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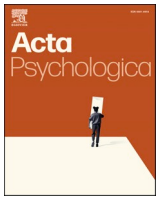

Understanding how the presence of music in advertisements influences consumer behaviour

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ABSTRACT

This study investigated how consumer behaviour is influenced by music's emotional valence (sad vs. happy) in advertisements. Female participants ($N = 134$) watched the same four advertisements with either happy or sad background music. The advertisements were split into two advertising breaks which were embedded in a television programme. Participants were tested on their recognition and recall of the advertised material, as well as their intentions to buy the advertised products. As predicted, the results revealed that brand recognition was higher with sad background music in the advertisements, while buying intention was higher when the advertisements were paired with happy background music. Although overall advertisement free recall was found to be better for sad than happy music, musical valence was not found to affect product recall. The findings are discussed in terms of the power of emotions and the possible effects of brand attitudes and music congruity. Limitations and suggestions for future research are presented.

The impact of advertisements on consumer behaviour has been widely investigated. Researchers have examined how buying intentions and memory for advertised material is influenced by fear-inducing, humorous or sexual content (e.g., Krishen & Bui, 2015; Sparks & Lang, 2015; Wong et al., 2019). However, an element that has been somewhat overlooked is music (Allan, 2006, 2007a, b). Relatively little research on music in advertisements has been conducted in the last decade, despite a dramatic increase in its use over recent years (Abolhasani et al., 2017; Gilliland, 2018) though there is evidence of a growing interest (Anglada-Tort et al., 2022; Breves et al., 2020; Maroely & Munichor, 2023; Raja et al., 2023). There are however recent important reviews on such things as the effect of music on information processing and retention (de la Mora Velasco et al., 2023) as well as reactions to particular settings (Trompeta et al., 2022).

The role of music in advertising is complex. To some extent it has been used to induce a mood and various associations with people, place and time (Furnham & Milner, 2013). It has been well established that mood effects information processing style (Fiedler, 2002). Thus the impact of mood on cognitive processing styles suggest that when in a positive mood, people use a heuristic processing style, while negative moods provides information that something is troublesome and dangerous and as a consequence, people begin to use a systematic processing style. The idea is that moods prime emotions which effect various aspects of information processing, including memory and desire to act.

Inevitably, researchers have concentrated on happy and sad moods induced by appropriate music though it is clear that not all music induces the same emotions in people. Music can be classified in many ways: fast vs slow, familiar vs unfamiliar, loud vs soft, vocal vs instrumental and each factor can have an influence on the resultant mood of the listener. Further, the same music can evoke different emotional and cognitive states in individuals based on their knowledge or experience. This perhaps suggests why results in this area are equivocal and that, at least from an advertisers perspective, the same music might have different effects like an increase in recall, but a decrease in the desire to purchase the product.

Music has also been used to attempt to "fix" various associations such that when a person hears a particular piece of music they think of a particular branded product and may be induced to purchase it (Anglada-Tort et al., 2022; Galan, 2009).

There are some "classic" studies and reviews in this area such as that of Gorn (1982), Bruner (1990) as well as Bless et al. (1990). Bruner (1990) suggested that there were nine types of music that influenced emotion including serene, majestic and frightening. Some of the results

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from early studies such as that of Bless et al. (1990) were initially seen as counter-intuitive by suggesting that good moods lowered, and sad moods heightened, memory because of the cognitive processes (top down vs. bottom up; central vs. peripheral route). However, all researchers note the complexity of the issue in that a number of factors influence recall and memory more generally.

Most of the applied research in marketing conducted in this area suggests that music can manipulate consumers' impression of the brand, increase their buying intentions, and improve memory for advertisements (Apaolaza-Ibáñez et al., 2010; Cuesta et al., 2018). However, there has been controversy over what kind of emotions evoked by music are most appropriate for generating particular consumer behaviours. While some studies have found that consumers' behaviour is more effectively impacted by music that evokes positive emotions (e.g., Broekemier et al., 2008; Vaccaro et al., 2011), others have found this effect with music evoking negative emotions (e.g., Alpert & Alpert, 1990). In this study we consider how consumer behaviour is affected by both positive and negative emotions elicited by music in the context of television advertisements. We concentrated on three specific outcomes: brand recognition, free recall and intention to buy. We hope to resolve some of the inconsistencies in this literature.

1. Music in advertisements

Music's increasing use in advertisements comes from its ability to manipulate commercial messages and shape consumer behaviour by eliciting memories and generating emotion (Alpert & Alpert, 1990; Graakjær, 2014). Moreover, Apaolaza-Ibáñez et al. (2010) suggested that music can be also used to create associative connections with brands: a particular piece of music is always associated with a particular brand or product.

Researchers have attributed these effects to the powerful connection between music and emotions (Bruini & Chalmers, 2009; Winkler et al., 2009). Music has been found to cause both direct and indirect reactions in individuals, which affect engagement, concentration, and memory of the brand (Vermeulen & Beukeboom, 2016). Direct reactions are reflex (automatic) reactions that induce an emotion when the listener experiences musical excitement (Arteaga, 2009). People perceive specific acoustic characteristics of music (especially sudden, loud or rapid tunes) as an important or urgent event that needs to be signalled, consequently producing arousal and the use of specific information-processing strategies (Juslin & Västfjäll, 2008). In contrast, indirect reactions are the mental portrayal of musical emotion, such as whether the listener exhibits feelings of sadness, happiness, anger etc., when listening to the tune (Arteaga, 2009). Most of the work in advertising is about indirect effects where music is used to induce or alter emotional states which then influence cognitive processing.

A potential neural basis for the manifestation of these reactions was outlined by Levitin (2007). He observed that listening to music that is perceived as pleasant leads to an increased release of endorphins (dopamine and adrenaline) and oxytocin in the brain, stimulating brain activity similar to sexual arousal or drug consumption. These hormones are known to reduce stress and induce positive feelings, as well as cause bodily reactions such as exudation or sexual arousal (Zander et al., 2010).

Music is not only a means to evoke emotions but also a powerful memory stimulator (Gabrielsson, 2001; Graakjær, 2014). Hearing a certain song can remind individuals of specific events, places or people, with recent findings showing that this also stands for brands (e.g., Belfi et al., 2015). For example, North, Hargreaves, et al. (2004), found that clearly defining a brand through music makes it 96 % easier to remember than brands that do not use sound at all in their advertisements.

However, music's effect on memory is believed to also be connected to emotions (Bolls et al., 2001; Bradley et al., 2007; Lee & Burns, 2014; Nineuil et al., 2020). In addition, Bakalash and Riemer (2013) claimed that the strength and type of emotions transmitted through an advertisement are also important for advertisement memory.

2. Music and brand attitudes

The emotions elicited by music have been found to not only impact the consumers' memory for advertisements, but also their attitudes towards certain brands. Brand attitudes can be generated by different indirect experiences such as the name of the brand, past experiences and advertising elements such as brand messages or storylines (Anand & Sternthal, 1990; Suh & Youjae, 2006).

Music can generate *both* positive and negative emotions and associative memories (Oakes, 2007). For instance, Hoeberichts (2012) suggests that individuals perceive music with a quicker tempo and smooth rhythm as happy, and melodies with low pitch and slower tempo as sad. Stewart and Koh (2017) suggested that music with quicker tempo was indeed perceived and experienced as happy, leading to more positive brand attitudes. In contrast, music with a slower tempo increased participants' feeling of sadness, generating less favourable attitudes towards the brand. Thus, it may be that more positive brand attitudes are created by music with positive emotional valences, while better memory for advertisements establishes through music with negative emotional valences. The present study aims to investigate consumers' purchase intentions and their memory for the brand, after they have watched advertisements with either positive or negative emotional valences. This was an experimental study with ecological validity. Further, whilst we believe the measures of recall and recognition would be closely related we believe the measure of purchase intention is quite different.

3. Music congruity

Given that brands seek ultimately to maximise their profits, an ideal marketing campaign would create positive brand attitudes, as well as powerful brand recognition and memorability, without having to sacrifice one at the expense of the other. Congruity (also known as musical fit) has been proposed as a possible solution.

According to Oakes (2007), music that consumers find fitting for the advertisement's content leads to the development of positive emotions towards the commercial and the brand. If the advertisement has sad content (e.g., advertisements for dog adoption, charity donations etc.) and uses a sad musical background, consumers are more likely to develop positive attitudes towards it than if it were to use a happy musical background. Zander (2006) proposed that music congruity improves consumers' behaviour because it reinforces “their conviction about the commercial's content” (p. 467). This notion has been supported by a number of studies (e.g., Ballouli & Hutchinson, 2013; North, MacKenzie, et al., 2004). The present study largely focuses on the role of emotions on consumer behaviour, but the findings on music congruity have been noted. Hence, advertisements that seemed to be fitting for both happy and sad music have been chosen for his experiment, in the hopes of establishing congruity between the advertisements and their background music regardless of the music's emotional valence.

4. Happy and sad music

There is an interesting literature on musical preferences and personality (Chamorro-Premuzic et al., 2010, 2009; Chamorro-Premuzic & Furnham, 2007). They demonstrated that people use music for various purposes such as emotional regulation, distraction and impression management. Hence it has been shown to be related to personality factors. It suggests that naturally people might not react in the same way to the same music.

Music can elicit a wide range of emotions, from happiness, euphoria and calm to fear, aggression and sadness (Liebetrau et al., 2012). Sparshott (1994) argued that listeners have no difficulty in distinguishing between melodies with contrasting moods (e.g., sad vs.

happy) and placing them in their respective category. On the other hand, there is variability in what some individuals would classify as happy and sad based on such things as personal associations: that is music which has the many associations of happiness may be classified by some people as sad for them, though these instances may be relatively rare. That is, particular music may have powerful unique associations for individuals based on their personal experience.

Whilst there appears to be inter-judge reliability in the classification of music as happy or sad, the effect is inevitably nuanced in the sense that there are different forms of both happiness and sadness. Indeed, some people seek out and enjoy what they and others consider sad music for a variety of reasons such as inducing nostalgia, recalling past events and becoming more introspective (Vuoskoski et al., 2011).

The research that has been conducted on the sad vs. happy affective component of music in the marketing sector has generated mixed results. One of the pioneers in this research area was Gardner (1985), who suggested that consumers who listened to music with a positive emotional valence (happy) should exhibit a more positive mood, which in turn should lead to increased shopping intentions and more favourable attitudes towards the brands. Alpert and Alpert (1990) argued that it was the structure of the music (based on harmony, tempo, dynamics, and rhythm) more than its emotional associations that was related to purchase intentions. Further they found that sad music was more effective in influencing purchase intent than was happy music and silence. They noted "Different profiles of musical structural elements of modality, tempo, dynamics and rhythm, may, all things being equal, lead to a perception of happy or sad musical content. In this study, equally liked musical backgrounds that differed in their profile of these structural elements were shown to affect audience moods in directions predictable from analysis of the musical structure, across a set of simulated greeting card advertisements. This finding has direct relevance to those interested in the impact on mood from factors such as the structural elements in background music"(p. 126–127).

Later, Alpert et al. (2005) provided empirical support for the notion that when music is used to evoke emotions congruent with the symbolic meaning of product purchase, the likelihood of purchasing is enhanced.

Also, more recent studies on the impact of emotions on consumer behaviour have generally supported Gardner (e.g., Broekemier et al., 2008; Vaccaro et al., 2011). Although the studies of Broekemier et al. (2008) and Vaccaro et al. (2011) did not involve advertisements, they suggest that the emotional valences of music can have a substantial impact on consumer behaviour.In the Broekemier et al. (2008) study participants viewed videotapes of an unfamiliar store and were exposed to one of several musical treatments while viewing and were asked to speak their thoughts about the store aloud. They found shopping intentions were greatest when subjects were exposed to happy music that was liked. Vocarro et al. (2011) surveyed shoppers in a mall and found that they were more likely to buy a snack in a store under slow tempo music conditions than under fast tempo music conditions.

There are at least two reasons for some equivocal findings in this area. The first is the wide variety of dependent variables including recognition, free and cued recall, product attitudes and intention to buy, which have yielded different results. The second is how the stimuli are presented: i.e., through a classic television presentation or a more laboratory based study. In this study we chose to have three dependent variables (free and cued recall, and intention to buy) in a ecologically valid setting used before to study memory (Lawrence et al., 2021).

5. The current study

This study explored consumer behaviour through the use of television advertisements, as television is still considered to be the most effective advertising medium (Delauro, 2020). We investigated the effect of happy or sad music playing in the same television advertisements on buying intention and memory for the brand. Our hypotheses are based on the previous, but inconsistent, literature, particularly the ideas from mood and information processing. Indeed, our hypotheses suggest that happy and sad music can have opposite effects from an advertising perspective, which has not hitherto been pointed out.

The following hypotheses were be tested:

H1. Participants in the happy music condition would be more inclined to buy the advertised products compared to participants in the sad music condition.

H2. Participants in the sad music condition would show better recall and recognition of the brand than participants in the happy music condition.

6. Method

6.1. Participants

An a priori analysis with G*Power 3.1 (Faul et al., 2007) revealed that a sample of 128 participants would produce adequate power (0.80) to detect medium sized ($f = 0.25$; Cohen, 1988) main effects and interaction. Using opportunity sampling, 134 female participants completed the experiment. We focused on female products. Their ages ranged from 18 years to 48 years ($M = 21.24$ years, $SD = 4.35$ years). Participants described themselves as European (62.69 %), East Asian (32.10 %), South Asian (3.73 %) and Other (1.50 %).

6.2. Materials

6.2.1. Advertisements and TV programme

This study used a ten-minute clip from a MasterChef Canada episode (MasterChef World, 2020). The extract covered the auditions for two women contestants and was selected because of the focus on female participants within the study. Two advertisements breaks were embedded in the programme, two and seven minutes into the episode. There were four advertisements in total, which were split into two blocks to fit the advertising breaks. Each advertisement was 30 s long. The advertised brands were Copia (Fairooz Imaging, 2015), Everlane (Everlane, 2020), Perfect Diary (ICTUS Audio, 2020) and Wildthings (Morozov, 2019). The brands targeted female audiences and depicted women advertising the following products: swimsuits (Copia), leggings (Everlane), lipstick (Perfect Diary), and jewelry (Wildthings). The products were chosen on the basis of Hoeberichts' (2012) finding that music has the strongest impact on consumer behaviour when there is "low cognitive involvement and high affective involvement" (p. 40). The advertisements of Everlane and Wildthings were paired together for one of the advertisement blocks, while Copia and Perfect Diary were paired together for the other block. The order in which they were shown to participants was counterbalanced; thus, half the participants saw the advertisements for Everlane and Wildthings first and Copia and Perfect Diary second, and the remainder in the reverse order.

6.2.2. Music

Four happy and four sad melodies were chosen as backgrounds for the advertisements. The melodies were selected through an a priori study, from a choice of sixteen (eight sad melodies and eight happy melodies). For stylistic uniformity, the sixteen melodies were all Preludes from Book 1 of the Well-Tempered Clavier by J. S. Bach (1997). The choice derived from Hevner (1937) findings, who observed that in general, people judge melodies in minor keys as sad, and melodies in major keys as happy. Moreover, Bradley (1971) advocated that familiarity with a song can influence liking and create biases which could further impact consumers' behaviours. However, the preludes were likely to be unfamiliar to the majority of the convenience sample in this study. Preludes number 3, 5, 11, 15, 17, 19, 21 and 23 were initially selected for the happy music condition, and Preludes number 4, 8, 10, 12, 14, 18, 22 and 24 for the sad music condition. A pilot study was then conducted to choose the final pieces for the main experiment. Thirty

consenting female participants with a mean age of 21.50 years (SD = 5.69 years) who did not take part in the main experiment, were presented with 50-s clips from each Prelude. They were required to rate each song's level of transmitted happiness on a Likert scale, with −5 being very sad, 0 being neutral and + 5 being very happy. The mean ratings for each prelude are presented in Table 1. There was good agreement between participants as indexed by Kendall's coefficient of concordance; $W = 0.71$, $\chi^2 = 319.69$, $p < .001$. The final stimuli did not seem particularly unusual or contrived though we accept it was an experimental manipulation, and hence the study needs to be replicated using different stimuli.

On the basis of the participants' ratings, Preludes 3, 5, 15, 17 (happy) and 8, 12, 14 and 22 (sad) were chosen as the final pieces for the experiment. Two compilations were subsequently created: one where the four advertisements had happy background music, and one where they had sad background music. The pairing between advertisements and Preludes for each music condition are shown in Table 2. The MasterChef clip, the advertisements and recording of the Preludes were downloaded from YouTube using the iTubeGo software (iTubeGo, 2020). The two compilations were created using the iMovie software (Apple, 1999).

6.2.3. Questionnaires

Participants had to fill in five questionnaires in total. They were given five multiple-choice questions with four answer choices to test whether or not they paid attention to the MasterChef clip (e.g., "What are the names of the two women auditioning for MasterChef? 1. Charlotte and Mia, 2. Anne and Mary, 3. Mary and Veronica, 4. Stacey and Olivia"). Participants who got more than one question wrong were to be excluded from the final data set. They also completed a free recall questionnaire ("Try to recall as many details about each advertisement as you can, such as the name of each brand, the product advertised by each brand, and any other details that stood out"), and a brand recognition questionnaire (e.g., "Which brand did you see in the advertisement? 1. Oberlo, 2. Everlane, 3. MissKick 4. Everstil") and familiarization with the broadcasted material questionnaire (e.g., "Have you ever seen this advertisement for Everlane before? 1. Yes, 2. No"). The choice of free recall and brand recognition questionnaires to test memory for the brand was motivated by previous studies which employed these measures, and deemed them reliable measures of memory (e.g., Furnham & Mainaud, 2011; Han et al., 2017; Lerman & Garbarino, 2002; Robertson, 1987). For the free recall questionnaire, one mark was awarded for each correctly recalled brand (e.g., Copia) and one for each correctly recalled product (e.g., Bathing Suit/Swimsuit/Swimwear). Therefore, each participant could get a maximum score of 8. For product recall, a list was drafted before starting the recruitment process, which contained possible synonyms to each of the advertised products. In addition to the memory questionnaires, participants were given a buying intentions questionnaire. For each brand, a picture of the product that had been advertised was presented, and participants were asked "How likely are you to buy this product?" They responded on a five-point scale from 'Very unlikely' to 'Very likely'.

Table 1
The mean ratings given to the 16 preludes in the pilot study.

Prelude No.	M	SD
3	3.37[a]	1.94
4	−2.03	2.03
5	3.60[a]	1.96
8	−3.53[a]	1.81
10	−1.43	2.16
11	3.10	1.92
12	−2.83[a]	1.74
14	−2.07[a]	1.44
15	3.53[a]	1.61
17	3.53[a]	2.01
18	−2.00	1.60
19	3.03	1.59
21	3.37	1.47
22	−2.97[a]	1.85
23	−0.03	1.83
24	−1.47	1.66

[a] Selected prelude.

Table 2
The pairing between brands and Preludes in the happy and sad music conditions.

	Music Condition	
Brand	Happy	Sad
Copia	Prelude No. 15	Prelude No. 14
Everlane	Prelude No. 3	Prelude No. 8
Perfect Day	Prelude No. 17	Prelude No. 12
Wildthing	Prelude No. 5	Prelude No. 22

6.3. Procedure

Ethical approval for this study was granted by the Ethics Committee (UCL EP/2018/007) following the completion of a risk assessment. Both the a priori study and the main experiment were created and hosted on the Gorilla platform (Gorilla.sc; Anwyl-Irvine et al., 2019).

Participants in the main experiment were presented with an information sheet that included general information about the study, making them aware that their data would remain anonymous. Participants were required to give their consent to participate in the experiment. Afterwards, they were instructed to watch the programme carefully, but no prior information was given regarding the advertisements. Once the programme had ended, participants were given the five questionnaires and then debriefed.

7. Results

All participants passed the multiple-choice attention check so none were eliminated from the data set. Preliminary data screening ahead of a planned parametric analysis of the data revealed a marked lack of homogeneity of variance in two of the dependent measures (recognition and buying intention). The data were positively skewed for buying intentions and negatively skewed for brand recognition. For this reason, it was decided to adopt a non-parametric approach to the analyses across all dependent variables.

Spearman correlation coefficients (measuring the monotonic relationship between the dependent variables) are presented in Table 3. Inspection of this table reveals a weak to moderate positive correlation between brand recognition and free recall for both the sad and happy music conditions. Somewhat stronger – but negative – correlations were found between brand recognition and buying intentions for the sad and happy music conditions. There was a weak, non-significant correlation between free recall and buying intentions in the sad music condition, and a moderate positive correlation between free recall and buying intentions in the happy music condition.

To investigate the effects of the music manipulation, the Mann-

Table 3
The correlations between brand recognition, free recall and buying intentions for participants in the sad and happy music condition.

Measure	Brand Recognition	Free Recall	Buying Intentions
Brand Recognition	_	0.257*	−0.326*
Free Recall	0.259*	_	0.348**
Buying Intentions	−0.371**	−0.127	_

Note. Correlations for participants in the happy music condition (n = 67) are presented above the diagonal, and correlations for participants in the sad music condition (n = 67) are presented below the diagonal.

* $p < .05$.

** $p < .01$.

Whitney test was chosen, as the design was between participants with two levels of each independent variable (music status and presentation order). The median values and interquartile ranges for each of the three measures under the two music conditions are presented in Table 4. For each dependent variable three, Mann-Whitney tests were conducted; one for each independent variable (music status and order), and one for their potential interaction.

7.1. Brand recognition

The Mann-Whitney test was found to be statistically significant for music status, $z = 4.87$, $p < .001$, $r = 0.42$, with brands when accompanied by sad music being better recognized than when accompanied by happy music. There was no effect of order of presentation, $z = 0.651$, $p = .515$, $r = 0.06$, and no interaction between music status and order of presentation, $z = 0.26$, $p = .795$, $r = 0.02$.

7.2. Free recall

There was a significant effect of music status of free recall, $z = 1.96$, $p = .049$, $r = 0.17$ with better recall for the advertisements when they were accompanied by sad music than happy music. There was no effect of order of presentation, $z = 0.76$, $p = .446$, $r = 0.07$, and no interaction between music status and order of presentation, $z = 0.02$, $p = .985$, $r < 0.01$. An additional analysis was conducted on recall for the products advertised (jewelry, leggings, lipstick and swimwear) only; there was no effect of musical status, $z = 0.28$, $p = .782$, $r = 0.02$, presentation order, $z = 1.42$, $p = .153$, $r = 0.12$ and no interaction, $z = 0.93$, $p = .352$, $r = 0.08$. A ceiling effect was evident in the data, as a median score of 4.0 was observed in all four cells of the 2(musical valence) x 2(presentation order) design.

7.3. Buying intention

There was also a statistically significant effect of music status on buying intention, $z = 4.23$, $p < .001$, $r = 0.37$ with higher buying intention when the advertisements were accompanied by happy music than sad music. There was no significant effect of order of presentation, $z = 0.38$, $p = .704$, $r = 0.03$ and no interaction between music status and order of presentation, $z = 1.01$, $p = .313$, $r = 0.09$.

8. Discussion

As predicted, the results of this experiment indicated that participants who watched advertisements accompanied by happy background music demonstrated higher intentions to purchase the advertised products relative to participants who watched the same advertisements with sad background music. These findings differed from those of Alpert and Alpert (1990) who found the opposite result with respect to buying intentions, but this could a function of the products being advertised and the structure of the music as much as the emotional associations.

With respect to brand recognition, participants in the sad music condition correctly recognized more brand names than participants who watched advertisements with happy background music, as predicted. A similar predicted pattern was obtained for free recall overall, with participants in the sad music condition generating higher recall scores than participants in the happy music condition. However, there was no effect of musical valence on the recall of the products advertised - due to a ceiling effect in the data. The effect size for the overall free recall measure indicated a much smaller difference between the scores of participants in the two music conditions compared to brand recognition and buying intentions, which generated moderate effect sizes.

Table 4
The median scores and interquartile ranges for the three measures of happy and sad music effectiveness in advertising.

	Happy music		Sad music	
Measure	Mdn	IQR	Mdn	IQR
Brand recognition	2.0	2.0	3.0	2.0
Free recall	4.0	1.0	5.0	2.0
Buying intention	14.0	6.0	10.0	2.0

Previous research suggested that although having advertisements accompanied by music generates more positive consumer behaviours than advertisements without music, an important aspect marketeers should also pay attention to is the *type* of music used for an advertisement, as different types of music can evoke different emotions (Hoeberichts, 2012; Oakes, 2007). The present study shows that using music that aims to elicit different emotions in advertisements (happiness vs. sadness) will create different patterns of consumer cognition and behaviour. With respect to buying intentions, this study found a similar pattern of results to those obtained by Anand and Sternthal (1990), and Stewart and Koh (2017), who found that advertisements with happy background music enhance consumers' attitudes towards the brand, leading to more positive consumer behaviours than advertisements with sad background music. This is of course an attitude measure and no guarantee that the person will seek out and purchase the particular brand.

The findings from the current study are also consistent with Gardner (1985) observation of the relationship between music with positive emotional valences and increased purchase intentions, as well as the results obtained by Broekemier et al. (2008) and Vaccaro et al. (2011), who also found that happy music increased buying intention. Overall, these findings suggest that happy music has a significant ability to influence consumers' purchase intentions in various conditions (experimental or naturalistic) and environments (real or simulated retail stores, online television advertisements).

However, the current study could did support the findings of Alpert and Alpert (1990), who drew the opposite conclusion regarding buying intentions. Thus, their results would seem to be an anomaly, likely caused by incongruity between their stimuli and the advertisements' background music. Much also must depend on the experimental variables like the music chosen and the task required. Indeed, to do good ecologically valid experimental studies in this area is most problematic, and which necessitates numerous replications inevitably with different materials.

This study's second hypothesis was also supported by the results, which were in line with those of Bradley et al. (2007), who also found higher advertisement memorability for television advertisements with a negative emotional valence. Two potential, and non-overlapping, explanations can be proposed. The *first* is represented by the concept of negativity bias. This suggests that negative stimuli possibly produce significantly more attentiveness and faster processing rates than positive stimuli, as “negative information weighs more heavily upon the brain” (Ito et al., 1998, p. 887), thus increasing the chances of remembering negative stimuli relative to positive ones (Cacioppo & Gardner, 1999; Ito et al., 1998). The *second* explanation can be found in the von Restorff effect, which asserts that the stimuli that stand out are more likely to be remembered (von Restorff, 1933). Advertisements for beauty products, accessories and clothing items rarely use sad background music, and encountering such music may have caused participants to perceive the stimuli as distinct and subsequently remember them more easily than participants in the happy music condition. Most music associated with beauty product ads is usually “upbeat” or “calming” as defined by structure and association, and rarely what may be described as sad. Indeed it is difficult to think of a product that is paired with sad music to attempt to increase memory or sales.

These results may also be interpreted by the Bless et al. (1990) findings which showed a sad mood may cause participants to process information in a bottom-up (heuristic) fashion because the mood signals that a situation is problematic and which may increase recall. In contrast, a happy mood may signal a benign situation where top-down

(systematic) processes suffice, which may predict lower memory scores but higher positive associations and purchase intentions.

Although a weak effect in the predicted direction was observed for free recall overall, with smaller differences between participants' scores in the two music conditions relative to brand recognition, and no effect of musical condition on product recall. Previous research suggests that recall is generally a harder task than recognition, as recall demands a considerably larger exposure time to the learning event (Gillund & Shiffrin, 1984; Kintsch, 1974; Roediger III et al., 1989). Moreover, recalling names is generally considered to be a demanding cognitive task, as the brain is not known to have a specialized region for remembering names (Stafford, 2012).

A negative correlation was found between brand recognition and buying intentions in both music conditions. This indicated that happy music will increase buying intentions, but decrease brand recognition, while sad music will increase brand recognition at the expense of decreasing buying intentions. However, a different pattern of results was obtained for the relationship between buying intentions and recall. Findings suggested that free recall was positively correlated with buying intentions in the happy music condition, and weakly (and not significantly) correlated with buying intentions in the sad music condition. This is a curious result, as brand recognition and free recall were found to be positively correlated in both music conditions. Currently, we have no explanation for this result, and further research into the relationship between memory and buying intentions as a function of emotional valence is clearly needed. It is indeed something of concern not only to experimental psychologists but those in advertising and marketing who note the potential "trade-off" between memory and buying intention.

There are inevitably limitations to this study. Firstly, we had a young female population that may not generalize to other groups. Prior studies have dealt sex differences in this area. Andersson et al., 2012). Also, participants' scores for buying intentions could have been negatively affected if they found the sad music to be inappropriate for the advertisement (Alpert et al., 2005; Craton & Lantos, 2011; North, MacKenzie, et al., 2004). Moreover, this study only investigated the use of classical music from a single composer – although as Kupfer (2019) noted, Bach "is one of a few baroque composers whose music regularly appears in commercials" (p. 276). Future research could investigate the effect of other types of music on buying intentions and memory for advertised material. Lastly, the present study only investigated short-term effects of background music in advertisements. Although previous research indicates that consumers' purchase rates are most influenced by advertisements in the short-term (Auerbach & Neuman, 2019; Zhou et al., 2003), brand recognition and recall were correlated with long-term effects, such as increased brand equity and customer loyalty (Wood & Poltrack, 2015). Whether or not the effects that the present study observed between brand memorability and music will enhance brand equity, customer loyalty or future purchases is not known. Thus, it would be interesting for future research to conduct longitudinal studies that explore which music genres are most efficient in enhancing consumers' memory and recognition of brands in the long-term.

In conclusion, we have provided empirical evidence that two key measures of advertising effectiveness – buying intention and brand recognition – can be influenced in opposite directions through the manipulation of music. Buying intention was found to be higher when the advertisements were paired with happy music, whereas brand recognition was found to be higher when the advertisements were paired with sad music.

Registration

This paper was not pre-registered with the journal.

Ethics

This was sought and obtained (UCL EP/2018/007).

Ethics approval

UCL Experimental Psychology Dept number EP/2018/007 granted permission for this study to be done

CRediT authorship contribution statement

Isabela Dogaru: Writing – original draft, Data curation. **Adrian Furnham:** Writing – review & editing, Resources. **Alastair McClelland:** Project administration, Data curation.

Declaration of competing interest

There is no conflict of interest.

Data availability

Data will be made available on request.

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