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Music is What Feelings Sound Like: The Role of Tonal and Atonal Music in Unethical Behavior

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Governments and societies often have condemned music as being "indecent" and encouraging people to act unethically. Despite these accusations, research did not previously address the link between music and unethical acts. Here we argue that music may signal what is appropriate or inappropriate, hence moral behavior. We focus on the distinction between tonal and atonal music to examine the relation of music with unethical behavior. Results from an experimental study showed that harmonic or tonal music encouraged unethical behavior in adolescents and this was mediated by negative affect. Our findings suggest that music plays an integral role in driving (im)moral behavior.

Keywords: atonal music, ethical behavior, moral behavior

> "Our criminal institutions are full of little creeps like you who do wrong things . . . and many of them were driven to these crimes by a horrible force called MUSIC!" — Frank Zappa, The Central Scrutinizer

As the "Central Scrutinizer," Frank Zappa criticized the acts of governments to ban music in their attempt to control citizens. Even recently the Iranian leader Ayatollah Ali Khamenei decided to prohibit Western-style music, portraying it to be "indecent" and to enhance unethical conduct (Dehghan, 2010; see also Ayatullah Sayyid Ali Khamenei, 2011). The past decennia, music has been accused of stimulating unethical acts, such as aggression, stealing, or deception. Yet the relation of music with immoral and unethical research other than prejudice or judgments is largely unexplored (e.g., Gan, Zillman, & Mitrook, 1997; North, Desborough, & Skarstein, 2005). In this research, we argue that music is a cue for and facilitates moral and immoral behavior depending on the characteristics of music as being tonal or atonal.

Music is an important factor in our lives, as it is ever present in public places like stores and waiting rooms as well as in the increased popularity of portable music players. Music has even been identified in a vast range of human cultures as a crucial aspect of their society. In Western shops, background music is played to improve store image, reduce employee turnover, and stimulate customer purchasing (Milliman, 1982). Generally, music affects our motivations through eliciting a wide range of emotions in the listener (Wells & Hakanen, 1991). Music drives our

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aspirations and motivates us to achieve our goals (e.g., music while running) even affecting physiological processes. For example, cardiovascular research showed that music that makes you feel good allows for healthier blood vessels by improved blood flow, whereas music that makes you feel bad results in narrower blood vessels and an increased risk of cardiovascular health problems (Miller, Mangano, Beach, Kop, & Vogel, 2010). This is consistent with research on emotions as feelings of joy give way to prepare people for openness, integrity, and friendly behavior, whereas negative feelings induce a state of restraint and self-preservation.

According to Hall and du Gay (1996), individuals prefer music that reflects who they are, their identity. When individuals are forced to listen to music that does not reflect their identity, they will add a negative meaning to this music, which in turn produces feelings of stress and irritation (Scruton, Hoondert, Meelberg, & Van Vugt, 2010). Music reflects one's personal preferences and emotions, as it has been described as creating "socially shared meanings by exploring and celebrating a state of awareness or consciousness . . . as an expression of its emotional and moral precepts" (Chesebro, Foulger, Nachman, & Yannelli, 1985, p. 116). People indeed are more positive about music that they prefer listening to, as this closely links to one's identity (Hall & du Gay, 1996) including their morality (Chesebro et al., 1985). In contrast, people add a negative meaning to music that does not relate to their identity (Scruton et al., 2010). Such a preference for music can be resembled by different types of music: tonal and atonal music.[1] Generally, tonal music sounds harmonious, such as most music on the radio. Atonal music sounds disharmonious. This music is usually performed at concerts or special music programs because it sounds a little "odd." Atonal music is by definition quite distinctive in contrast to harmonic music (Gistelinck, 1991). Even nonhuman primates react differently to tonal and atonal music, having a clear preference for tonal music (Hauser & McDermott, 2003). The way people react to tonal and atonal music is dependent on how people define their identity. Adolescents, for example, often wish to define their identity as being different and distinct from others (Elkind & Weiner, 1978; Pipher, 2002; Seltzer, 1989) and therefore may feel more positive about atonal music.

Emotion as information theory states that positive emotions create a global state of reasoning encouraging openness and exploration. Negative emotions, on the other hand, create a more local state of reasoning encouraging self-preservation and the perception that own interests are compromised (Förster & Dannenberg, 2010; Schwarz & Clore, 2003). In their theoretical framework, Gaudine and Thorne (2001) suggested that negative emotions may result in introspection and therefore cause less sensitivity to the environment in general and to the existence of an ethical situation in particular. Positive emotions also raise the requirements for satisficing and result in deliberative judgments more consistent with ideal ethical norms and values (Gaudine & Thorne, 2001). Moral intuitions theory states that people's affective experiences are interrelated with ethical behavior (Haidt, 2007). That is, people's emotions often guide ethical decisions. In sum, we argue that music is a cue for moral or immoral behavior through the emergence of positive

[1] Gistelinck (1991) defined that for tonal music all tones of the composition are organized around a central tone called the keynote or tonic. The function of this keynote is to provide the "key" to the tones that the composer should use to make his or her composition sound harmonic. For example, when a piece will be written in the scale of A minor, only the tones that are part of the scale of la minor or of scales related to la minor can be used. Because of this organization in tonal compositions, tonal music sounds harmonic. In fact, some relationship to a tonic is characteristic of all music except that in which it is deliberately avoided. This kind of music is called atonal music. As a consequence of the lack of organization between tones, this music sounds disharmonic.

or negative emotions. Specifically, we argue that people—in this case, adolescents—attribute negative meaning to tonal music arousing negative emotions, which in turn elicits unethical behavior.

METHOD

Participants

One hundred thirty-six undergraduate students (48 female, 88 male) participated in the study. The average age of participants was 20 years ($SD = 4.21$). A between-subjects design was used in which participants were randomly assigned to the tonal and atonal music conditions

Procedure

Upon arrival at the laboratory, participants were welcomed by the experimenter and seated in separate cubicles. The experimenter was blind to the hypotheses of the study. The experimenter told them that they were to engage in a study about ancient Egypt. The picture content between music conditions was identic: a documentary about ancient Egypt (1.22 min). The background music in this movie was the manipulation in the study. This was different depending on the condition: tonal, atonal, or no background music. In this way, the music was presented to the participants in a very subtle way. In the control condition no background music was played. Previous research showed that even speech can generate feelings (De Brouwer & Rijcken, 2001). To be sure that this condition would be neutral, we decided to use no sound in the background. In the tonal condition, Piano Sonata in A Minor from Schubert, D784, op. 143, movement: allegro giusto was used (Demarré, 2004). In the atonal condition, Frank Zappa's "The Adventures of Greggery Peccary: Movement III" was used. These pieces of music are consistent in rhythm and pitch and are good exemplars of tonal and atonal music, respectively. Then, participants' unethical behavior was measured. The experimenter told each of the participants that he or she would divide the reward that they and another participant would obtain for their participation in the study. This reward consisted of lottery tickets that gave them the chance to engage in a raffle with which they could win movie tickets. Participants received an envelope with seven lottery tickets. Participants were told that each lottery ticket was worth two movie tickets. However, they were also told that, because they allotted the tickets, the other person did not have the information that these tickets were worth twice as much. As such, participants were in the opportunity to deceive the other person without him or her knowing about the deception (as the other person was ignorant about the true value of a ticket). After handing out the envelope, the experimenter went back to her desk, and participants divided the lottery tickets. They transferred the tickets for themselves in their pockets and the tickets for the other participant into a white envelope, sealed the envelope, and handed it in to the experimenter, who would give it to the other participant as soon as he or she finished the experiment.

Finally, participants were asked to how they experienced the music using eight positive (enthusiastic, affectionate, cheerful, kind, inspired, sympathy, watchful, happy; Cronbach's $\alpha = .91$) and seven negative (frightened, mad, stressed, irritated, nervous, ashamed, sad; Cronbach's $\alpha = .85$) emotions (Positive and Negative Affect Schedule; Watson, Clark, & Tellegen, 1988) as well as the extent that the music was their preferred taste and the extent that they thought

the picture content in the movies to be pleasant and enjoyable (positive emotions related to the movie; $r = .79$). Finally, participants were asked how arousing and exciting they considered the music and the movie, respectively. All items were assessed on a 5-point scale ranging from 1 (*not at all*) to 5 (*very much so*).

RESULTS

An analysis of variance (ANOVA) revealed a significant effect of music condition on the positive, $F(1, 89) = 19.88$, $p = .001$, and negative emotions, $F(1, 89) = 31.90$, $p = .001$ (Figure 1). Participants experienced higher negative emotions in the tonal than in the atonal condition. ($M_{tonal} = 2.32$, $SD_{tonal} = 0.91$; $M_{atonal} = 1.44$, $SD_{atonal} = 0.48$) and lower positive emotions in the tonal than atonal condition ($M_{tonal} = 2.57$, $SD_{tonal} = 0.79$; $M_{atonal} = 3.31$, $SD_{tonal} = 0.79$).

An ANOVA also showed a significant effect on unethical behavior, that is, the amount of lottery tickets participants kept for themselves, $F(2, 133) = 4.69$, $p = .01$. A post hoc Least Significant Difference test showed they kept significantly more lottery tickets for themselves, and therefore were more deceitful, in the tonal condition ($M = 2.96$, $SD = 1.53$) than atonal condition ($M = 2.27$, $SD = 1.40$). Further, fewer tickets were kept in the atonal than in the neutral condition ($M = 3.16$, $SD = 1.33$). Because tickets are worth twice as much, if participants wished to equally split the reward they could at most keep two tickets for themselves (in the most conservative choice situation). A t test comparing the means within each condition against two (tickets) indeed showed no significant difference in the atonal condition ($t = 1.29$, $p = .20$) in contrast to significant differences in the tonal ($t = 4.28$, $p < .001$) and neutral conditions ($t = 5.83$, $p < .001$). This shows that in the atonal condition participants were less deceitful than in the tonal and even neutral condition.

To test for mediation, regressing unethical behavior on the independent variable (the music conditions) and negative emotions showed a significant effect for the mediator negative emotions ($\beta = .29$, $p < .005$), and the effect of the independent variable became nonsignificant ($\beta = -.12$, $p = .31$; Baron & Kenny, 1986). A Sobel test (Sobel, 1982) showed that this reduction was

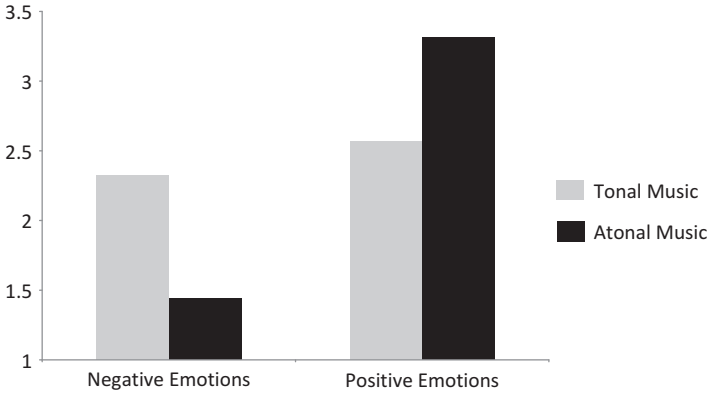

FIGURE 1 Positive and negative emotions in the tonal and atonal music conditions.

significant ($z = 1.97$, $p < .05$), suggesting that negative emotions mediate the relation between music and unethical behavior.

An ANOVA also showed a significant effect on personal music preferences, $F(2, 89) = 5.75$, $p = .001$. Participants indicated that the tonal music matched less with their personal music preferences than the atonal music ($M_{tonal} = 1.81$, $SD_{tonal} = 0.92$ and $M_{atonal} = 2.59$, $SD_{atonal} = 1.26$). An ANOVA showed a significant effect on the extent that participants felt positive about the picture content of the movie, $F(2, 133) = 13.43$, $p = .001$. Post hoc tests showed that even though the picture content was the same in every condition, participants felt it to be more pleasant and enjoyable in the neutral ($M = 3.30$, $SD = 0.97$) and atonal ($M = 3.31$, $SD = 0.76$) condition than in the tonal condition ($M = 2.53$, $SD = 0.74$). There was no significant difference in the extent that the participants felt aroused, $F(1, 89) = .01$, $p = .91$ ($M_{tonal} = 3.23$, $SD_{tonal} = 1.15$; $M_{atonal} = 3.20$, $SD_{atonal} = 1.32$), or excited, $F(2, 133) = 1.85$, $p = .16$ ($M_{neutral} = 2.29$, $SD_{neutral} = 1.23$; $M_{tonal} = 2.09$, $SD_{tonal} = 0.95$; $M_{atonal} = 2.52$, $SD_{atonal} = 1.05$).

DISCUSSION

How people are guided to human morality has been the subject of scholarly research for centuries. Here we examine how music can be a cue for moral behavior. What is right and wrong often is not strictly prescribed but rather a process of what is appropriate or inappropriate behavior. Like morality, music is closely related to affective reactions and may therefore also signal what is appropriate or not. Even though music has been accused by national leaders or religious groups of arousing indecent or unethical behavior, to date, it was unclear whether this was truly the case. We focused on the fundamental properties of music by distinguishing between tonal and atonal music as a way that music may encourage feeling good or bad and subsequent (subtle) unethical behavior by focusing on deception. Moreover, we focused on the role of negative affect as the intermediating process explaining this relationship. Music indeed could be shown to trigger unethical conduct, and more specifically tonal music. For our group of participants, that is, adolescents, tonal music arouses negative affect which led to increased deceitful conduct.[2]

We add to previous research by showing that music specifically arouses positive or negative emotions because of its tonal or atonal properties. In a sample of adolescents we could show that tonal music elicits more negative emotions than atonal music. Moreover, tonal music resulted in more unethical behavior as illustrated by participants being more deceitful toward other persons.

[2]As our sample of participants was assembled of adolescents who often aim to be different and therefore were expected to identify with and prefer atonal over tonal music we also examined how adults experience tonal and atonal music. Sixty participants (30 female, 30 male) participated in this study. Their ages varied between 22 and 63 years, with an average age of 40.65 years ($SD = 0.50$). The same materials are used as in the study presented here. An ANOVA showed a significant effect of music condition on the level of positive, $F(2, 57) = 90.80$, $p < .05$, and negative emotions, $F(2, 57) = 89.61$, $p = .001$. Participants felt more negative in the atonal ($M = 3.81$, $SD = 0.42$) than the tonal condition ($M = 1.78$, $SD = 0.49$). They also felt less positive in the atonal ($M = 1.99$, $SD = 0.31$) than tonal condition ($M = 3.84$, $SD = 0.49$). In sum, we showed that adults felt more negative and less positive toward atonal than tonal music. This finding adds to previous research which showed that tonal music will produce positive and atonal music negative emotions (Kellaris & Kent, 1991, 1993; Thompson & Robitaille, 1992) suggesting that music is closely linked to how we define ourselves.

Tonal music allowed for more negative emotions, which consistent with theorizing on emotions (Schwarz & Clore, 2003) and information processing (Förster & Dannenberg, 2010) resulted in a more local state of reasoning that focused participants' motivation on self-preservation and protecting own interests. Gaudine and Thorne (2001) also argued that negative emotions result in more introspection and resulted in reduced sensitivity to the existence of an ethical situation. Following moral intuition theory (Haidt, 2007) people's emotions were indeed predictive of ethical decisions resulting in participants engaging in deceitful behavior. Unfortunately, music we do not like or cannot relate to affects our subsequent behavior, which in the present research indeed was dishonest. As such, music may signal moral and immoral behavior through how feelings sound like.

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