



Citation for published version:

Gordon, L, Abolhasani, M & Hang, H 2022, 'Disentangling effects of subjective and objective characteristics of advertising music', *European Journal of Marketing*, vol. 56, no. 4, pp. 1153-1183. <https://doi.org/10.1108/EJM-01-2021-0017>

DOI:

[10.1108/EJM-01-2021-0017](https://doi.org/10.1108/EJM-01-2021-0017)

Publication date:

2022

Document Version

Peer reviewed version

[Link to publication](#)

The final publication is available at Emerald via <https://dx.doi.org/10.1108/EJM-01-2021-0017>

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Disentangling Effects of Subjective and Objective Music Characteristics in Advertising

Abstract

Purpose:

Drawing on information processing theory, we study how consumers' liking of background music in advertising affects their purchase intention, and explore the roles of positive brand attitudes, music mode, and music tempo within such a relationship.

Design/methodology/approach:

We created several radio advertisements that promote two fictitious products: an electric car (EcoCar) and a reusable coffee mug (EcoMug). We study the role of music in these advertisements and examine how it affects purchase intention across multiple experiments.

Findings:

We confirm the prediction that positive brand attitudes mediate the relationship between music liking and purchase intention. We also show that music moderates such an indirect relationship because major mode music strengthens the effect of positive brand attitudes on purchase intention. Additionally, we find that major mode music with a fast tempo can further strengthen the effect of positive brand attitudes on purchase intention. As a result, the indirect effect of music liking upon purchase intention via positive brand attitudes will be moderated jointly by the music mode and the music tempo.

Originality:

Limited scholarship explores how the subjective characteristics of music affect consumer buying behaviour in conjunction with the objective characteristics of music. The current research addresses this gap by investigating how music liking (a subjective characteristic of music) and music mode and tempo (objective characteristics of music) affect consumer buying behaviour.

Keywords: Information processing theory; Music liking; Music mode; Music Tempo; Brand attitudes

Introduction

Marketers have widely used music to influence consumer behaviour. A content analysis study by Allan (2008) indicated that 94% of prime-time TV commercials in the United States used music, and suggested that this figure was rising. Advertising agencies and client companies pay sizeable fees for the background music that they use in commercials. For example, Microsoft paid the Rolling Stones \$3 million to use their song “Start Me Up” as the theme to launch Windows 95 (Naughton, 1999). A more recent study by Kupfer (2020) shows that an international brand spends an average of \$10-20 million annually on music-related rights and licenses. In terms of the effectiveness of using background music within marketing activities, research shows that advertising campaigns that involve music are 27% more likely to report substantial business effects than those that do not involve music (Binet et al., 2013). Recent studies in the *European Journal of Marketing* also provide evidence that indirectly bears on this concern. For example, Davtyan et al. (2020) find a positive effect of brand placement repetition in music videos on consumers’ memory, brand attitude, and behavioural intention. In 2019, the journal devoted a special issue to assessing the relationship between music and marketing in the digital age (Sinclair and Saren, 2019). The significance of music in marketing has clearly stimulated significant research.

The previous literature highlighted two characteristics of music – subjective (e.g., familiarity, etc.) and objective (e.g., volume, lyrics, etc.) – that can separately affect consumer buying behaviour (see Table 1). Yet, few researchers ask whether, and if so how, the two characteristics of music can jointly influence the effectiveness of marketing communications in stimulating purchase intention. This is a surprising research gap, particularly because a piece of music (used in advertising) has both subjective and objective characteristics. We do not suggest that researchers have not considered this matter at all. Instead, we note that they have paid limited attention to examining how the specific mix of

1
2
3 subjective and objective characteristics can affect purchase intention (e.g., Abolhasani et al.,
4
5 2017; Hahn and Hwang, 1999). To address these shortcomings, we draw on information
6
7 processing theory to develop a conceptual framework (See Figure 1) that explains how
8
9 consumers' liking of background music in an advertisement affects their purchase intention,
10
11 and explores the roles of positive brand attitudes, music mode, and music tempo within such
12
13 a relationship.
14
15

16
17 "Insert Figure 1 Here"

18
19 Information processing theory explains how certain advertising stimuli affect how
20
21 consumers process brand information (MacInnis and Jaworski, 1989). Music liking is one of
22
23 the most widely-examined subjective characteristics of music (see Table 1). Researchers have
24
25 shown that consumers' liking of the background music in an advertisement can be viewed as
26
27 an important stimulus that affects their buying behaviour (e.g., Vermeulen and Beukeboom,
28
29 2016). Nevertheless, consumers do not purchase a firm's products simply because they like
30
31 the music used in an advertisement. According to information processing theory, the
32
33 advertising stimulus triggers a brand attitude formation process, thereby affecting consumers'
34
35 responses (MacInnis and Jaworski, 1989). In line with this theoretical perspective, we assume
36
37 an indirect effect whereby music liking can stimulate the development of consumers'
38
39 favourable attitudes towards the firm's brand, which in turn affects their purchase intention.
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42
43
44 Prior studies partially support this assumption and highlight the association between music
45
46 liking and positive brand attitudes (Bozman et al., 1994; Mittal, 2015), as well as the
47
48 connection between positive brand attitudes and consumer purchase intention (Davtyan et al.,
49
50 2020; Hartmann and Apaolaza-Ibañez, 2012). Yet, adequate empirical tests of this
51
52 assumption remain lacking.
53
54

55
56 Furthermore, we also argue that the two objective characteristics of music – music
57
58 mode and music tempo – can alter the influence of music liking on consumer buying
59
60

behaviour by affecting the strength of the relationship between positive brand attitudes and purchase intention. This consideration also builds on information processing theory, which considers emotional stimulus to be an important factor affecting the brand attitude formation process (Ching et al., 2013; Priluck and Till, 2004). Music mode is a scale with distinct melodic characteristics, while music tempo is the speed at which the musical passage progresses (Kellaris and Kent, 1991; Oakes and North, 2006). Marketers often apply various music modes and tempos to manipulate consumers' emotions as a way to affect their responses to advertised brands (Abolhasani et al., 2017; Kellaris and Kent, 1991). This suggests that, in situations involving different types of music mode and tempo, the influence of positive brand attitudes on consumer purchase intention may vary. Collectively, the subjective characteristics (i.e., music liking) and objective characteristics (i.e., music mode and tempo) of music in advertisements can jointly affect consumer buying behaviour in a complex manner. Such insights, while critical to managers charged with leveraging the use of music in advertising to enhance consumer purchase intention, remain underexamined.

To test and validate our framework, we create several radio advertisements promoting two fictitious products: an electric car (EcoCar) and a reusable coffee mug (EcoMug). We study the role of music in these advertisements and examine how it affects purchase intention across multiple experiments. In general, our research provides empirical evidence concerning the assumption of the indirect effect of music liking upon purchase intention via positive brand attitudes. We also find that music mode can, both independently or in conjunction with music tempo, moderate this indirect effect by influencing the strength of the relationship between positive brand attitudes and purchase intention. In doing so, we advance the literature on music and marketing communication that focuses primarily on examining how the subjective and objective characteristics of music can separately affect consumer behaviour (Table 1). We instead highlight how these two characteristics of advertising music

1
2
3 can work in a complex way to affect purchase intention. Furthermore, we advance the
4
5 applicability of information processing theory (MacInnis and Jaworski, 1989; Thompson and
6
7 Hamilton, 2006) by highlighting how music in advertisements can be considered an
8
9 important stimulus and boundary condition that affects the brand attitude formation process,
10
11 which in turn impacts consumer buying behaviour.
12

13 14 15 16 **Theory and Hypotheses**

17 18 ***Music in Marketing***

19
20 We can analyse the previous research on the use of music in marketing in two
21
22 dimensions (Table 1). Firstly, the characteristics of music reflect the fundamental elements of
23
24 music structure, which can be distinguished into objective (e.g., mode, tempo, genre, etc.)
25
26 and subjective (e.g., complexity, mood, liking, etc.) properties. Secondly, we investigate the
27
28 role of music in two predominant areas of marketing, which can be broadly categorised as
29
30 marketing communication (e.g., advertising, sponsorship, etc.) or “in-store” background (e.g.,
31
32 background music in a supermarket). These two dimensions give rise to four different
33
34 streams of research literature¹.
35
36
37

38
39 “Insert Table 1 Here”
40

41 The first stream of literature investigates how the objective characteristics of music in
42
43 marketing communications affect consumers’ perceptions and evaluation (e.g., Alpert et al.,
44
45 2005; Kellaris and Kent, 1991; Oakes and North, 2006). For example, Kellaris and Kent
46
47 (1993) study consumer responses to music tempo and texture in marketing communication.
48
49 Anisimova et al. (2014) find that a close fit between the lyrics and product/brand-related
50
51 message can enhance consumers’ emotions and identification of the products and brand.
52
53 Guido et al. (2016) show that background music that ends abruptly distracts consumers’
54
55

56
57 ¹ We acknowledge that these four research dimensions are not mutually exclusive, but may be interrelated in
58
59 important and complex ways. In fact, our research fundamentally addresses the question of how the objective
60
and subjective characteristics of music interact within marketing communication. Nevertheless, we use these
four dimensions independently to provide a clearer review of the previous literature on this field.

1
2
3 attention and reduces their memory of both the products and the messages. The second
4
5 literature stream focuses on understanding the subjective characteristics of music in
6
7 marketing communication and their influence on consumer attitudes. For example, Oakes
8
9 (2007) states that disliked background music may cause valence incongruity if it undermines
10
11 advertising that seeks to elicit positive brand attitudes. Chou and Lien (2014) find that old
12
13 songs can generate positive emotions and more effective advertising only in the case of more
14
15 familiar songs and more relevant lyrics. Radio advertising research by Lavack et al. (2008)
16
17 shows that consumers associate a complicated piece of music with quality and sophistication.
18
19

20
21
22 The third literature stream investigates the objective characteristics of in-store
23
24 background music and their impact on consumer responses (e.g., Milliman, 1982; North et
25
26 al., 2000). For example, Caldwell and Hibbert (2002) studied how music tempo affected
27
28 consumer behaviour in a restaurant. Morrison et al. (2011) show that music played at a high
29
30 volume can significantly impact shoppers' emotions and satisfaction levels. Knoferle et al.
31
32 (2012) explored the effects of different music modes and tempos on sales. North and
33
34 Hargreaves (1998) found that different musical styles had different effects on the perceived
35
36 characteristics of a cafeteria, and that the subjects were prepared to pay the most for the food
37
38 items on sale therein when classical music was playing. The fourth literature stream explores
39
40 the influence of the subjective characteristics of music on consumer behaviour in terms of
41
42 creating a favourable/unfavourable in-store atmosphere (e.g., Mattila and Wirtz, 2001; North
43
44 and Hargreaves, 1996). To illustrate, Dubé et al. (1995) found music-induced pleasure and
45
46 the arousal of consumers' desires in the context of bank services' buyer-seller interactions,
47
48 while Andersson et al. (2012) examined the effects of the presence or absence of music in a
49
50 service store and found that consumers spent more time and money in the store in the
51
52 presence of music compared to in its absence.
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2
3 In these four research streams (Table 1), researchers tend to consider music's
4
5 subjective and objective characteristics separately when examining the effects of music on
6
7 consumer behaviour. However, such an approach ignores the complex nature of the consumer
8
9 experience when viewing/listening to an advertisement involving music. In an actual
10
11 advertisement accompanied by a piece of music, these characteristics of music are
12
13 inseparable. Some researchers examine both characteristics of music together in the same
14
15 study. For example, Hahn and Hwang (1999) examine the effect of music tempo (objective)
16
17 and familiarity (subjective) on consumers' message processing in TV advertising. Abolhasani
18
19 et al. (2017), in their netnography study, explore the effects of music liking (subjective) and
20
21 genre (objective) on consumers' affective responses to advertising messages. These attempts
22
23 to examine the combined influence of these subjective and objective characteristics of music
24
25 are important because they jointly influence consumers' perceptions of advertisements'
26
27 content. The current research attempts to extend such efforts by investigating how the
28
29 subjective (i.e., music liking) and objective characteristics (i.e., music mode and tempo) of
30
31 music in an advertisement can work jointly in a complex way to affect the purchase intention.
32
33 We will develop hypotheses to specify their relationships in the following sections.
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Brand Attitude and Music Processing within Advertising

42
43 Marketers can incorporate certain elements into an advertisement to affect consumers'
44
45 information processing and, subsequently, their purchase intention. Music liking in the
46
47 context of advertising is defined as the degree to which a piece of music is liked by
48
49 consumers (Oakes, 2007). As the prior work on information processing theory shows, a
50
51 certain stimulus can affect consumers' processing of information within an advertisement
52
53 (MacInnis and Jaworski, 1989). Music appears to be an important stimulus in an
54
55 advertisement. As the previous work shows (Abolhasani et al., 2017; Bozman et al., 1994),
56
57 consumers are more likely to respond positively to advertisements involving liked music. In
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1
2
3 addition, the prior research on advertising information processing often suggests that
4
5 consumer purchase intention commonly represents the ultimate positive response (Frias et al.,
6
7 2008). These rationales, combined, provide the underlying logic related to music's influence
8
9 on purchase intention. This conclusion is unsurprising and many previous studies support it
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11 (e.g., Mittal, 2015; Vermeulen and Beukeboom, 2016).
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15 This research conceptualises positive brand attitudes as a critical intermediate
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17 mechanism that connects music liking with purchase intention (see Figure 1). We define
18
19 positive brand attitudes as favourable personal evaluation, emotional feelings, and
20
21 behavioural tendencies that individuals display toward a firm's brand (Davtyan et al., 2020).
22
23 This conceptualisation concerning the mediating role of positive brand attitudes in our
24
25 framework also builds on information processing theory, according to which one of the
26
27 central goals of advertising is to promote positive brand attitudes (MacInnis and Jaworski,
28
29 1989). In terms of empirical evidence, the prior work on music within advertising has already
30
31 examined the relationship between music liking and positive brand attitudes. For example,
32
33 Simpkins and Smith (1974) revealed how using a disliked musical genre (country music) in
34
35 advertising resulted in significantly less positive brand attitudes compared to using a liked
36
37 musical genre (rock music). The rationale behind such a relationship is that individuals may
38
39 prefer certain music genres over other genres or styles, which may affect the extent to which
40
41 they like or dislike various pieces of music. A liked piece of music within advertising may
42
43 create associations with a consumer's past, emotion-laden experiences. The positive feelings
44
45 that liked advertising music create then transfer to the advertised brand. At the same time, the
46
47 link between brand attitude and purchase intention is also well-established in the marketing
48
49 literature (e.g., Davtyan et al., 2020; Hartmann and Apaolaza-Ibáñez, 2012). Consumers'
50
51 brand attitude can directly affect their perceived value of the brand. Purchase intention is a
52
53 motivational state among consumers, and appears to be a consequence of their evaluation of
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2
3 the brand (Davtyan et al., 2020). When consumers have a positive attitude towards the
4
5 advertised brand, they are more likely to purchase the firm's products. Information
6
7 processing theory supports these rationales. According to the theory, positive brand attitudes
8
9 involve consumers' attitudinal responses to advertising that represent important outcomes of
10
11 the brand attitude formation process (MacInnis and Jaworski, 1989), which can affect
12
13 consumer purchase intention. Combining the theoretical perspective of information
14
15 processing theory with the previous research findings, we can conclude that consumers'
16
17 liking of music in advertisements can stimulate the development of positive brand attitudes,
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19 which in turn affects their purchase intention. In other words, the effect of music liking and
20
21 purchase intention can be indirect in nature.
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25
26 *Hypothesis 1: Positive brand attitudes mediate the relationship between music liking
27
28 and purchase intention.*²
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31 ***The Roles of Music Mode and Tempo***

32
33 We conceptualise music mode and tempo as moderators in our framework by drawing
34
35 on information processing theory. The music mode refers to a type of musical scale, coupled
36
37 with a set of characteristic melodic behaviour, which is composed in major and minor modes
38
39 or keys that can produce strong but very different feelings and emotional responses in the
40
41 listeners (Alpert et al., 2005; Kellaris and Kent, 1991). Music tempo refers to the speed at
42
43 which the musical passage progresses. It is considered low when the tempo is less than
44
45 72bpm, and fast which the tempo is over 94bpm (Milliman, 1982; Oakes, 2003). According
46
47 to information processing theory, analysing the brand attitude formation process in relation to
48
49 advertisements requires a consideration of the emotional stimulus as the contingency factor
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56
57 ² Since the "music liking-positive brand attitude" and "positive brand attitude-purchase intention" relationships
58
59 have been widely examined and verified, we did not consider that the test results (the mediation role of a
60
61 positive brand attitude) provide a significant contribution to the relevant literature concerning music and
62
63 marketing communication. The purpose of formalising this hypothesis is to facilitate the flow of the article, as it
64
65 may be easier for readers to understand the relationship among music liking, positive brand attitudes and
66
67 purchase intention. We thank a reviewer for pointing out this limitation.

1
2
3 (Ching et al., 2013; Priluck and Till, 2004). Many studies have investigated music mode and
4
5 tempo due to their role in influencing consumers' emotions and responses regarding
6
7 advertised content (e.g., Alpert et al., 2005; Oakes and North, 2006). We, therefore, consider
8
9 these two objective characteristics of music as contingency factors in our framework. We will
10
11 develop detailed arguments about their relationship, as our framework indicates (see Figure
12
13
14
15 1).

16
17 When consumers like the music used in an advertisement, according to information
18
19 processing theory (MacInnis and Jaworski, 1989), they are more likely to formulate positive
20
21 brand attitudes during the brand attitude formation process, and positive brand attitudes will
22
23 lead to purchase intention (Davtyan et al., 2020; Hartmann and Apaolaza-Ibáñez, 2012). If
24
25 the music used in such an advertisement is composed in the major mode, previous research
26
27 suggests that consumers are more likely to develop positive emotions (Juslin and Sloboda,
28
29 2011; Trochidis and Bigand, 2013). We expect the music mode to serve as a critical
30
31 contingency factor for this indirect relationship by amplifying or suppressing the effect of
32
33 positive brand attitudes on purchase intention. Previous studies have shown that the emotions
34
35 that music produces are not merely variable subjective experiences (Juslin and Laukka,
36
37 2003), but appear to be highly consistent between listeners (Juslin and Laukka, 2003),
38
39 irrespective of the listeners' musical background and the experimental session. Music mode
40
41 can elicit positive or negative emotions about the advertised brand as a peripheral cue. More
42
43 specifically, major mode music is often associated with expressions such as happiness/joy,
44
45 grace, serenity, and solemnity. In contrast, music composed in the minor mode is often
46
47 associated with sadness, tension, disgust, and anger (Juslin and Sloboda, 2011). When
48
49 consumers have a favourable attitude towards a firm's brand, using major mode music in
50
51 advertisements is more likely to reinforce the effects resulting from positive brand attitudes.
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53 Such reinforcement enhances the influence of positive brand attitudes on customers'
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2
3 willingness to purchase a firm's products. Combining the proposition concerning the indirect
4
5 relationship, we suggest that the relative importance of positive brand attitudes in leveraging
6
7 music liking into an enhanced purchase intention should be higher when major mode music
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9 plays in an advertisement:
10

11
12 *Hypothesis 2: As music mode strengthens the relationship between positive brand*
13 *attitudes and purchase intention such that the relationship is stronger for major*
14 *mode music, the music mode will moderate the indirect effect of music liking upon*
15 *purchase intention via positive brand attitudes.*
16
17

18 Our logic leads to hypothesis 2, assuming that music mode, as an emotional stimulus,
19
20 can enhance the effect of positive brand attitudes and purchase intention. We now suggest
21
22 that music tempo also serves as a source of contingency for the relationship between positive
23
24 brand attitudes and purchase intention, so that music mode and tempo can work jointly to
25
26 affect the strength of such an association. This is because mode and tempo are two musical
27
28 parameters that constitute the inherent properties of musical structure, which affects listeners'
29
30 emotions (Fernández-Sotos et al., 2016). Many studies assess the effects of music tempo,
31
32 often combined with music mode, in evoking listeners' affective reactions and eliciting
33
34 various feelings (e.g., Husain et al., 2002; Trochidis and Bigand, 2013). In this research, we
35
36 argue that fast tempo music can enhance the moderating effects of the major music mode on
37
38 the relationship between positive brand attitudes and purchase intention.
39
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41

42
43 In the past, researchers have linked fast tempo music with a positive hedonic value
44
45 (Holbrook and Anand, 1990; Hunter et al., 2010). We argue that the use of fast tempo can
46
47 intensify the effect of major mode music in stimulating consumers' positive perceptions of
48
49 the advertised brand. To illustrate, a study by Trochidis and Bigand (2013) investigates the
50
51 effects of mode and tempo on emotional ratings and EEG responses (using an
52
53 electroencephalogram to record brain activity) and reports that, beyond the effect of music
54
55 mode, music tempo modulated the emotional ratings, with a faster tempo evoking the
56
57 emotions of anger and happiness as opposed to slow tempo, which induced a stronger feeling
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1
2
3 of sadness and serenity. This means that major mode music with a fast tempo can further
4
5 evoke various positive emotions (e.g., inspiration). According to information processing
6
7 theory (MacInnis and Jaworski, 1989; Thompson and Hamilton, 2006), background music in
8
9 the major mode with a fast tempo in an advertisement can affect the brand attitude formation
10
11 process and help to boost the positive emotional appeal, thereby reinforcing the effect of
12
13 positive brand attitudes. Consumers' immediate positive emotions arising from
14
15 viewing/listening to music in an advertisement may determine their response to the advertised
16
17 brand, which in turn affects their willingness to purchase the firm's products. Combining the
18
19 above discussions, in the indirect effect starting from music liking through to positive brand
20
21 attitudes to purchase intention, the presence of major mode music with a fast tempo in an
22
23 advertisement can further strengthen the relationship between positive brand attitudes and
24
25 purchase intention. In this sense, fast tempo major mode music in an advert often seems
26
27 arousing and pleasant (Juslin and Sloboda, 2011). Consumers' positive emotions arising from
28
29 music complement the effect of their positive brand attitudes by encouraging their purchase
30
31 intention:
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38 *Hypothesis 3: As music mode and tempo jointly strengthen the relationship between*
39 *positive brand attitudes and purchase intention such that the relationship is stronger*
40 *at major mode music with fast tempo, the indirect effect of music liking upon*
41 *purchase intention via positive brand attitudes will be moderated jointly by music*
42 *mode and music tempo.*
43
44

45 **Overview of the Studies**

46 ***Research Context***

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48
49 We select a "green product advertisement" as the dominant theme to develop these
50
51 experiments for the following reasons. First, the context of an advertisement promoting green
52
53 products often places great emphasis on educating the consumer about the product's value to
54
55 promote environmental sustainability and the firm's efforts to support this objective
56
57 (Hartmann and Apaolaza-Ibañez, 2009; Rivera-Camino, 2007). Thus, the central focus of
58
59
60

1
2
3 such an advertisement is an attempt to enhance consumers' favourable responses to the
4
5 advertised brand. Second, green advertising often focuses on triggering the respondents'
6
7 positive feelings or attitudes towards the firm's brand (Fowler III and Close, 2012). Music, as
8
9 part of an advertisement's surface features and heuristic cues, plays a critical role in
10
11 subconsciously stimulating the respondents' emotions during brand communication
12
13 (Müllensiefen, 2020).³ Together, the use of music can have a strong influence on the
14
15 effectiveness of green advertising. The present research explores the influence of music on
16
17 purchase intention, and green product advertisement offers a rich context in which to
18
19 investigate the effectiveness of the music played during advertisements.
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25

26 *Stimuli Development*

27
28 We created two radio advertisements to promote two fictitious green products for the
29
30 present research: an electric car (EcoCar) and a reusable coffee mug (EcoMug). These two
31
32 advertisements were recorded in a studio, using professional recording facilities and a
33
34 professional male voiceover artist. The advertisements for both products had the same
35
36 structure and length, stating specific reasons for the need to purchase the product, and also
37
38 presented an environmentally-driven selling argument based on rational grounds, followed by
39
40 a slogan at the end (see Appendix 2). We hired composers from a professional advertising
41
42 music company, who have created advertising music for many well-known brands (e.g., Aldi,
43
44 Mango, Zara, Samsung, and Amazon, to name but a few), to compose various pieces of
45
46 music for our research. The composers were briefed on the requirements of the musical
47
48 compositions. They were also able to compose the required musical pieces by manipulating
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54

55 ³ Although one might argue that green product advertisement triggers both affective (emotional) and cognitive
56 (rational) processing, the prevalent view in the current psychological and advertising research literature (Heath,
57 2012) is that affective processing dominates both in terms of frequency and effectiveness (Müllensiefen, 2020).
58 In fact, there is a school of thought that advertising generally should be less concerned with attracting attention,
59 making arguments, and conveying messages, and more concerned with making an implicit, unconscious impact.
60 Heath (2012) points out that, while processing consciously, consumers can build up a cognitive defence against
persuasive communication messages.

1
2
3 the two objective characteristics of music (tempo and mode) only and creating different
4
5 music pieces that reflected the intended emotions – “Inspiring”, “Sad”, and “Afraid” (see
6
7 Appendix 3). The “Inspiring” piece was in the major mode, while the “Sad” and “Afraid”
8
9 pieces were in the minor mode. The company created a 70bpm and 100 bpm version of each
10
11 of these three pieces of music to represent slow and fast tempo music, respectively (Milliman,
12
13 1982; Oakes, 2003). These pieces of music were superimposed onto the two advertisements
14
15 (EcoCar and EcoMug), which were tested to establish an appropriate volume level to
16
17 facilitate a comfortable listening experience and ensure that the background music did not
18
19 impede the voiceover under the different conditions.
20
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24 We conducted six studies to examine our theoretical framework: one pilot study and
25
26 five main studies. Following Berinsky et al. (2012) and Buhrmester et al. (2016), we recruited
27
28 participants from Amazon Mechanical Turk (MTurk), an online crowdsourcing service for
2
30 advertising and consumer behaviour research, because recruiting participants online is
31
32 cheaper and quicker than using the paper-and-pencil method. At the start of each survey, we
33
34 sound-checked the online participants. In the sound-check phase, we asked the participants to
35
36 click on a button to open a page and specify the sound they heard by making a selection from
37
38 a list of various sounds (e.g., a train whistle, a crow cawing, etc.). Those who failed the
39
40 sound-check test could not continue with the survey and left the study. We invited the online
41
42 participants to listen to a 50-second version of the radio advertisement, then answer a set of
43
44 questions about it. The online survey process did not allow the participants to fast forward or
45
46 skip the advertisement, to ensure that they had listened to the entire radio advertisement
47
48 before starting the survey.
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53 ***Pilot Study***

54 *Sample, Experimental Design and Stimuli*

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3 For the pilot study, we used the advertisement for the EcoCar. This study has two
4
5 advertising conditions: one without any background music, and one with slow tempo major
6
7 mode music, intended to elicit 'inspiring' emotions (slow-inspiring music). We randomly
8
9 selected this music condition. There were 95 participants in the slow-inspiring music
10
11 experimental condition, and 102 in the no-music condition. To assess the participants'
12
13 purchase intention, we adopted a three-item, seven-point Likert-scale from MacKenzie et al.
14
15 (1986). To assess music liking, we followed Caldwell and Hibbert (2002) and asked the
16
17 participants to rate from 1 to 7 their agreement with the statement: "I like the music that was
18
19 playing" (see Appendix 1). Moreover, the variance inflation factor analysis results ruled out
20
21 concerns about multicollinearity.
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28 *Results*

29
30 We compared the participants' purchase intention under the music condition versus
31
32 the non-music condition. We also used the Eta Squared (η^2) value to estimate the effect size
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34 for ANOVA – with near .01 as small, near .06 as medium, and above .14 as large effect size
35
36 (Warner, 2012). The analysis of variance indicated that there were significant differences
37
38 between the presence of music ($M = 4.45$) and the absence of music ($M = 3.16$) conditions
39
40 concerning purchasing intention - $F(1, 195) = 26.60, p < .01$, with an effect size above .01 –
41
42 $\eta^2 = .02$. We further examined the participants' purchase intention when they liked vs
43
44 disliked the music in the advertisement. The analysis of variance indicated that there were
45
46 significant differences between the music liking ($M = 5.00$) and disliking ($M = 3.07$)
47
48 situations – $F(1, 93) = 31.64, p < .01$, with an effect size above .01 – $\eta^2 = .12$. Our results
49
50 support our conceptual framework's baseline assumptions: 1) background music is important
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52 when designing advertisements, as it promotes purchase intention, and 2) the effect of music
53
54 is stronger when consumers like the background music in advertisements.
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Main Study 1

Sample, Experimental Design and Stimuli

We recruited 108 participants via MTurk. To control the participants' existing knowledge and attitudes regarding existing products, we used the EcoCar advertisement. We randomly selected background music that elicits an "afraid" emotion, with 110 beats per minute (fast-afraid music). We used the same measurement items and scales to assess purchase intention and music liking. We adopted the items and seven-point Likert-scale from Belch (1981) for measuring positive brand attitudes. The variance inflation factor values are all below 3, which indicates that there are no multicollinearity problems.

Results

Hypothesis 1 proposes that music liking has an indirect effect on purchase intention via positive brand attitudes. We used regression analysis for the indirect relationship, controlling for sex, age, and education. We also used Cohen's f^2 value to estimate the effect size for the regression analysis – with near .02 as small, near .15 as medium, and above .35 as large effect size (Cohen et al., 2003). Our results replicate Pilot Study 1, showing a direct relationship between music liking and purchase intention, which is positive and significant ($\beta = .43, p < .01$; the effect size is above .02 – Cohen's $f^2 = .24$). This indicates that the purchase intention will increase by .43 units with a 1 unit increase in music liking. In terms of the indirect relationships, we use Hayes (2018)'s Process Model #4. We estimate the relationship between music liking and positive brand attitudes (Model 1: $\beta = .42, p < .01$; the effect size is above .02 – Cohen's $f^2 = .33$). We also estimate the relationship between positive brand attitudes and purchase intention ($\beta = .50, p < .01$; the effect size is above .02 – Cohen's $f^2 = .21$), accounting for the effect of music liking. This indicates that purchase intention will

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3 increase by .50 units with a 1 unit increase in positive brand attitudes. Then, we calculate the
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5 indirect effect by using 10,000 bootstrap samples. We find that the indirect effect (.21)⁴ is
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7 positive and significant, with a 95% confidence interval [lower-level = .09; higher-level =
8
9 .36] which does not include zero. In conclusion, Pilot Study 2 provides evidence of the
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11 indirect relationship between music liking through positive brand attitudes via purchase
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13 intention. Thus, we confirm Hypothesis 1.
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18 19 **Main Study 2a and 2b**

20 21 *Sample, Experimental Design and Stimuli*

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24 Main Study 1a was a one-factor (music mode: major vs minor) between-subject
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26 design, for which we randomly assigned the participants to one of the two conditions. We
27
28 recruited 202 participants from MTurk, with 99 participants in the major mode condition and
2
30 103 in the minor mode condition. We exposed the former to background music that elicited
31
32 an inspired emotion. The other advertisement had minor mode music, evoking a “sad”
33
34 emotion. The inspiring music was also set at 110bpm (fast-inspiring and fast-sad music) to
35
36 keep the music tempo consistent. We randomly selected the background music mode with the
37
38 same music tempo (See Appendix 1). To check whether our music piece produced the
39
40 intended emotion (inspired and sad), we conducted another pre-test with 100 participants,
41
42 recruited from MTurk. Each participant listened to our inspiring piece of music and rated
43
44 their emotions using the PANAS scale (Watson et al., 1988). The manipulation check results
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46 suggested that the participants felt inspired more than other emotions. The experimental
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48 stimuli, procedures, and measures (i.e., music liking, positive brand attitudes, and purchase
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50 intention) for Main Study 2a were identical to those for Pilot Study and Main Study 1 (see
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58 ⁴ The indirect effect quantifies the effect of the independent variable (i.e., music liking) on the dependent
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60 variable (i.e., purchase intention) through the mediator (i.e., a positive brand attitude). It is the product of the
respective effects of the independent variable and the mediator when the former is held fixed (Hayes, 2018). The
results reveal the amount of mediation by the mediator.

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3 Appendix 1). Finally, we coded the participants who watched an advertisement with major
4 mode music (fast-inspiring music) as “1” (the dummy variable) and those who watched an
5 advertisement with minor mode music (fast-sad music) as “0”. The results for the variance
6 inflation factor analysis ruled out concerns about multicollinearity. Furthermore, to test the
7 robustness of Main Study 1a’s findings, Main Study 1b used the EcoMug advertisement (see
8 Appendix 1). In addition, we randomly selected “fast-inspiring” and “fast-afraid” music as
9 our music stimuli. Two hundred and eight participants were recruited from MTurk for Study
10 2b, where the participants were randomly assigned to one of the two conditions. The
11 remaining experimental design and measures were identical to those in Main Study 2a.
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24 “Insert Table 2 Here”
25

26 *Results*

27
28 To establish a baseline assumption, we completed the following steps. First, we
29 examined the direct and mediation effects. For the direct effect, we find a positive
30 relationship between music liking and purchase intention ($\beta = .46$, $p < .01$; the effect size is
31 above $.02$ – Cohen’s $f^2 = .26$). For the indirect relationship, our results support a positive
32 relationship between music liking and a positive brand attitude ($\beta = .57$, $p < .01$; the effect
33 size is above $.02$ – Cohen’s $f^2 = .68$), and also between a positive brand attitude and purchase
34 intention when accounting for the effect of music liking ($\beta = .63$, $p < .01$; the effect size is
35 above $.02$ – Cohen’s $f^2 = .32$). We find that the indirect effect (.36) is positive and significant,
36 with a 95% confidence interval [lower-level = .23; higher-level = .51] which does not include
37 zero. We confirmed a direct and mediation relation among music liking, positive brand
38 attitudes, and purchase intention. Such results also replicate our findings from the Pilot
39 Studies.
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Second, we examined the moderating effect of music mode on the relationship between positive brand attitudes and purchase intention. Using Hayes (2018)'s Process Model #1, our analysis ($\beta = .50$, $p < .01$; the effect size is above $.02$ – Cohen's $f^2 = .10$) confirmed this prediction. This indicates that purchase intention will increase by $.50$ units with a 1 unit increase in the joint effect of positive brand attitudes and the major mode music. We also plot our results in Figure 2. The graph shows that higher levels of positive brand attitudes have a greater influence on purchase intention when major mode music plays in advertisements. However, it also shows that lower levels of positive brand attitudes have a greater influence on purchase intention when minor mode music plays in advertisements. We reason that minor mode music helps to stimulate consumers' negative emotions (Juslin and Sloboda, 2011). When consumers have a less favourable attitude towards a firm's brand, using minor mode music in advertisements is more likely to reinforce such effects in terms of promoting purchase intention.

“Insert Figure 2 Here”

Hypothesis 2 posits that, as the music mode strengthens the relationship between positive brand attitudes and purchase intention such that the relationship is stronger in the case of major mode music, the indirect effect of music liking upon purchase intention via positive brand attitudes will be moderated by the music mode. Our proposed moderated mediation relationship (see Figure 1) is in line with the 2nd stage moderation model of Edwards and Lambert (2007), where the condition effects (moderating effects) appear on the path between the mediator and the dependent variable. According to Hayes (2018), the indirect effect of such a moderated mediation relationship is equal to the product of two coefficients: 1) the effect of the independent variable (music liking) on the mediator (a positive brand attitude) and 2) the conditional effect of the mediator – a 2-way interaction effect between the mediator (a positive brand attitude) and the moderator (major mode music)

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3 – on the dependent variable (purchase intention). Hayes (2018) also refers to the value of this
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5 product term as the “*index of moderated mediation*”.
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7

8 Following Hayes (2018)’s Process Model #14, we estimate the moderated mediation
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10 effect with 10,000 bootstrap samples (see Table 2). The results show that the indirect effect
11
12 (index of moderated mediation) between music liking and purchase intention (.29) is positive
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14 and significant, with a 95% confidence interval [lower-level = .13; higher-level = .45] which
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16 does not include zero. Thus, this supports Hypothesis 1b. In a different study (Main Study
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18 1b), we again tested the moderated mediating effect using Hayes (2018)’s Process Model #14
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20 with 10,000 bootstrap samples. We found that the indirect effect (.16) is positive and
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22 significant, with a 95% confidence interval [lower-level = .16; higher-level = .28] which does
23
24 not include zero. These findings confirm the moderating role of the major mode music on the
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26 indirect relationship between music liking and purchase intention through positive brand
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28 attitudes.
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3 *Main Study 3a and 3b*

37 *Sample, Experimental Design and Stimuli*

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40 Main Study 3a’s advertising messages focused on the EcoMug (a fictitious reusable
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42 mug brand). We recruited 397 participants from MTurk for Study 3a. We employed a 2
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44 (music mode: major vs minor) x 2 (music tempo: fast vs slow) between-subject design. We
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46 randomly assigned the participants to one of the four conditions: 1) music composed in the
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48 major mode to elicit an “inspired” feeling with a “slow” tempo (slow-music), 2) music
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50 composed in the major mode to elicit an “inspired” feeling with a “fast” tempo (fast-inspiring
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52 music), 3) music composed in the minor mode to elicit a “sad” feeling with a “slow” tempo
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54 (slow-sad music) and 4) music composed in the minor mode to elicit a “sad” feeling with a
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56 “fast” tempo (fast-sad music). We used the same measurement items and scales to assess
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3 purchase intention, positive brand attitudes, and music liking (see Appendix 1). For the music
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5 mode, we coded as “1” (dummy variable) the participants who watched an advertisement
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7 with major mode music and “0” the participants who watched an advertisement with minor
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9 mode music. For the music tempo, we coded as “1” the participants who watched an
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11 advertisement with a fast music tempo and “0” the participants who watched an
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13 advertisement with a slow music tempo. According to the collinearity diagnosis, all of the
14
15 variance inflation factor values were below 3, so multicollinearity was not a severe problem
16
17 for our inferences. Furthermore, Main Study 3b used the EcoCar advertisement. We
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19 randomly selected “fast-inspiring”, “slow-inspiring”, “fast-sad” and “slow-sad” conditions
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21 for this study, with 402 participants recruited from MTurk. The remaining experimental
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23 design and measures were identical to those in Main Study 3a.
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31 *Results*

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33 We followed the same approach as indicated above to establish a baseline assumption.
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35 First, we tested the direct and mediation effects. We confirmed a positive relationship
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37 between music liking and purchase intention ($\beta = .45$, $p < .01$; the effect size is above .02 –
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39 Cohen’s $f^2 = .23$) and there is a mediating role of a positive brand attitude (indirect effect =
40
41 .26 with a 95% confidence interval [lower-level = .19; higher-level = .30] which does not
42
43 include zero). Second, we tested the three-way interaction effect of positive brand attitudes,
44
45 major mode and fast tempo on purchase intention to highlight the joint moderation effects of
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47 music mode and tempo on the relationship between positive brand attitudes and purchase
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49 intention. Using Hayes (2018)’s Process Model #3, our analysis show that this prediction is
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51 confirmed ($\beta = .45$, $p < .05$; the effect size is above .02 – Cohen’s $f^2 = .14$). This indicates
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53 that purchase intention will increase by .45 units with a 1 unit increase in the joint effect of
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55 positive brand attitudes, major mode music and fast music tempo. We also plot the three-way
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3 interaction effects in Figure 2. The graph shows that positive brand attitudes at all levels will
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5 strongly affect purchase intention, in conjunction with major mode and fast tempo
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7 background music in advertisements.
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10 Hypothesis 3 posits that, as music mode and tempo jointly strengthen the relationship
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12 between positive brand attitudes and purchase intention, such that the relationship is stronger
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14 for major mode music with fast tempo, the indirect effect of music liking upon purchase
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16 intention via positive brand attitudes will be moderated jointly by music mode and music
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18 tempo. Using the same approach, we calculate the indirect effect (index of moderated
19
20 mediation) of the moderated mediation relationship as the product of two coefficients: 1) the
21
22 effect of the independent variable (music liking) on the mediator (a positive brand attitude)
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24 and 2) the conditional effect of the mediator on the dependent variable (purchase intention).
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26
27 However, at this time, the conditional effect of a positive brand attitude on purchase intention
28
29 is a three-way interaction among a positive brand attitude, major mode and fast tempo.
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33 Using Hayes (2018)'s Process Model #18 with 10,000 bootstrap samples, we found
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35 that the indirect effect (.12) is positive and significant, with a 95% interval [lower-level = .04;
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37 higher-level = .25] which does not include zero. Thus, this supports Hypothesis 3. In a
38
39 different study (Main Study 3b), we again tested the moderated mediating effect using Hayes
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41 (2018)'s Process Model #18 with 10,000 bootstrap samples. We find that the indirect effect
42
43 (.20) is positive and significant, with a 95% confidence interval [lower-level = .01; higher-
44
45 level = .40] which does not include zero. These findings confirm the combined moderating
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47 role of major mode music and fast music tempo on the indirect relationship between music
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49 liking and purchase intention through positive brand attitudes.
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53 54 55 56 **Discussion and Concluding Remarks**

57 58 *Theoretical Contribution*

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This work provides new insights into how the subjective (i.e., music liking) and objective (i.e., music mode and music tempo) characteristics of music in advertisements can work jointly to affect purchase intention. We reveal that brand attitude formation plays an important role in this process. Our results confirm that consumers' subjective perception of the likeability of a piece of music used in advertisements can facilitate the development of positive brand attitudes, which in turn promotes purchase intention. Our work also advances the view that the objective characteristic of music, such as the music mode, can influence the effectiveness of this process. To date, the literature concerning the influence of music mode on marketing communication (see Table 1) has focused primarily on examining its direct impact on consumer behaviour (e.g., Alpert et al., 2005; Kellaris and Kent, 1992), instead of viewing it as a critical boundary condition for translating the brand attitude formation process into marketing results (i.e., purchase intention). Our results provide strong evidence that the use of major mode music in advertisements can amplify the beneficial effect of positive brand attitudes on purchase intention. As a result, music mode moderates the mediation effect of music liking regarding purchase intention via positive brand attitudes. These findings highlight how music liking (subjective characteristics of music) and music mode (objective characteristics of music) can work together to persuade consumers to purchase a firm's products.

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Furthermore, the previous research on this area focuses mainly on analysing the direct influence of music tempo on consumers' perceptions and recall of advertised content (e.g., Brooker and Wheatley, 1994; Oakes and North, 2006). We extend this literature by investigating the role of music tempo, combined with music mode, in affecting the relationship between music liking and purchase intention through positive brand attitudes by amplifying the impact of positive brand attitudes on purchase intention. We show three-way interaction effects of positive brand attitudes, major mode and fast tempo on purchase

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3 intention. Our moderated mediation analysis demonstrates that the indirect effects of music
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5 liking, through positive brand attitudes to purchase intention, are contingent on the
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7 combination of major mode music and a fast music tempo. Thus, our work not only advances
8
9 a view that recognises the influence of advertising background music tempo on marketing
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11 communication (see Table 1), but also addresses our research objective that explores how the
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13 subjective (i.e., music liking) and objective (music mode and music tempo) characteristics of
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15 music in advertisements can work jointly to affect purchase intention. Our literature review
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17 suggests that researchers have paid limited attention to understanding the influence of music
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19 on consumer behaviour from this angle (e.g., Abolhasani et al., 2017; Hahn and Hwang,
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21 1999).

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26 Finally, we add to the information processing theoretical perspective of advertising
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28 (e.g., Ching et al., 2013; Frias et al., 2008; MacInnis and Jaworski, 1989), which the
29
30 marketing literature uses to explain how consumers process marketing information and the
31
32 effectiveness of advertising (Priluck and Till, 2004; Thompson and Hamilton, 2006). Our
33
34 study demonstrates that the applicability of information processing theory explains the joint
35
36 influence of the subjective and objective characteristics of music in marketing
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38 communication. We suggest that music mode and tempo can be considered important
39
40 boundary conditions that influence the brand attitude formation process, stimulated by music
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42 liking, leading to an enhanced purchase intention. In doing so, we develop a holistic
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44 framework that accounts for the influence of both the objective and subjective characteristics
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46 of music on information processing in advertisements.
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50 51 52 53 ***Managerial Implications***

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55 Our findings provide marketers with a deeper understanding of how to incorporate
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57 music into advertisements that seek to promote products. In particular, music liking related to
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3 an advertisement can help to enhance purchase intention. However, marketers must
4
5 understand that simply incorporating a piece of music that consumers like when designing an
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7 advertisement may be insufficient to enhance their purchase intention. It is vital to emphasise
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9 the firm's brand value in an advertisement.
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12 Furthermore, marketers must recognise the crucial role of music mode and music
13
14 tempo when incorporating music in advertisements. More specifically, the use of the major
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16 mode music in advertisements can enhance the effect of positive brand attitudes on purchase
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18 intention, which will in turn enhance the benefits of incorporating music that consumers like
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20 when designing advertisements. Furthermore, our findings also reveal that the beneficial
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22 effects of major mode music with a fast tempo surpass those generated by using major mode
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24 music with a slow tempo. In practice, marketers seeking to sell products should use
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26 appropriate background music that reinforces positive feelings, such as inspiration, hope, and
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28 motivation, to ensure that the brand attitude formation process leads to an enhanced purchase
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30 intention.
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34 35 36 37 38 ***Research Limitations***

39
40 There are several limitations to the study. First, although music can elicit similar
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42 emotions in people, irrespective of the individual listeners' musical background, the context
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44 may play a differentiating role in terms of stimulating feelings. Music mode may convey
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46 different meanings in different cultural and geographical contexts, and there may be
47
48 differences between the degrees to which customers like various pieces of music in varied
49
50 cultures (Fang et al., 2017).
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53
54 Second, we tested and validated our framework by developing radio advertisements
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56 for two fictitious products: an electric car (EcoCar) and a reusable coffee mug (EcoMug).
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58 Although this context might be useful for examining consumers' responses concerning the
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2
3 use of music in advertisements (Fowler III and Close, 2012; Müllensiefen, 2020), it also
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5 limits the generalisability of our findings. Furthermore, the design of green advertisements
6
7 can focus not only on stimulating respondents' "hot" emotions favourably towards a firm's
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9 sustainable brand image and products, but also on triggering their cognitive thinking about
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11 their environmental responsibility.
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15 Third, in our arguments leading to the development of the research hypotheses, we
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17 suggest that advertisements with different pieces of music can affect consumers' emotions.
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19 Consequently, the consumer brand attitude and purchase intention will also be affected.
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21 However, our framework did not include any "emotion" construct (e.g., happiness, sadness,
22
23 etc.).
24

25
26 Fourth, although the present research adopted a robust methodological approach by
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28 creating various pieces of music (see Appendix 3) merely through manipulating the music
29
30 mode and tempo, we used an identically structured voiceover (the narration) for all conditions
31
32 (see Appendix 2). It may be argued that, for example, for minor mode music that seeks to
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34 elicit sad emotions to be effective in an advertisement, the voiceover of the advertisement
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36 copy should also be congruent with the feelings that the music seeks to elicit and contain a
37
38 sad narration, and vice versa. Furthermore, the pieces of music used in the current research
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40 project were all instrumental in nature, without any lyrics.
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47 ***Future Research Opportunities***

48
49 These research limitations lay the ground for future research directions. First,
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51 although music can elicit similar emotions in people, the context may play a differentiating
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53 role in stimulating feelings irrespective of the listeners' musical background. As Hargreaves
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55 et al. (2002, p. 13) point out, "listeners are not passive consumers, but active partners in a
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57 cultural process who use music to fulfil different functions according to different social
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1
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3 contexts". National music styles may evoke concepts and images congruent with cultural
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5 stereotypes of that country. For example, while German music might make consumers think
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7 of beer and bratwurst, French music might evoke images of wine and the Eiffel Tower (North
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9 et al., 1997; Tekman and Hortaçsu, 2002). Researchers could explore the effects of music
10
11 mode and tempo in advertising in different cultures to enhance the generalizability of the
12
13 findings.
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16
17 Second, researchers on a similar topic should consider including emotion constructs in
18
19 the framework to explain precisely how different advertisements affect purchase intention. To
20
21 further improve the nomological value of the study, researchers may also investigate different
22
23 emotional concepts and advertising contexts that may affect the formation of consumer brand
24
25 attitudes when music plays in advertisements.
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29 Third, researchers could examine whether the overarching positive effects of major
30
31 mode music in eliciting a positive response towards advertising overshadow the potential
32
33 benefits of eliciting negative emotions in consumers in order to generate favourable
34
35 attitudinal and purchase intention outcomes if the pieces of music and voiceover themes are
36
37 congruent. Researchers can also explore how using music with lyrics affects the elicitation of
38
39 positive and negative emotions and, consequently, consumers' attitude towards the advertised
40
41 brand and buying behaviour, as well as investigating the interaction between lyrics, mode,
42
43 and tempo, on the one hand, and the elicitation of feelings by advertisements, on the other.
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45

46
47 Fourth, consumers may respond differently to product advertising than service
48
49 advertising, and service represents most of our economic activities (Abernethy and Butler,
50
51 1992). Researchers might explore the effects of music on service brand and purchase
52
53 intention. Fifth, in this research, the genre of music and instruments used to play the various
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55 pieces of music were the same, in an attempt to control their effects. Researchers might
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manipulate these in order to explore in greater depth the influence of music on marketing communication.

Lastly, other subjective and objective characteristics of music (see Table 1) might affect the influence of music in advertising (e.g., volume, strings vs brass, modern vs classical, etc.). In this research, we attempt to control all of these factors in our experiments by ensuring that all of the “conditions” are kept identical. The only difference between the pieces of music that play in advertisements was their mode and tempo. Researchers might explore the influence of other subjective and objective characteristics of music in our framework to offer a more complete picture of the role of music in the brand attitude formation process.

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Figure 1: Framework

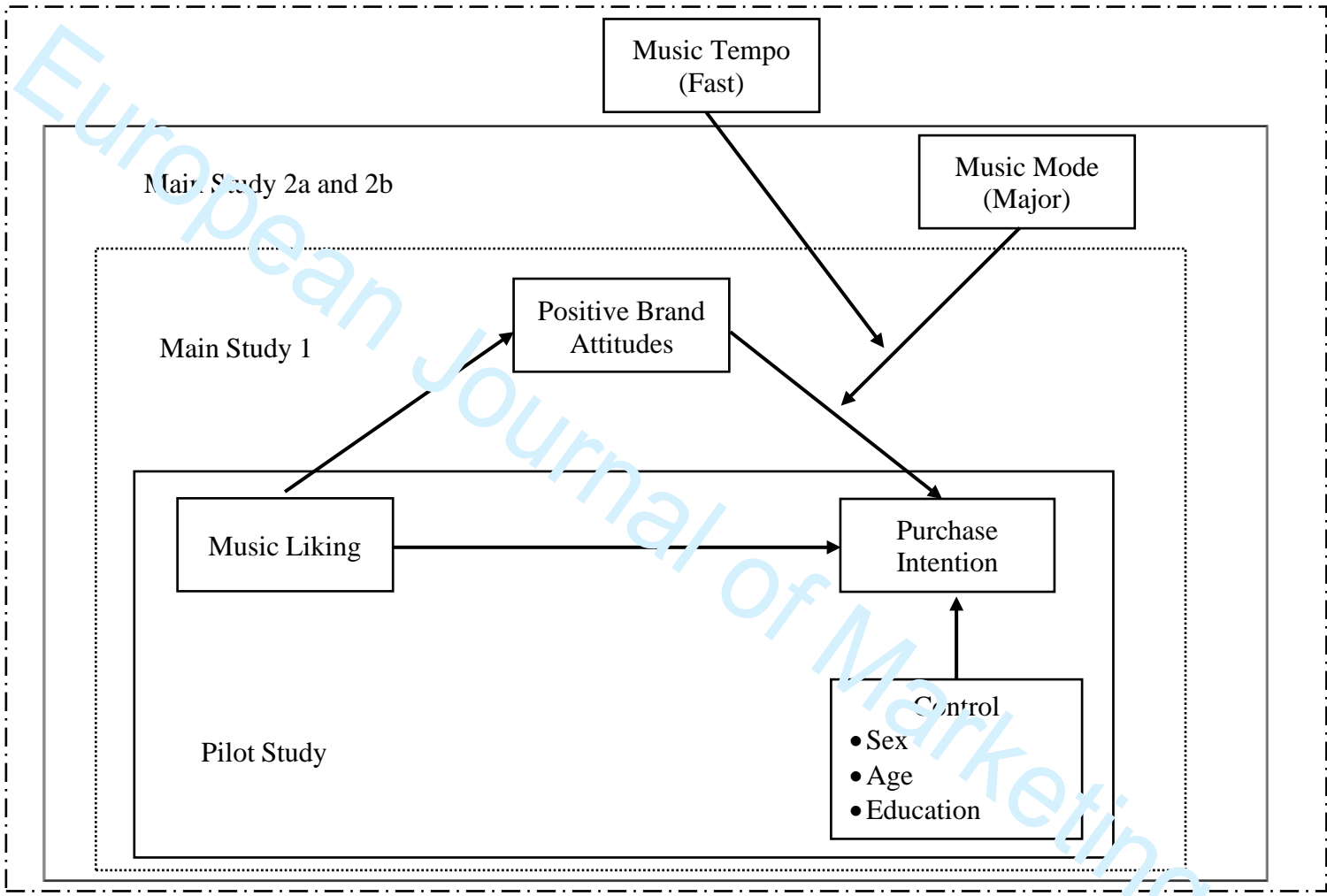


Table 1: Overview of Existing Research about Music in Marketing

		Characteristics of Music	
		Objective	Subjective
Practices	Marketing Communication	<ul style="list-style-type: none"> • Tempo (Hahn and Hwang 1999; Kellaris and Kent 1993; Oakes and North 2006) • Texture (Kellaris and Kent 1993) • Volume (Kellaris and Rice 1993) • Lyrics (Anisimova et al. 2014; Chou and Lien 2014) • Key (Kellaris and Kent 1992, 1993) • Ending (Guido et al. 2016) • Mode (Alpert et al. 2005; Kellaris and Kent 1991) 	<ul style="list-style-type: none"> • Liking (Abolhasani and Oakes 2017; Alpert and Alpert 1989; Craton et al. 2008; Gorn 1982; Mittal 2015; Oakes 2007; Simpkins and Smith 1974; Vermeulen and Beukeboom 2016) • Familiarity (Chou and Lien 2014; Hahn and Hwang 1999) Nostalgia (Apaolaza-Ibantilde et al. 2010; Chou and Lien 2014) • Mood (Alpert et al. 2005) • Arousal (MacInnis and Park 1991) • Complexity (Lavack et al. 2008)
	"In-Store" Background	<ul style="list-style-type: none"> • Tempo (Caldwell and Hibbert 2002; Knoferle et al., 2012; Milliman 1982, 1986; Oakes 2003) • Volume (Morrison et al. 2011; North et al. 2000) • Style (North and Hargreaves 1998; North et al. 2000) • Mode (Knoferle et al., 2012) 	<ul style="list-style-type: none"> • Liking (Andersson et al. 2012; Dubé et al. 1995; Hui et al. 1997; Morin et al. 2007; North and Hargreaves 1996; Vaccaro et al. 2012; Vida et al. 2007) • Arousal (Dubé et al. 1995; Mattila and Wirtz 2001)

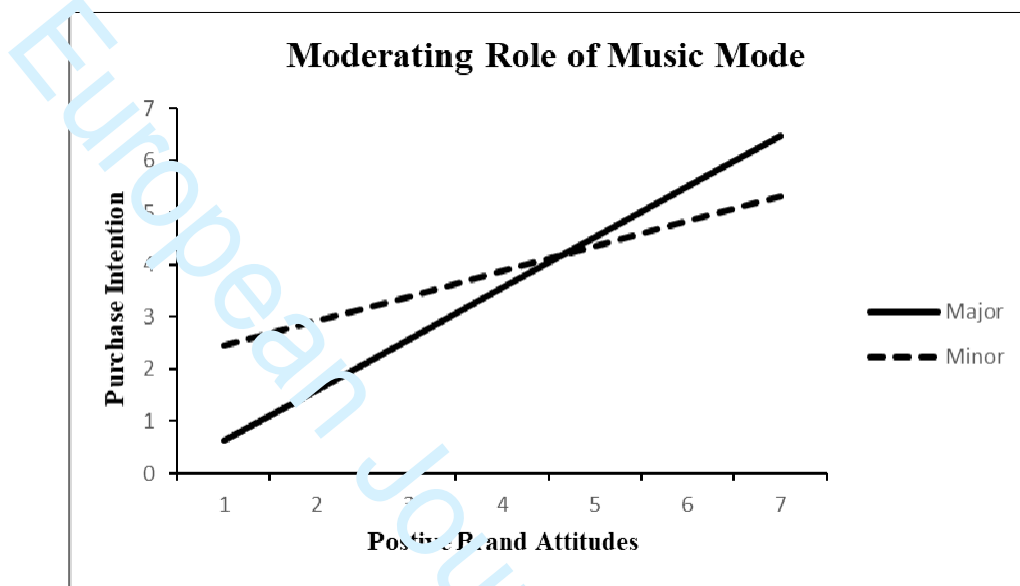
Table 2: Main Studies

	Main Study 1		Main Study 2a		Main Study 2b		Main Study 3a		Main Study 3b	
	Model 1	Model 2	Model 3	Model 4	Model 5	Model 6	Model 7	Model 8	Model 9	Model 10
Outcome	PBA	PI	PBA	PI	PBA	PI	PBA	PI	PBA	PI
Controls										
Sex	.37(1.41)	-0.14(-.48)	.26(1.61)	-.38(-2.15)**	-.61(-3.97)***	-.07(-.36)	-.25(-2.24)**	.04(.27)	.03(.26)	-.20(-1.52)
Age	-.04(-.28)	-.25(-1.75)*	.03(.42)	-.46(-5.33)***	-.01(-.13)	-.07(-1.03)	.04(.93)	-.12(-2.58)**	.03(.54)	-.42(-6.50)***
Edu	.02(.23)	.01(.13)	.02(.47)	.10(1.71)*	.01(.13)	.17(2.35)**	.01(.30)	.08(1.66)*	.01(.24)	.093(2.072)**
Predictors										
Music Liking	.42(5.85)***	.22(2.413)**	.57(11.46)***	.10(1.44)	.34(7.98)***	.17(2.59)*	.30(8.94)***	.20(4.60)***	.53(15.16)***	.13(2.58)**
Positive Brand Attitudes [PBA]		.50(4.612)***		.66(8.33)***		.61(5.47)***		.88(15.18)***		.64(6.63)***
Music Mode (Major)				.05(.19)		-2.63(-2.81)**		-.07(-.59)		-.83(-1.14)
Music Tempo (Fast)								-.14(-1.10)		.88(1.48)
Interaction										
PBA x Music Mode (Major)				.50(3.85)***		.46(2.91)**		.20(1.88)*		.12(.87)
PBA x Music Tempo (Fast)								-.01(-.10)		-.25(-2.03)**
Major x Music Tempo (Fast)								.11 (.44)		-1.51(-1.49)
PBA x Music Mode (Major) x Music Tempo (Fast)								.41(1.95)**		.38(1.98)**
Intercept			1.97(4.13)***	4.38(7.82)***	4.29(8.40)***	-.53(-.63)	4.13(12.17)***	3.52(8.91)***	2.43(7.24)***	1.25(2.37)**
Model Summary										
F-Value	9.30***	10.91***	38.33***	39.88***	2.42***	22.80***	21.68***	35.74***	61.83***	40.21***
R-Square	.27	.35	.44	.60	.29	.44	.18	.51	.38	.53

Notes:
 Study 1: N=108; Study 2a: N = 202; Study 2b: N = 208; Study 3a: N = 397; Study 3b: N = 402
 *** p < .01; ** p < .05; * p < .10
 PI = Purchase Intention
 Unstandardized Coefficients are reported with (t-value) in parentheses
 Bootstrap sample = 10000 with 95% confidence intervals
 Indirect effect (Model 1 and Model 2) = .21 LLCI (.09) ~ ULCL (.36)
 Indirect effect (Model 3 and Model 4) = .29 LLCI (.13) ~ ULCL (.45)
 Indirect effect (Model 5 and Model 6) = .16 LLCI (.59) ~ ULCL (.28)
 Indirect effect (Model 7 and Model 8) = .12 LLCI (.04) ~ ULCL (.25)
 Indirect effect (Model 9 and Model 10) = .20 LLCI (.01) ~ ULCL (.40)

Figure 2: Graphical Representation

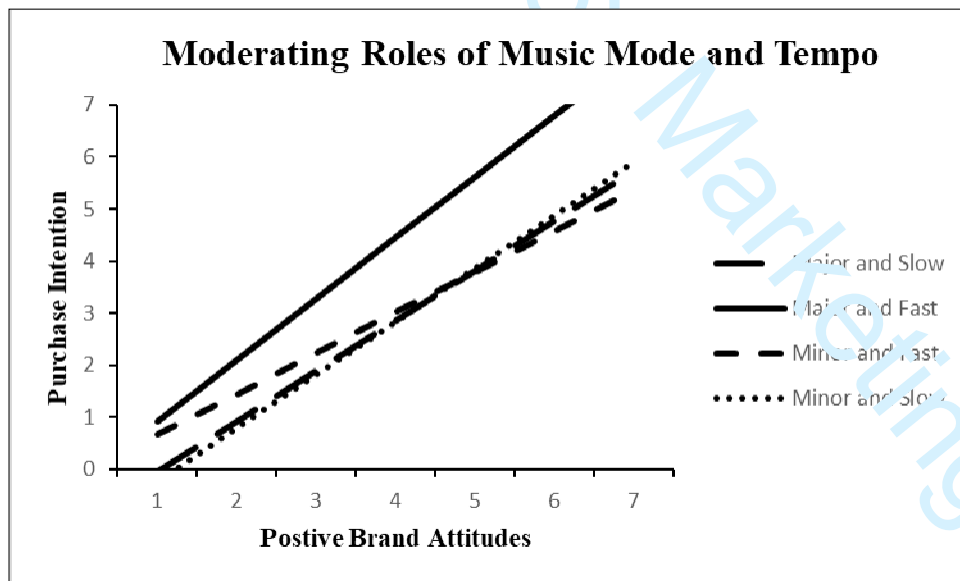
a) Moderating Role of Music Mode – Study 2a



Note:

Two-way interaction effect of positive brand attitudes and music mode. The graph shows that higher levels of positive brand attitudes have a greater influence on purchase intention when using major mode music in advertisements. However, it also shows that lower levels of positive brand attitudes have a greater influence on purchase intention when using minor mode music in advertisements.

b) Moderating Roles of Music Mode and Tempo – Study 3a



Note:

Three-way interaction effect of positive brand attitudes, music mode and music tempo. The graph shows that positive brand attitudes at all levels will strongly affect purchase intention, accompanying major model and fast tempo background music in advertisements.

Appendix 1: Experiments and Measurements

Experiments	Pilot Study	Main Study 1	Main Study 2a	Main Study 2b	Main Study 3a	Study 3b
Advertising Copy	EcoCar	EcoCar	EcoCar	EcoMug	EcoMug	EcoCar
Music Conditions	Slow-Inspiring No Music	Fast-Afraid	Fast-Inspiring Fast-Sad	Fast-Inspiring Fast-Afraid	Fast-Inspiring Slow-Inspiring Fast-Sad Slow-Sad	Fast-Inspiring Slow-Inspiring Fast-Sad Slow-Sad
Participant Sex	Male (116); Female (81)	Male (56); Female (52)	Male (105); Female (97)	Male (115); Female (93)	Male (214); Female (183)	Male (205); Female (197)
Participant Age	16 ~ 24 years (3) 25 ~ 34 years (60) 35 ~ 44 years (39) 45 ~ 54 years (31) 55 ~ 64 years (63) 65+ years (1)	16 ~ 24 years (1) 25 ~ 34 years (5) 35 ~ 44 years (31) 45 ~ 54 years (21) 55 ~ 64 years (50) 65+ years (0)	16 ~ 24 years (4) 25 ~ 34 years (59) 35 ~ 44 years (40) 45 ~ 54 years (39) 55 ~ 64 years (58) 65+ years (2)	16 ~ 24 years (12) 25 ~ 34 years (59) 35 ~ 44 years (57) 45 ~ 54 years (33) 55 ~ 64 years (26) 65+ years (21)	16 ~ 24 years (34) 25 ~ 34 years (144) 35 ~ 44 years (83) 45 ~ 54 years (67) 55 ~ 64 years (45) 65+ years (24)	16 ~ 24 years (10) 25 ~ 34 years (120) 35 ~ 44 years (80) 45 ~ 54 years (78) 55 ~ 64 years (111) 65+ years (3)
Participant Education*	Level 1 (10) Level 5 (35) Level 2 (37) Level 6 (30) Level 3 (27) Level 7 (15) Level 4 (19) Level 8 (1)	Level 1 (6) Level 5 (28) Level 2 (30) Level 6 (5) Level 3 (30) Level 7 (2) Level 4 (3) Level 8 (4)	Level 1 (5) Level 5 (36) Level 2 (27) Level 6 (51) Level 3 (43) Level 7 (20) Level 4 (17) Level 8 (3)	Level 1 (1) Level 5 (21) Level 2 (0) Level 6 (84) Level 3 (19) Level 7 (34) Level 4 (45) Level 8 (4)	Level 1 (1) Level 5 (70) Level 2 (52) Level 6 (170) Level 3 (79) Level 7 (48) Level 4 (38) Level 8 (9)	Level 1 (12) Level 5 (70) Level 2 (60) Level 6 (106) Level 3 (74) Level 7 (36) Level 4 (39) Level 8 (5)
Music Liking (Caldwell and Hibbert, 2002) 1=Strongly disagree; 7 = Strongly agree	Mean = 5.16** SD = 1.47**	Mean = 3.86 SD = 1.73	Mean = 4.41 SD = 1.64	Mean = 4.94 SD = 1.72	Mean = 4.94 SD = 1.64	Mean = 4.51 SD = 1.66
I like the music that was playing.	Loading = N/A	Loading = N/A	Loading = N/A	Loading = N/A	Loading = N/A	Loading = N/A
Positive Brand Attitudes (Belch, 1981) 1 = Not at all; 7 = Very much	Mean = N/A*** SD = N/A*** Cronbach's α = N/A***	Mean = 4.62 SD = 1.48 Cronbach's α = .93	Mean = 4.83 SD = 1.45 Cronbach's α = .95	Mean = 5.73 SD = 1.24 Cronbach's α = .97	Mean = 5.68 SD = 1.21 Cronbach's α = .96	Mean = 4.95 SD = 1.41 Cronbach's α = .94
I found the brand – good	Loading = N/A***	Loading = .79	Loading = .87	Loading = .90	Loading = .88	Loading = .86
I found the brand – likable	Loading = N/A***	Loading = .89	Loading = .89	Loading = .92	Loading = .89	Loading = .88
I found the brand – favourable	Loading = N/A***	Loading = .91	Loading = .88	Loading = .91	Loading = .89	Loading = .87
I found the brand – appealing	Loading = N/A***	Loading = .87	Loading = .88	Loading = .90	Loading = .88	Loading = .88
Purchase Intention (MacKenzie et al., 1986) 1 = Not at all; 7 = Very much	Mean = 3.79 SD = 1.86 Cronbach's α = .94	Mean = 3.17 SD = 1.71 Cronbach's α = .96	Mean = 3.61 SD = 1.82 Cronbach's α = .95	Mean = 4.60 SD = 1.80 Cronbach's α = .95	Mean = 4.64 SD = 1.74 Cronbach's α = .95	Mean = 3.76 SD = 1.80 Cronbach's α = .95
I like to purchase the product.	Loading = .86	Loading = .90	Loading = .87	Loading = .87	Loading = .86	Loading = .88
I am probably going to purchase the product.	Loading = .89	Loading = .94	Loading = .92	Loading = .92	Loading = .91	Loading = .92
I am possibly going to purchase the product.	Loading = .90	Loading = .92	Loading = .90	Loading = .91	Loading = .90	Loading = .90

Note:

Number of participants are reported in parentheses

* Level 1 = Elementary school; Level 2 = Some high school, no diploma; Level 3 = High school graduate, diploma or equivalent; Level 4 = Some college credit, no degree; Level 5 =

Trade/technical/vocational trading associate degree; Level 6 = Bachelor's degree; Level 7 = Master's degree; Level 8 = Doctorate degree

**Only apply to the music condition (vs. no music condition as control group)

*** Positive Brand Attitudes is not tested in Pilot Study 1

Appendix 2: Advertising copies for two products

Reusable Coffee Mug (brand name: EcoMug)

How often do you buy a cup of coffee?

How often do you think about the environmental impacts of using disposable cups?

Despite looking like they are made of cardboard, 99 per cent of disposable coffee cups are not recyclable and every minute over one million cups end up in landfills globally.

Using your reusable **EcoMug**, you can save 365 disposable cups if you drink one coffee every day.

This may seem a small thing, but it can have a big impact to reduce waste and pollution within our environment. If everyone made one small change, could we all change the world?

EcoMug! Choose to reuse!

Electric Car (brand name: EcoCar)

How often do you drive your car?

How often do you think about the environmental impacts of using gasoline cars?

In 2013, transportation contributed more than half of the carbon monoxide and nitrogen oxides, and almost a quarter of the hydrocarbons emitted into our air.

Driving your electric **EcoCar**, you will produce half the CO2 emissions of a gasoline car, including the manufacturing emissions.

If most things in our lives run on electricity when they could run on gasoline, why do our 57 run on gasoline when they could run on electricity? Could we all change the world?

EcoCar, for the love of the air!

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Appendix 3: Music composition methodology

Standard abbreviations for chords: the chord takes its name from a “root” pitch, given as a capital letter. If the chord is major, no additional symbol is needed; if minor, a small “m” is added. Thus C major is “C”, and C minor is “Cm”. Other symbols appear, usually numerical, which indicate additional pitches in the chord that do not generally affect its major or minor quality, but give clues as to its function in the harmonic sequence.

The pieces all make use of a standard 5-part string orchestra: 1st violins (sometimes subdivided into two groups), 2nd violins, violas, cellos, and basses. These sounds were created with sample playback on “Logic”, a Mac-based digital audio workstation. The sounds all come from the “Vienna Symphonic Library” sample collection, being a mixture of the standard “orchestral strings” with some more recent patches from their “Synchron strings” library. Although the sounds themselves are realistic (they are recordings, painstakingly assembled by the Vienna Symphonic Library workforce, of actual musicians playing real instruments), a lot of work has to go into shaping them expressively to make them sound like a real ensemble. In fact, over the years, this aim has become less and less relevant: the introduction of this technology has itself begun to shape the expectations of the audience, and particularly in the genres of film music and game music, the computerised sound, and the mannerisms that it encourages (increased size of ensemble, and of the apparent space in which it is recorded, repetitive nature of material, for instance), have been accepted as the norm.

The pieces, as notated, are 16 bars long, of which the second 8 bars are effectively a repeat of the first 8, with some differences. They were conceived in 70bpm. The 70bpm recorded versions fade out before 16 bars; the 110bpm versions loop round to the beginning again, and fade out before the second round is complete. The tempo changes were effected mechanically, by changing the tempo setting on the playback of the midi information. Often a drastic change in tempo can have odd effects, but no action was taken to modify the pieces after tempo operations, and the 110bpm pieces are identical in every way with their 70bpm counterparts, except in tempo.

We decided to avoid creating a complex melody, partly because we thought that anything too busy on the top line would distract attention from the advertising copy (a common problem). In the absence of a prominent melody, the top line (played on the violins) comes to the fore, moving in long slow notes, and so too does some of the figuration (faster-moving notes) on the violas and second violins. The basses, playing pizzicato, perform the same role in all pieces, marking out the *tempo* by articulating emphatic points in the bar. They also supply the bassline for the harmony, but in this they are largely duplicating the role of the cellos.

For the “sad” minor mode piece, the musical composers chose the key of **C minor**, and used minor chords only, as far as possible. However, even in a minor mode music piece, the composer has both major and minor chords at his/her disposal. There are three minor chords available in the key of C minor: Cm, Fm and Gm. In addition, the composers have used the chord G, rather than Gm, at cadences (ends of sequences). Though it is a major chord, it paradoxically helps to define the key as C minor.

The musical score is presented in four systems, each with five staves: Violin 1, Violin 2, Viola, Violoncello, and Double Bass. The key signature is C minor (three flats) and the time signature is 4/4. Chord markings are placed above the staves to indicate the harmonic structure.

System 1 (Measures 1-4): Chords are Cm, Gm, Cm, and Fm. The Double Bass part includes a 'pizz.' (pizzicato) marking.

System 2 (Measures 5-9): Chords are Cm, Gm, Fm, G(sus4), G, and Cm. Measure 5 is marked with a '5' above the staff.

System 3 (Measures 10-13): Chords are Gm, Cm, Fm, and Cm. Measure 10 is marked with a '10' above the staff.

System 4 (Measures 14-17): Chords are Gm, Fm, G(sus4), and G7. Measure 14 is marked with a '14' above the staff.

For the “inspiring” major mode piece, the composers transformed the “sad” piece into C major by shifting all E flats up to E natural, all A flats up to A natural, and all B flats up to B natural. This created a piece harmonised entirely with major chords. To connote determination, they replaced the long slow notes of the cello with a pattern of shorter, more strongly articulated notes.

Violin 1

Violin 2

Viola

Violoncello

Double Bass

pizz.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

Vln. 1

Vln. 2

Vla.

Vc.

Db.

For the “afraid” minor piece, the composers shifted all the notes from the “sad” C minor piece upwards by 9 semitones. This put the whole piece into **A minor**, and it was then possible for them to raise, or lower, any notes they chose by an octave.

The musical score is arranged in four systems, each containing five staves: Violin 1, Violin 2, Viola, Violoncello, and Double Bass. The key signature is one flat (B-flat), and the time signature is 4/4. The score includes various musical notations such as rests, notes, stems, beams, and slurs. Chord symbols are placed above the staves, including Am, Em(b9)/D#, F7, E(sus4), E7(b9), Dm9, E, and E7. Performance instructions like "half with mutes", "pizz.", and "sul pont." are included. Measure numbers 5, 10, and 14 are indicated at the start of their respective systems.