavy metal music to release anger, the better their family relationships and the lower their drug use (Lacourse et al., 2001).

Fans have also reported using heavy metal music to fully experience and release anger and sadness, calm down, increase happiness, and to immerse themselves in the feelings of being in love (Sharman & Dingle, 2015). These findings are consistent with a study in which fans and non-fans listened to 60-s excerpts of death metal and reported their emotional responses to the music using quantitative and qualitative measures (Thompson et al., 2019). After listening to the excerpts, fans reported: 1) a decrease in negative affect, including tension; and 2) an increase in positive affect, including energy, enjoyment, engagement, empowerment, joy, wonder, nostalgia, peace and transcendence. This pattern was the converse for non-fans who reported decreased positive affect and increased negative affect (e.g., tension, fear, anger). These findings have now been replicated in a different sample of death metal fans and extended to fans of violent rap music (Olsen et al., 2022). Fans have also reported that violent heavy metal music serves cathartic and motivational functions, and has helped promote engagement with physical, creative, work/study and domestic based activities. Interestingly, an equal proportion of fans and non-fans (~ 10% within each group) reported that the emotions experienced during listening were conducive to antisocial behaviour (e.g., aggression, violence, reckless driving, excessive drinking). Thus, the majority of heavy metal fans report using music in adaptive ways aimed at enhancing wellbeing.

However, the outcomes of using heavy metal music to regulate mood and emotion are not always positive. For instance, although similar proportions of pop and rock/heavy metal fans report listening to their preferred music when in sad or happy moods, rock/heavy metal fans who felt sadder *after* listening had higher levels of depression, delinquency, suicidal ideation, and higher rates of self-harm and drug-use (Martin et al., 1993). Relatedly, in a non-clinical sample of 145 young adult fans of heavy metal, rap, or classical music, those who reported a greater magnitude of depressive symptoms were more likely to experience negative emotions (sadness, tension, anger, and fear) in response to their preferred music, and more likely to attempt to regulate depressive symptoms via the discharge mood regulation strategy, rather than diversion (Powell et al., 2021). Notably, both mood regulation strategies did not alleviate (or exacerbate) the experience of negative emotions in those reporting depressive symptoms.

There are also associations between adolescent females' use of music for release of aggression and poor family relationships, greater feelings of powerless, normlessness and meaninglessness, and increased drug use (Lacourse et al., 2001). It appears that music-based coping styles interact

with gender. Namely, adolescent females who use music as an *avoidant* coping strategy report higher levels of depression than adolescent females who use music as a *problem-oriented* coping strategy (i.e., to resolve or reduce stress) (Miranda & Claes, 2009). However, increased levels of depression in adolescent males are more closely linked to an *emotion-oriented* music-based coping style than avoidant or problem-oriented coping styles. Together, the evidence is consistent with research indicating that: 1) listeners experiencing anxiety and depression, and those who tend to ruminate may feel worse after listening to mood-congruent sad music (Garrido & Schubert, 2015; Garrido et al., 2016; McFerran et al., 2015; Peltola & Eerola, 2016); and 2) using music to suppress unwanted emotions can have negative impacts on psychological, emotional, and social wellbeing (Chin & Rickard, 2014).

Studies using a validated measure of music-based mood regulation such as the Music in Mood Regulation Scale (MMR; Saarikallio, 2008, 2012) have also highlighted strategies that may be maladaptive. These studies further bring into question the reports provided by fans; namely that music helps them release, vent or *discharge* negative emotion (e.g., anger). Without considering specific genres, discharging anger via listening has been associated with higher levels of depression, anxiety and stress, and using music as a distraction or *diversion* from negative emotions is associated with elevated levels of anxiety and stress. Conversely, those who use music for *entertainment* – to maintain a happy mood – show low levels of depression (Thomson et al., 2014). Carlson et al. (2015) also reported that the use of the discharge strategy in males was associated with higher levels of anxiety and neuroticism.

However, it has been suggested that particular strategies may elicit different outcomes as a function of preferred music genre (Carlson et al., 2015; Karreman et al., 2017; Thoma, et al., 2012a, 2012b; Thoma, et al., 2012a, 2012b). For example, Bodner and Bensimon (2015) examined preferred mood regulation strategies against preferences for so-called 'problem music' (heavy metal, alternative rock, hip-hop, rap, punk, house and trance) or 'non-problem music' (other genres). The two fan-groups did not differ in the degree to which they used music for entertainment or to induce strong sensation. However, fans of 'problem-music' used music for solace, revival, diversion, to facilitate mental work and to discharge emotion more so than 'non-problem music' fans. With a particular focus on fans of death metal, a self-report study revealed that fans used music for revival, discharging emotions and facilitating mental work more so than non-fans (Thompson et al., 2019). Unlike Bodner and Bensimon (2015), fans reported using music for entertainment more so than non-fans, but did not report using music any more than non-fans for solace or diversion. These differences are likely because Thompson and colleagues examined

mood regulation strategies of a specific sub-genre of heavy metal music, and it is indeed possible that fans of heavy metal demonstrate different profiles than fans of other genres classified as 'problem music' (e.g., rap, hip-hop, dance) by Bodner and Bensimon (2015).

Following the emerging interest in the relationships between genre preferences and music-based emotion regulation strategies, there is now a need to explore how the use of these strategies may be adaptive or maladaptive for heavy metal fans, with consideration given to gender (e.g. Miranda & Claes, 2009) and personality (e.g. Karreman et al., 2017). For instance, there is evidence that listeners with high levels of neuroticism show greater reductions in negative affect when instructed to consciously enhance their emotional state during music listening (Karreman et al., 2017). More research in the domain of music in mood regulation is needed to understand the emotional and psychological outcomes for heavy metal fans who use particular emotion regulation strategies, and with systematic consideration given to other individual factors (e.g., gender, personality). This endeavour is critical for highlighting the implications of adopting emotion regulation strategies for longer-term mental health (Blais-Rochette & Miranda, 2016; Carlson et al., 2015; McFerran & Saarikallio, 2014; Randall et al., 2014; van den Tol, 2016) and for recommending specific strategies in therapeutic settings (e.g., Dingle et al., 2016). For instance, advising a heavy metal music fan to listen to calming music to reduce distress may be detrimental when their preference is to listen to their preferred genre to discharge negative emotions.

Conclusions

The aim of this narrative review was to synthesise research findings grounded primarily within the field of music psychology and with particular focus on risks and benefits of heavy metal music with aggressive themes. With respect to risks, correlational evidence suggests that listening to heavy metal music is associated with psychological and behavioural problems that include aggression, delinquency, disrespect toward societal norms and women, and a vulnerability to mood disturbances such as anxiety and depression. However, there is little empirical reason to conclude that heavy metal music actually causes such problems. Fans of heavy metal also report relatively lower rates of substance use than fans of other genres (e.g., punk, techno), but substance use in this population is still considerably higher than societal norms.

Not unexpectedly, such risks are moderated by individual difference variables including personality and gender. For instance, sensation seeking may partially account for substance use and antisocial behaviour among fans of heavy metal music. Importantly, evidence suggests that female fans are more likely to experience poor mental health than male

fans (Lacourse et al., 2001; Martin et al., 1993; Miranda & Claes, 2009). Three factors may account for this gender difference. First, relative to males, it is typically less acceptable for females to be heavy metal fans and their fan status may be viewed as a more extreme form of non-conformity, isolating them from mainstream culture (Phillipov, 2012). Second, females are frequently represented as victims of violence in lyrical and visual content of heavy metal music with aggressive themes (e.g., album covers, music videos), whereas males are often portrayed as having agency and power (Walser, 2013). Third, females are underrepresented among musicians and fan communities, giving female fans fewer opportunities for feelings of connectedness and belonging (Donze, 2010). These propositions require empirical investigation, and exploring the relationships between wellbeing, gender and sensation seeking among fans will provide greater insight.

With respect to benefits, there is an emerging body of evidence showing that heavy metal music can confer a range of benefits to its fans, especially those who approach fandom with harmonious rather than obsessive passion (Olsen et al., 2022). Primarily, this research has focused on the role of music in regulating mood and emotion (Dingle et al., 2016; McFerran & Saarikallio, 2014; Saarikallio & Erkkilä, 2007; Thompson et al., 2019), forming individual and cultural identity (North & Hargreaves, 1999; North et al., 2000), facilitating autonomy from the family, and fostering peer affiliation (C. Baker & Brown, 2016; Hines & McFerran, 2014; Lozon & Bensimon, 2014).

A critical observation from this narrative review is that there are inherent challenges in examining the short- and long-term impact of heavy metal music that constrain the kinds of conclusions that can be drawn. First, statistics on the psychological and behavioural profile of fans are necessarily correlational, making it difficult to draw causal inferences (C. Baker & Brown, 2016; F. Baker & Bor, 2008; McFerran, 2016). Does heavy metal music cause or reinforce psychological problems for certain individuals, or do people with pre-existing psychological challenges gravitate towards this music, perhaps because it is consistent with their experience and provides a sense of belonging and consolation (McFerran et al., 2016)? Second, experimental studies that report short-term negative outcomes from listening to this music frequently fail to restrict their sampling strategies to self-declared fans of the music when it is known that fans and non-fans react in contrasting ways. Those who enthusiastically embrace extreme metal music tend to feel empowered and joyful after engaging with this music; those who do not like this music rarely report positive outcomes and are typically left feeling tense, irritated, and angry (Thompson et al., 2019). Of course, non-fans are unlikely to listen to heavy metal music in their day-to-day lives, and yet there is a risk that social attitudes, policy decisions and therapeutic recommendations might be made on the basis of studies that reflect the experiences of non-fans, rather than fans who actually engage with this music.

Future research will benefit from a greater focus on the experiences of self-declared fans and include experimental designs in conjunction with correlational analyses. Research will also benefit by investigating potential precursors to positive and negative engagement with heavy metal music, for example by assessing trait characteristics such as morbid curiosity (Scrivner et al., 2021) and moral reasoning (Messick & Aranda, 2020), in conjunction with fans' tendencies for harmonious or obsessive passion (Olsen et al., 2022). The effects of listening to heavy metal music on psychiatric patients is also an area of research that requires attention, as it is within this population that empirical evidence is critical for guiding clinical recommendations pertaining to music use. This avenue of research is critical to ensure that negative stereotypes do not cloud clinical decisions (Rosenbaum & Prinsky, 1991). Indeed, understanding the mechanisms that drive affective, cognitive and behavioural responses to heavy metal music will be critical for informing interventions that address mental health concerns in fans. Such research will help therapists identify fans' adaptive and maladaptive trait characteristics and listening behaviours, so informed decisions can be made regarding music engagement that optimally supports wellbeing while minimising maladaptive risk.

Declarations

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