KATHOLIEKE UNIVERSITEIT LEUVEN

FACULTEIT PSYCHOLOGIE EN
PEDAGOGISCHE WETENSCHAPPEN

Onderzoeksgroep Arbeids-, Organisatie- en
Personeelspsychologie

MUSIC IS WHAT FEELINGS SOUND LIKE

The role of tonal and atonal music in ethical behaviour

Master thesis presented to
obtain the degree of Master
in de Psychologie
By
Sandra Gilissen
promotor: Prof. Dr. J. Stouten

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Thesis

Previous research has described the concept of "bounded ethicality". According to these researchers, there are limitations on human ethical behaviour. These can arise from certain situational characteristics and environmental factors. Music may be one such environmental factor.

In this master thesis I will explore the role of tonal and atonal music in ethical behaviour. Tonal music sounds harmonious and atonal music sounds disharmonic. I will discuss the theoretical underpinnings of the possible role of tonal and atonal music in ethical behaviour. That is, I argue that music instills emotions in the listener. According to this hypothesis, participants will prefer music which reflects their own identity. When people are forced to listen to music which does not reflect their identity, they will add a negative meaning to this music, which in turn produces feelings of stress and irritation. This negative emotions are a reason why they behave in a less ethical way.

In this study, we can apply this hypothesis as follows: The average age of participants was 20 years. Previous research has shown that adolescents often feel different than anyone else. As such, the atonal music reflects their feelings of differentness, since atonal music is the outsider in the world of music. In the study, there was also a condition in which these young participants had to listen to tonal music. Because this music does not reflects their identity, they will add a negative meaning to this music, which in turn produces negative emotions. This negative emotions are a reason why they behave in a less ethical way. In addition to this application, we can also apply this hypothesis to the pretest: The results of the pretest suggest that participants had more negative feelings in the atonal condition. This can be explained by the fact that the average age of participants was 41 years. Previous research has shown that most adults feel like they are living an ordinary life. The tonal music is thus the music that reflects their identity the best, since most (ordinary) music is tonal. As such, they will add a negative meaning to atonal music. When they have to listen to atonal music, they will experience negative emotions.

Research and results

In order to explore the role of tonal and atonal music in ethical behaviour, we conducted two experimental studies: one pretest and one study. Results of the pretest confirm the first part of the hypothesis of music initiating emotions of the listener. Results of the study confirm the full hypothesis of music as reflecting and generating emotions of the listener.

Conclusion

In this master thesis, I explored the role of tonal and atonal music in ethical behaviour. I brought forward a hypothesis about this role, and there was found some evidence for this.

Acknowledgements

During the realization of this article I have been accompanied and supported by many people. It is now a great pleasure to take the opportunity to thank some of them.

In the first place, I like to thank Prof. Dr. Jeroen Stouten for his caring supervision, his enthusiastic involvement in this project and his supportive suggestions and comments. His experience and substantial help have been invaluable finishing this article. I learned a lot from him, as well as concerning scientific insights as working method.

I also like to thank Prof. Dr. Vera Hoorens, for permitting extensive use of the laboratory.

I like to thank Stijn Decoster, Loredana Trabucco and Anna Vanaerschot for their assistance with the conduction of the study. And, of course, I am very grateful to all the persons who participated in the study, especially to Lene Beelen, Evelien Moerenhout, Dieter Daniels and Henri Lugil.

Next, I like to thank my parents and my friends for their support and assistance during my whole study and especially during the realization of this article.

And last but not least, my special gratefulness for René Stas and André Gilissen, for reviewing this article.

As I already mentioned, in this master thesis, I will present an article which will be submitted to ‘Psychological Science’.

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Music is What Feelings Sound Like
The Role of Tonal and Atonal Music in Ethical Behaviour

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Abstract

Music is an important factor in our lives. Though there have been many previous studies about music, there is still a lot to discover about this subject. In this article, I will explore the role of tonal and atonal music in unethical behaviour. Results showed that although people's ethical behaviour should in essence be unrelated to context specific aspects, this research showed that music and specifically tonal music encouraged unethical behaviour.

Music is What Feelings Sound Like

The Role of Tonal and Atonal Music in Ethical Behaviour

Music is an important factor in our lives. One of the main reasons for this is that it is ever present. Not only is there background music in most public places like stores and waiting rooms, but most people nowadays own a portable music player so they can listen to music at anytime, anyplace. Music is also a very subtle factor and it is easily controlled by those who use it (Milliman, 1982). Thus, music may have a great influence on us while we are not aware of it. Though there have been many previous studies about music (e.g., Fischer & Greitemeyer, 2006; Greitemeyer, 2009; Guéguen, Jacob & Lamy, 2010; North, Tarrant & Hargreaves, 2004), there is still a lot to discover about this subject. For example, we do not know the effect of music on (un)ethical behaviour. This is important to know, let me illustrate this with an example. In almost every office is background music. Also, in almost every office are made ethical decisions, some with huge consequences. Think on the Lockheed-affair, these decisions were made in offices, probably with background music. Thus, if music has an influence on ethical behaviour, we should know this, because it can have major consequences.

This will be the subject of this article. I will explore the role of tonal and atonal music in unethical behaviour. In order to do so, I will first discuss the theoretical underpinnings of the possible role of tonal and atonal music in unethical behaviour. Next, I will describe a study and a pretest I conducted which provide some evidence for this theoretical framework.

Theoretical Underpinnings of the Possible Role of Tonal and Atonal Music in Unethical Behaviour

As I already stated above, music is an important factor in our lives. It is in our homes, cars, supermarkets, boutiques, department stores, health clubs, doctors' offices, elevators, our phones even play music when we are put on hold. We must recognize that there is simply no chance of avoiding music. This is the main reason why music is so important: it is ever present. Research has shown that the average person between thirteen and twenty-six listens two to three hours of music a day and that is a huge amount of the time we are awake (North, Hargreaves & O'Neill, 2000). In addition to

his overall presence, music is also a very subtle factor and it is easily controlled by those who use it. Music is employed in the background of production facilities, offices and retail stores to produce certain desired attitudes and behaviours among employees and/or customers. For example, background music is thought to improve store image, make employees happier, reduce employee turnover and stimulate customer purchasing (Milliman, 1982). Music drives our aspirations and motivates us to achieve our goals (e.g. music while running). For all these reasons, music may have a great influence on us while we are not aware of it.

The question of when do people deceive others is a subject that occupied many scholars since ancient times. Psychologists rediscovered the field of ethics in the latter part of the twentieth century (Gutting, 1994). People are not always rationally deciding on unethical conduct. This is argued by the concept of "bounded ethicality". Chugh et al. (2005) described bounded ethicality as a manifestation of Simon's (1983) concept of bounded rationality in ethical domains. Just as Simon describes a "behavioural model (in which) human rationality is very limited, very much bounded by the situation and by human computational powers" (1983, page 34), Chugh et al. (2005) described "bounded ethicality" as the bounded limitation of individuals that lead people to engage in ethically questionable behaviours that are inconsistent with their own preferred ethics (Tenbrunsel, Diekmann, Wade-Benzoni & Bazerman, 2009). These limitations on ethical behaviour can arise from certain situational characteristics such as social morals, cognitive and motivational patterns and environmental factors (Chugh, Bazerman & Banaji, 2005).

Music may be one such an environmental factor. There are various reasons for this, which I will describe below. A first reason why music can be expected to have an effect on unethical behaviour, is that previous research has shown that music has an effect on many other behaviours close to unethical behaviour. For example, Guéguen, Jacob and Lamy (2010) found in their experiment that women previously exposed to romantic music would easier accept a date with an average guy than women exposed to neutral music. In another experiment of the same authors it was found that male customers, but not female, exposed to romantic songs played in a flower shop spent more money than when no music was played or when non-romantic pop music was played (Guéguen, Jacob, & Lamy, 2010). Greitemeyer (2009) revealed that exposure to

prosocial songs (relative to neutral ones) increased prosocial thoughts, feelings and behaviour . Greitemeyer and Fischer (2006) also studied the impact of sexual-aggressive song lyrics on aggression-related thoughts, emotions and behaviour toward the same and the opposite sex. Here they concluded that male participants who heard misogynous songs administered more hot chili sauce to a female than to a male confederate. The male participants who heard misogynous songs also recalled more negative attributes of women and reported more feelings of vengeance than when they heard neutral songs. In addition, men-hating songs had a similar effect on aggression-related responses of female participants toward men. A second reason why music can have an effect on unethical behaviour, is that previous research has shown that music has a significant effect on emotions. North, Tarrant and Hargreaves (2004) found that music has a significant effect on behaviour very close to unethical behaviour through its effect on mood. They investigated the influence of music on helping behaviour. They indicated that music can be used to bring about manipulations of mood to influence the likelihood of an individual demonstrating instances of helping behaviour. Uplifting music led to participants offering more help in the high-cost task than did annoying music. Third, the influence of emotion on individuals' (un)ethical behaviour has been identified by numerous researchers (e.g., Etzioni, 1988; Gibbard, 1990; Piers, 1953; Solomon, 1976). Gaudine and Thorne (2001) suggested that positive affect (e.g., optimism, joy, happiness) may raise the requirements for satisficing, and result in deliberative judgments more consistent with ideal ethical norms and values. They also suggested that positive affect increases the likelihood that a person will be aware of an ethical situation. George and Brief (1992) found that individuals who felt positive emotions were more apt to help co-workers than individuals who did not feel these emotions. Hence, individuals who feel good like to do good, and the opposite is true for individuals who feel bad. Margalit (2002) discusses the impact of the emotions of humiliation and violence. These are, according to this researcher, meaning emotions that motivate unethical and unmoral behaviour that cause terrorism, suicide bombing, and wars. Gaudine and Thorne (2001) suggested that negative emotions such as anger, depression, fear and frustration may result in introspection and less sensitivity to the environment and less sensitivity to the existence of an ethical dilemma. Thus, the conclusion here is that previous research on the influence of emotions on individuals'

ethical behaviour suggest that negative emotions induce unethical behaviour. In sum, we can conclude that previous research has shown that (1) music has an effect on many other behaviours close to unethical behaviour (2) music has a significant effect on emotions and (3) emotions have an effect on unethical behaviour. Based on these findings, we expect that music has an effect on ethical behaviour.

In this article I will focus on the role of the tonality of music in unethical behaviour. In each piece of music, there is a certain relationship between the notes and between the chords that are used in the piece. This relationship is called tonality (Gistelinck, 1991). Previous research has shown that tonality is an important predictor of the affective response to music (Heinlein, 1928; Hevner, 1935).

More specific, I will explore the role of tonal and atonal music in unethical behaviour. Gistelinck (1991) provides us with a definition of these two. Each piece of tonal music is based on a musical scale. In each musical scale, there is one note in a central position. This is called the tonic. All other notes and chords are in a fixed relationship with this tonic. Thus in tonal music, there are rules about the place of a note or chord. Due to these rules, tonal music sounds harmonious. Atonal music is not based on a musical scale. As a consequence, there are no rules about the place of a note or chord. Due to this, atonal music sounds disharmonic.

There has been some previous research on the influence of tonal and atonal music on emotions. This research has shown that tonal music is associated with happiness, boredom and peacefulness, while atonal music is associated with anger (Thompson & Robitaille, 1992). Kellaris and Kent (1991) found that tonal music was evaluated as relaxing while atonal music was perceived as stimulating. In another study, it was found that tonality affected pleasure. Participants indicated tonal music as more pleasurable than atonal music (Smith & Witt, 1989). Gfeller and Coffman (1991) found that trained musicians had a more positive evaluative response to atonal music than naïve listeners. However, Kellaris and Kent (1991) found that the effects of tonality are not always that clear. According to them, atonal music is not always inducing negative emotions. They assume that the originality of the music is an important factor here.

There seems to be a gap in literature when it comes to research about the direct role of tonal and atonal music in unethical behaviour. Therefore, I will discuss the theoretical underpinnings of the possible role of tonal and atonal music in unethical

behaviour in this article. First, I will provide a general theoretical framework about the possible role of music in general in unethical behaviour. Next, I will specify this to tonal and atonal music.

I argue that music instills emotions in the listener. This happens as follows. According to Hall and Du Gay (1996), individuals prefer music which reflects who they are, their identity. When individuals are forced to listen to music which does not reflect their identity, they will add a negative meaning to this music, which in turn produces feelings of stress and irritation (Hoondert, 2010). As I already stated above, this negative emotions are a reason why people might behave in an unethical way (Margalit, 2002; Gaudine and Thorne, 2001).

Now I can apply this general theoretical framework to the possible role of tonal and atonal music in unethical behaviour. In the study I focus on adolescents. Previous research (Elkind & Weiner, 1978; Pipher, 2002; Center Seltzer, 1989) has shown that adolescents often want to feel different. Since atonal music is different in relation to more harmonic music (Gistelinck, 1991), we can assume that this music will reflect the feelings of the participants the best. In this study, there was also a condition in which these young participants had to listen to tonal music, which is assumed to not reflect their identity. Because individuals prefer music which reflects their own identity (Hall & Du gay, 1996) and add a negative meaning to music which does not (Hoondert, 2010), they will add a negative meaning to the tonal music, which in turn produces negative emotions. This negative emotions are a reason why they behave in a less ethical way when they have to listen to tonal music.

Next I will consider the study and the pretest I conducted which provide some evidence for this theoretical framework.

Pretest

In the pretest, I verified if the materials that would be used in the study had the desired effects. This materials included three short movies with the same picture content but different background music, depending on the condition. The results of this pretest should show that the music condition has a significant effect on the level of positive and negative emotions that the participants experience. And the picture content of all the movies should be rated as emotional neutral.

Method

Participants. Twenty participants (30 female, 30 male) participated in this pretest. Their ages varied between 22 and 63 years, with an average age of 40.65 years (*SD* = 0.50).

Materials. The manipulation in the study will be the type of music that the participants hear: tonal, atonal or no music (control condition). This music is in each condition presented as background music in a short movie. In this way I can expose the participants to the music while they are not aware that the manipulation is in fact the music they hear and not the movie they see. This in order to avoid socially desirable reactions.

The picture content of the three movies was the same. It showed a documentary about the ancient Egypt. The duration was also the same (1.22 min).

The background music was different in each condition. In the control condition I used no background music. Previous research showed that even speech can generate some emotions (De Brouwer & Rijcken, 2001). To be sure that this condition would be neutral, I decided to use no sound in the background. In the tonal condition, I used Piano Sonata in A Minor from Schubert, D784, op. 143, movement: allegro giusto. This piece is already been used in previous research as an example of tonal music (Demarré, 2004). In the atonal condition, I used a piece from Frank Zappa: The adventures of Greggery Peccary: movement III, from the album 'Wazoo'. The questionnaire the participants filled out after each short movie contained five items assessing participants' feelings toward the music and the picture content of the movies. Two of them were ratings of the agreeableness of picture content and music, rating from 'very unpleasant' to 'very pleasant'. One question asked if the music matched their personal preferences, with a rating from 'certainly not' to 'certainly well'. The fourth item measured to which degree they felt certain emotions to the music, with ratings from 'certainly not' to 'certainly well'. And the last question asked to which degree they agreed with statements considering morality, here was also a rating from 'certainly not' to 'certainly well'.

Procedure. Here, a within subject design was used. Each participant saw the three short movies which would be used in the study. Each in a different order. After

each movie they filled out a questionnaire about their emotions towards the picture content and the background music in the movies.

Results and Discussion

An ANOVA showed a significant effect of music condition on the level of positive F (2, 57) = 90.80, $p < 0.05$ and negative emotions F (2, 57) = 89.61, $p = 0.00$ that the participants experienced. Figure 1 shows that participants in the atonal condition indicated to feel more negative emotions (M = 3.81; SD = 0.42) than positive emotions (M = 1.99; SD = 0.31). In the tonal condition it was the other way around: they felt more positive emotions (M = 3.84; SD = 0.49) than negative ones (M = 1.78; SD = 0.49). There are no data for the neutral condition because participants heard no music here.

This result can be explained by our hypothesis. The average age of participants was 41 years. Previous research (Atchley,1989; Damon & Hart, 1982) has shown that most adults feel like they are living an ordinary life. Since most (ordinary) music is tonal (Gistelinck, 1991), we can assume that this music reflects their identity the best. In the pretest, this adults also had to listen to atonal music, which is assumed to not reflect their identity. Because individuals prefer music which reflects their own identity (Hall & Du gay, 1996) and add a negative meaning to music which does not (Hoondert, 2010), they will add a negative meaning to this atonal music. This will result in the fact that they experience more negative emotions when they listen to atonal music.

Another ANOVA showed that the picture content in the movies had no significant effect on emotions that the participants experienced F (2, 57) = 0.31 p = 0.74. The mean score on the relevant question was almost the same for all conditions: ($M_{neutral}$ = 3.35; $SD_{neutral}$ = 0.75, M_{tonal} = 3.25; SD_{tonal} = 0.79, M_{atonal} = 3.15; SD_{atonal} = 0.87).

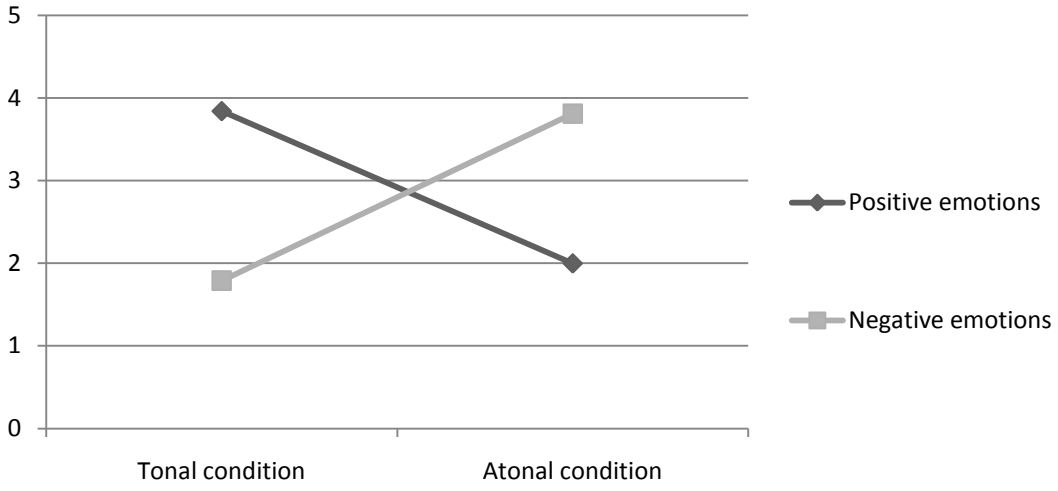

Figure 1. Results from Pretest. Mean difference in score on positive and negative emotions in the tonal and atonal condition.

Study

In the study, I examined the role of tonal and atonal music in unethical behaviour.

Method

Participants. One hundred thirty-six Dutch-speaking Belgian undergraduate students (48 female, 88 male) participated in the study. Some of them in exchange for partial course credit. Participants were randomly assigned to one of three conditions: tonal music, atonal music or a control condition with no music. The average age of participants was 20 years (*SD* = 4.213).

Materials. The questionnaire about leadership styles contained 9 statements about leadership. Participants had to rate to which degree they agreed with these statements from 'strongly agree' to ' strongly disagree'. This questionnaire was part of the cover story. The movies that were used in this study are already described above in the materials from the pretest. The level of unethical behaviour was measured through a task in which the participants engaged in a raffle and had to divide lottery tickets between themselves and another participant. In this task they were given the opportunity to deceive the other person. Measurement of the deception was a proxy for unethical behaviour in turns of the amount of tickets they kept for themselves. Participants received an envelope with 12 lottery tickets. 5 with an even number and 7 with an uneven number. The envelope also contained a note with the value of the two kinds of

lottery tickets: the even numbers were worth 1 movie ticket, the uneven numbers were worth 2 movie tickets. At the end of the study, the participants had to fill out a general questionnaire which contained questions about trust, ethics, prosocial behaviour and their feelings. There were 13 items. The first four asked to which degree they agreed with statements considering trust, morality, prosocial behaviour and ethics. Here was a rating from 'certainly not' to 'certainly well'. One question asked if the music matched their personal preferences, with a rating from 'certainly not' to 'certainly well'. The next item measured to which degree they felt certain emotions to the music, with ratings from 'certainly not' to 'certainly well'. And the last seven items were ratings of the agreeableness of picture content and music, rating from 'very unpleasant' to 'very pleasant'.

Procedure. A between subjects design was used. I based this procedure on a procedure that was used by Batson et all. (Batson, Collins & Powell, 2006). Each session lasted about half an hour. We randomly assigned conditions to sessions. Between 2 and 10 participants were included in each session. The laboratory was divided into one big room, where the participants were welcomed and a couple of smaller rooms, where they conducted the test. In the smaller rooms, the participants where alone and they could not communicate with each other. The interaction between them before the start of the experiment was limited to a greeting.

Upon arrival at the laboratory, the participants were welcomed and they were told that this was an experiment about leadership styles. We used this cover story to avoid socially desirable reactions to the music and to make the participants feel like they are a leader in order to measure their level of ethical leadership at the end of the experiment.

Next, the participants were seated in a small room. They received instructions to fill out a questionnaire about leadership styles. This questionnaire was part of the cover story. After finishing, the experimenter told them that they could watch a movie while she went to evaluated their answers on the questionnaire in order to select the participants who could be the leader in the next task. The background music in this movie was the manipulation in the study. As stated in the material description, the background music 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 (the manipulation check shows that only a few participants were aware of the fact that the music was the manipulation in the study). This was necessary to avoid socially desirable reactions to the music.

Next, their level of unethical behaviour was measured. The experimenter told each of the participants that his or her answers on the questionnaire about leadership styles were great. Because his/her leadership style met certain requirements, he or she had been selected to perform a special, secret task. He/she had to divide the reward that the participants would obtain for their participation in the study as honest as possible. This reward consisted of some lottery tickets which gave them the change to engage in a raffle. The prizes in this raffle were movie tickets. Participants received an envelope with 12 lottery tickets. 5 with an even number and 7 with an uneven number. The envelope also contained a note with the value of the two kinds of lottery tickets: the even numbers were worth 1 movie ticket, the uneven numbers were worth 2 movie tickets. After handing out the envelope, the experimenter went back to her desk and did not check if the participants followed her instructions. The participants stayed in their small room and 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 it and handed it in to the experimenter who would give it to the other participant as soon as he would have finished the experiment.

Finally, participants had to fill out a general questionnaire which contained questions about trust, ethics, prosocial behaviour and their feelings. Debriefing took place after all sessions had been run.

Results and Discussion

An ANOVA revealed a significant effect of music condition on the level of positive $F(1,89) = 19.88$, $p = 0.00$ and negative emotions $F(1, 89) = 31.90$, $p = 0.00$ that the participants experienced. The participants obtained a higher score on negative emotions in the tonal condition than in the atonal condition. ($M_{negtonal} = 2.32$; $SD_{negtonal} = 0.91$; $M_{negatonal} = 1.44$; $SD_{negatonal} = 0.48$) and a higher score on positive emotions in the atonal condition than in the tonal condition ($M_{postonal} = 2.57$; $SD_{postonal} = 0.79$; $M_{posatonal} = 3.31$; $SD_{postonal} = 0.79$)

There are no data for the neutral condition because participants heard no music in this one. These results are shown in figure 2.

This result confirms the hypothesis that participants experienced more negative emotions when they had to listen to music which does not reflect their identity. In order to test whether tonal or atonal music differed in terms of music preferences for participants, an ANOVA was used. Results showed a significant link between condition and personal music preferences $F(2, 89) = 5.75$, $p = 0.00$. The 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 $M_{atonal} = 2.59$, $SD_{atonal} = 1.26$). This is shown in figure 3. Next, an ANOVA was used to examine the effect of emotions on (un)ethical behaviour. Results showed a significant effect of music on the amount of lottery tickets the participants kept for themselves, $F(2, 133) = 4.69$, $p = 0.01$. A post-hoc LSD test showed they kept significant more lottery tickets for themselves in the tonal condition ($M = 2.96$, $SD = 1.53$) than in the neutral ($M = 3.16$, $SD = 1.33$ or atonal condition ($M = 2.27$, $SD = 1.40$). There was no significant difference between the latter two. These results are shown in figure 4. They suggests that the participants behaved in a less ethical way in the condition with tonal music than in the condition with atonal or no music.

Furthermore, if the effect of music drives participants unethical behaviour through the experience of negative emotions mediation was tested. A multiple mediation analyse was used. Results show that negative emotions mediate the relationship between condition and non-ethical behaviour on the 0.10 level. Remark that this also explains why the mean score on negative emotions was lower than the mean score on positive emotions in both conditions.

In the debriefing, most participants were very surprised when it was revealed that the manipulation of the experiment was actually the background music in the short movie.

Results from the study can be found in figures 2, 3 and 4.

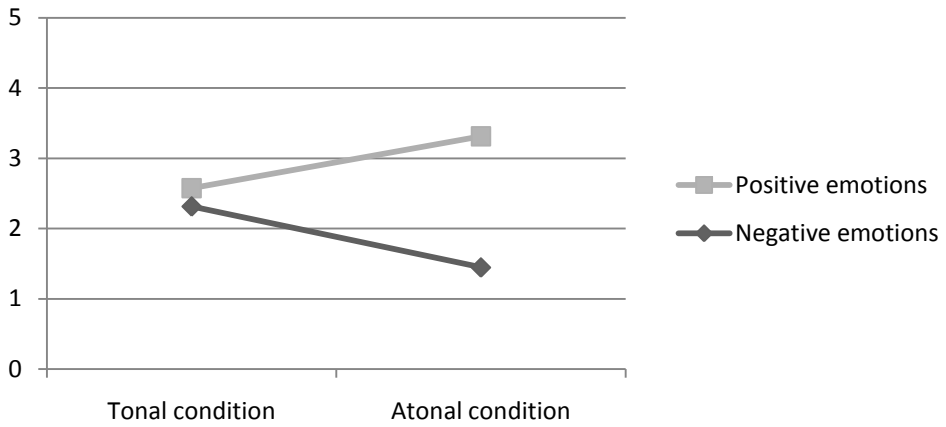

Figure 2. Results from Study. Mean difference in score on positive and negative emotions in the tonal and atonal condition.

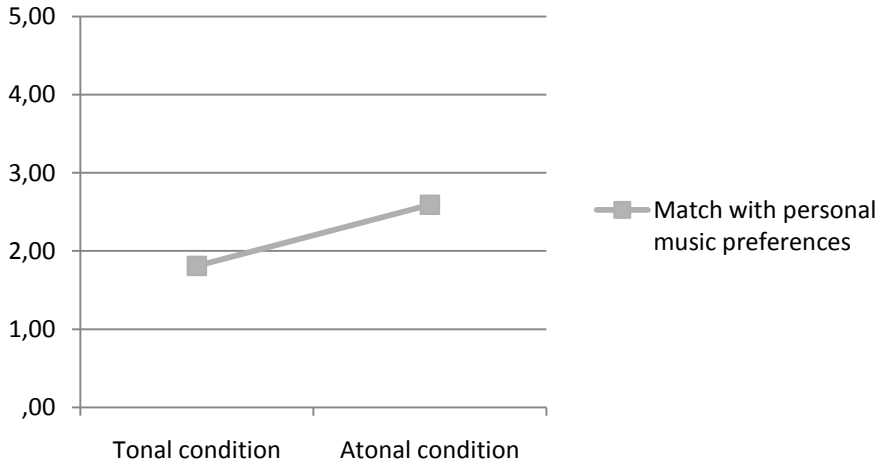

Figure 3. Results from Study. Mean difference in score on match between personal music preferences and music in the tonal and atonal condition.

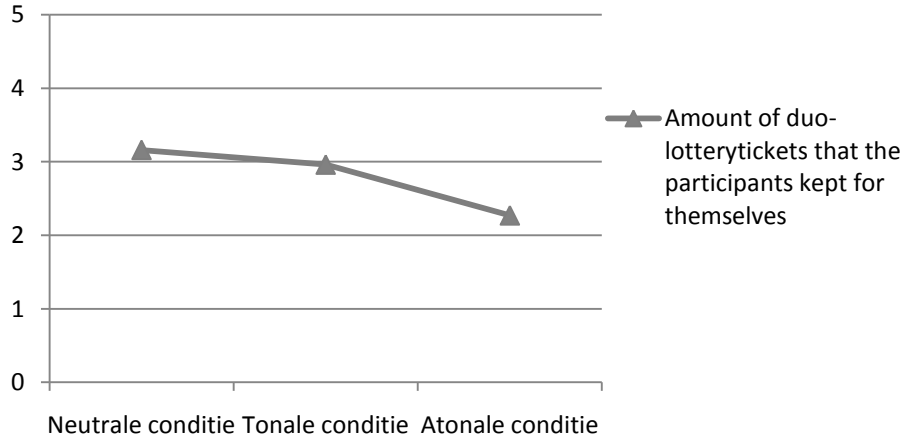

Figure 4. Results from Study. Mean difference in amount of duo-lotterytickets that the participants kept for themselves in the neutral tonal and atonal condition. This was a proxy for unethical behaviour.

General Discussion

Even though people's ethical behaviour should in essence be unrelated to context specific aspects, this research showed that music and specifically tonal music encouraged unethical behaviour.

Results of the study suggest that that individuals prefer music which reflects their identity. When they have to listen to music which does not reflect their identity, they add a negative meaning to this music, which in turn produces feelings of stress and irritation. These negative feelings are a reason why they behave unethical. For example, like in this study, by keeping more duo-lottery-tickets or themselves.

In the study, the average age of participants was 20 years. These adolescents preferred atonal music to tonal music. In the pretest, the average age of participants was 41 years. These adults preferred tonal music to atonal music. As the adolescents in the study preferred atonal music because it reflects their feelings of differentness, adults prefer tonal music since it reflects their feeling of living an ordinary life. Thus, they like the music which reflects their identity. When the adolescents had to listen to tonal music, they experienced more negative emotions, while the adults experienced more negative emotions in the atonal condition. These results support the assumption that listening to music which does not reflect the identity of the listener induces negative emotions. In addition to this, in the study was found that participants in the tonal condition behaved in a less ethical way by keeping more duo-lottery-tickets for themselves. A mediation analysis showed a link between negative emotions and this unethical behaviour. Thus, we can assume that the negative emotions these participants experienced where a reason for this unethical behaviour.

This study has theoretical and societal implications. First of all, this study adds to the literature. There has been some previous research on the influence of tonal and atonal music on emotions (Thompson & Robitaille, 1992; Kellaris & Kent, 1991; Kellaris & Kent, 1993). And the influence of emotion on individuals' ethical behaviour has been identified by numerous researchers (e.g., Etzioni, 1988; Gibbard, 1990; Piers, 1953; Solomon, 1976; Gaudine & Thorne, 2001; George and Brief, 1992; Margalit, 2002). But there is little or no previous research about the direct role of tonal and atonal music in ethical behaviour. Nevertheless, this is an interesting research topic. As already stated above, previous research has suggested a link between tonality and emotions and

between emotions and unethical behaviour. Investigation of the link between tonality and unethical behaviour (through emotions) will connect these concepts and will make this reasoning complete.

Second, many classical theories about the influence of tonal and atonal music on emotions rest on the assumption that tonal music produces more positive emotions in people and atonal music produces more negative emotions (Thompson & Robitaille, 1992; Kellaris & Kent, 1991; Kellaris & Kent, 1993). But this is only true for adults. This study shows that for adolescents, the opposite could be true. Results suggest that adolescent feel more positive emotions while listening to atonal music and more negative emotions with tonal music.

As a third, these results also have broader societal implications. For example, publicity agencies cannot assume that tonal music will systematically produce positive feelings in every person. If adolescents experience negative feelings while listening to tonal music, advertisements which aim at this target population, may better use atonal background music. This knowledge can also be useful in work contexts. The tonal background music in the workplace may instill positive emotions in the older employees while it does the opposite to the younger employees. The experience of positive or negative emotions in turn, can have major effects for job satisfaction, employee turnover (Milliman, 1982) and, as the results of this study show, for ethical behaviour. Since there is background music in almost every workplace, this can be a very influencing factor while employees are not aware of it.

At least, these findings also carry important implications for the field of music therapy, especially for the therapists who use the behavioural approach in which music is used as a stimulant, a relaxant or a reward (Wigram, Nygaard & Ole Bonde, 2002). One cannot assume that hearing tonal music will always be a reward for every person. If tonal music produces negative emotions in adolescents, it is more a punishment than a reward for them. This knowledge could elevate the success rate of music therapy for adolescents. It is possible that a part of the adolescents for whom music therapy does not work simply gets the wrong music as a reward.

A number of potential study limitations should be noted. A first limitation is the use of different age categories in the pretest and the study. If the pretest was also conducted with adolescents, the reactions to the music in the pretest would have been

better predictors for the reactions to the music in the study. However, this use of different age categories provided a good comparision between the reactions of adults and the reactions of adolescents to exact the same music. In this way, it makes the results of this study stronger since differences in reactions can not be owed due to differences in the music. Second, previous research (Randall & Fernandes, 1991) shows that people often show socially desirable reactions in study's about (un)ethical behaviour. It is possible that this also happened in this study. For example, the fact that the mean score on negative emotions was lower than the mean score on positive emotions in both conditions can be due to socially desirable answers: it is difficult to display negative emotions (Zeman & Garber, 2008). However, I minimized this effect by using a cover story. Since most participants were surprised when they heard that the manipulation in the study was actually the music, I can assume that there was a minimal effect of socially desirable reactions in this study. Third, it is possible that other variables mediate the relationship between tonal and atonal music and unethical behaviour. It was not technically or conceptually feasible to use an exhaustive list of possible (emotional)reactions to tonal and atonal music. The purpose of this study was to explore the role of tonal and atonal music in ethical behaviour. That goal was accomplished.

I hope this study will bring attention to the impact that music can have on us, especially on our ethical behaviour. It is my intention that this study serve as a springboard for additional empirical research into the influence of music on our thoughts and behaviour. Some future research directions include research into other aspects of music (e.g. tempo, rhythm, pitch, etc.) that can influence (un)ethical behaviour. It is also possible to examine this subject across cultures. Music is present in all cultures, but norms about how music is perceived differ across cultures (Brittin, 1996). It would be interesting to examine if the effect that was found in this study also applies to, for example, African or Asian people.

In sum, this study revealed that music and specifically tonal music encouraged unethical behaviour. An underlying reason for this can be that music which does not reflect the identity of the listener induces negative emotions, which in their turn induce unethical behaviour. It is clear that music can have a great impact on us, and it is important to be aware of this fact. Since there is still a lot to discover about this subject,

there are numerous possible applications of music to improve the quality of our life. For example, if music can influence our emotions and ethical behaviour, it is possible that it can be used to treat mental issues.

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