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Music-listening in everyday life: Devices and choice

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Abstract

Utilizing the Experience Sampling Method, this research investigated how individuals encounter music in everyday life. Responding to two text messages sent at random times between 8:00 and 23:00 daily for one week, 177 participants completed self-reports online regarding their experience with any music heard within a two-hour period prior to receipt of the message. Overall, the radio, mobile MP3 players, and computers featured prominently. Detailed analyses revealed significant patterns in device usage based on time of day; ratings of the music in terms of choice, liking, arousal, and attention; mood; and the perceived consequences of the music. While feeling lethargic associated with recorded music broadcasted in public, in contrast personal music collections promoted contentment. Similarly, devices allowing for personal input were met with positive consequences, like motivation. The current findings imply that the greater control that technology affords leads to complex patterns of everyday music usage, and that listeners are active consumers rather than passive listeners.

Keywords

choice, everyday life, experience sampling method, listening device, music

Twenty-first century technologies are changing the way in which people interact with music (Nill & Geipel, 2010; North, Hargreaves, & Hargreaves, 2004; Sloboda, Lamont, & Greasley, 2009). Music is no longer restricted to live performance, physical recordings or radio broadcasts, but can instead be accessed via several newer, typically digital methods, such as smart phones, tablet computers, and desktop computer applications which can stream millions of pieces of music on demand. As a result, people have many more opportunities than hitherto for integrating music into their daily lives, and into situations where it was previously not available (Heye & Lamont, 2010; Juslin, Liljeström, Västfjäll, Barradas, & Silva, 2008; Sloboda et al., 2009). Moreover, improving technology gives people considerable control over the music that

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they listen to, even in public places (North et al., 2004; O'Hara & Brown, 2006). In short, advances in music technology present the opportunity for music to become increasingly prevalent in people's daily lives.

One way to examine how people experience music in everyday life is through the Experience Sampling Method (see Czikszentmihalyi & Lefevre, 1989; Sloboda, O'Neill, & Ivaldi, 2001). The Experience Sampling Method allows for naturalistic data collection, as it permits the study of responses as they unfold in contexts naturally (Juslin et al., 2008). With this method, throughout the day, participants receive signals via handheld devices (such as their mobile phones) that serve as prompts to respond to a series of questions. For instance, Greasley and Lamont (2011) used the Experience Sampling Method to explore engagement with music and Juslin et al. (2008) considered emotional reactions to music in everyday life. North et al. (2004) used text message prompts to ask participants to report who they were with, what they were doing, where they were, when the experience occurred, and why they were exposed to music in that situation. Participants indicated that music experiences were most likely to occur at home during the evening, but more interesting is that the music experiences in question were rarely the focus of participants' attention, but more often an accompaniment or backdrop to other tasks in which they were engaged. These results suggest that people may not be taking full advantage of the potential of music technology to allow access to music "on-the-go," but instead continue to access music in conventional contexts where portability is not required. Moreover, although a variety of music listening devices have come about through digitization, we can only speculate as to how people might use these devices and how they might influence music listening practices. Digital listening devices provide considerable opportunities for varying the location and means of music listening, and at present we have very little information concerning whether and how these opportunities influence actual practice.

The present research builds on North et al.'s (2004) by 1) exploring the devices that people use to access music in their everyday lives, and 2) examining whether different ways of accessing music lead people to experience music in different ways. Six broad research questions guided this research, as follows, with literature relevant to each reviewed below:

1. What particular devices do people use to listen to music in their everyday life?
2. Are the devices by which people experience music related to characteristics of the individuals concerned, such as age, gender, how important a person considers music to be in his/her life, a person's average amount of daily listening, and/or a person's level of music education?
3. Does the time of day/day of week relate to the devices people use to listen to music?
4. How does device usage relate to one's mood?
5. How does device usage relate to the consequences of hearing music in everyday contexts?
6. Does the ability to have choice in what is heard relate to the devices by which people hear music?

Device selection, listener characteristics, and time

Although music technology has developed rapidly, adoption of these technologies would be expected to occur over a much longer time frame, and to varying extents among differing groups of consumers. For instance, Tepper and Hargittai (2009) reported that students are "frequent early adopters of new technology" (p. 235), and recent research has found that teenagers are more likely to access music via YouTube rather than via radio or CDs, while adults are

much more likely to access music via radio or CD (Nielsen company, 2012; Smith, 2012). These findings suggest, therefore, that the ways in which people access music might differ depending on age, with the hypothesis that with younger people more likely to use mobile and computer devices to access music, whereas older cohorts use more traditional formats, such as radio and CD. Other demographic characteristics may be related to how people interact with music also since, for instance, North and Hargreaves (2008) review evidence showing that technology adoption and music piracy are more common among groups that can be defined in terms of income and sex: such patterns might well be reflected also in everyday experiences of music. Moreover, prior research indicates that engagement plays in a role how individuals experience music, in terms of the how often individuals participate in music related activities (Greasley & Lamont, 2006) and of the reasoning provided to explain listening (Greasley & Lamont, 2011). It is possible that engagement also plays a role in specifically how (and how often) individuals experience music in their daily lives. Therefore, the devices involved in daily listening are potentially dependent on one's level of engagement with music, such that it is hypothesized that those who consider music to be important in their lives may choose to seek out opportunities to hear music performed live and/or utilize digital technology which would increase their ability to access music.

North et al. (2004) found that a greater percentage of listening incidences occurred later in the evening and at the weekend and speculated that increased leisure opportunities may be behind this particular finding. As people engage in different activities and are in different places at different times, it seems sensible to also explore time in relation to everyday listening, and how individuals encounter music in particular as a function of time. For instance, as watching TV is a more common pastime in the evening (as evidenced by viewing figures), music might be more likely to be encountered in such a manner later in the day.

Everyday listening and mood

Sloboda (2010) noted that most research investigating emotional responses to music has focused on non-everyday music (e.g., that experienced in the lab or in concert settings) even though contemporary music experiences often occur in an everyday context. Similarly, Juslin and Laukka (2004) highlighted the need for research investigating emotional responses to music to consider the context of the experience from the listener's perspective (not the musician's perspective), and North et al. (2004) suggested that future research should examine affect before and after exposure to music in order to provide a demonstration of its effect in the real world. As such, one aim of the current research was to carry out measures of listeners' emotional responses to music both pre- and post-exposure. Sloboda (2010) argued that emotional responses to music in everyday life would likely occur often and be listener-focused but within the context of multiple locations and activities; and that, as much of the music encountered may be unchosen, or subject to negotiated levels of choice, a significant portion of the emotions experienced may be negative.

The consequences of everyday music

Prior research has identified multiple functions of listening to music beyond simple enjoyment, such that there are social, cognitive, and emotional reasons for listening to music (Hargreaves & North, 1999). Moreover, it has been proposed that a full account of a response to music must include the reasons for and consequences of listening (Sloboda, 2005). With prior research

outlining the various functions of music, a large sample could provide a naturalistic illustration of the consequences of hearing music in terms of temporal and situational contexts. Previous research leads us to expect that individuals will identify many and varied consequences of hearing music. Previous research (e.g., Greasley & Lamont, 2011) found a high frequency of reporting hearing music for enjoyment, to pass the time, to create an atmosphere, and to help concentration. As such we might expect these consequences to similarly feature prominently in the present data. Moreover, this research provides the opportunity to consider such consequences as a function of the devices used for listening. We might expect an MP3 player to be associated with enjoyment and motivation in particular, while perhaps the radio might be associated with passing the time, and a stereo might assist in creating the "right" atmosphere (i.e., a restaurant creating a certain ambiance, or a person trying to impress a date).

Choosing to listen to music

Although people may be exposed to music that they did not deliberately choose to listen to, people often do choose music as an accompaniment to a range of daily activities (Bull, 2007; Sloboda & Juslin, 2010). New music technologies give people increased choice and control over what music they can listen to and how they can integrate this music into their daily lives. Research demonstrates that (even merely the perception or illusion of) control affects health and well-being, and reactions to stressors and pain in particular (Lachman & Weaver, 1998; Lee, Ford, & Gramotnev, 2009; Mitchell, MacDonald, & Knussen, 2008; Schulz, 1976; Taylor & Brown, 1988). One possibility, therefore, is that control over the music experienced in everyday life may promote feelings of well-being and lack of control over such perhaps may detract from well-being. There is some evidence to support this speculation. For example, Skånland (2011) found that people used MP3 players to maintain their well-being, consciously exerting a great degree of control to make the situation more tolerable; and Liljeström, Juslin, and Västfjäll (2012) argued that self-selected music was conducive to experiencing positive emotions because it offered a greater sense of control over the situation.

Additional support for the notion that choice over the music should lead to more positive outcomes is provided by Sloboda (2005) and Sloboda and O'Neill (2001) who found evidence that music accompanied by higher degrees of choice was associated with positive emotional change and that the unchosen music experienced in public was met with ambivalence or even disliked. However, Sloboda's past research is limited in scope due to the small samples employed; and the present research is able to consider everyday music listening in terms of device usage, given the recent changes in such as a consequence of the digital revolution. Because mobile devices in particular, relative to other listening devices, allow people to exercise control over their auditory environment, it is hypothesized that higher well-being, as measured by greater improvements in mood, will be associated with mobile devices as compared to other devices. In practical terms, the mood change scores associated with mobile devices should be greater and more positive than for other devices.

Method

Participants

The week-long study was voluntarily completed by 177 participants, who were recruited through posters at a university campus in Scotland, information on the first author's website,

and emails to University students and alumni. The sample included 101 females (57.06%), and participants' ages ranged from 17–75 years (M = 32.70 years, Mdn = 28, SD = 14.61). Just under half the sample were students (41.24 %).

Following North and Hargreaves (1995) and several others, a panel of three raters assessed each participant's degree of musical education and training. "Low" represented those with no to little experience (49.7% of the sample), "moderate" reflected playing an instrument recreationally, or to grade 5 within the UK music examination structure (38.4%), and "high" reflected proficiency on an instrument (beyond grade 5 within the UK music examination structure) as well as professional musicians, teachers, or having studied music at university (11.9%). Participants were asked to complete two responses per day throughout the study period (14 responses in total). 102 participants (57.63%) completed all 14 responses, while 26.55% and 15.82% completed 13 and 12 responses, respectively. Note that an additional 193 people initially agreed to take part in the research, but completed fewer than 12 responses during the study period, and so were excluded from the analyses.

Design and procedure

Participants first completed a short background survey, where they were asked to report their sex, age, occupation, musical background, musical preferences, level of engagement with music, and contact details. Next, participants received an email with a unique participant identification number, the address of the website to use during the study in order to enter their responses, and details regarding the response procedure. Each participant was also sent a test text message to determine that they would be able to receive such messages during the study.

For each of 7 days, participants received one text message between 8:00 and 15:29, and one text message between 15:30 and 23:00 requesting that they complete a response entry online as soon as they could safely do so. The text messages were sent using a free Internet service (esemes.co.uk). Within each time range, random times were selected to send text messages using an online random day and time value generator. An online response format was used to maximize the completion rate.

Upon receiving each text message, participants were asked to go to the survey website, enter their unique participation identification code, report the date and time they received the text message prompt as well as the time that they completed the questionnaire and then complete the questionnaire itself. If participants had not been exposed to any music in the 2 hours prior to the text message prompt, they were asked to simply report that they had not heard any music, and their entry was complete. If participants were exposed to music in the 2 hours prior to receiving the text message prompt, they then responded to a series of subsequent questions regarding the most recent listening experience. These questions are detailed in the Appendix. Participants first reported how the music was played (e.g., radio, MP3 player). On each questionnaire, participants were asked to rate their level of choice in selecting the music, how much attention they afforded the music, how much they liked the music, and how arousing the music was using seven-point Likert scales ranging from 1 (*none/not at all*) to 7 (*total/very much*). Participants also retrospectively rated their affect immediately before and after exposure to the music using seven-point Likert scales. The characterization of emotion in the present research was influenced by the circumplex model which plots specific emotions in relation to their arousal and valence, and, following North and Hargreaves' (1997)

application of this to music specifically, participants were asked to provide four emotional reactions representing combinations of high and low arousal and pleasantness, namely "bored/unstimulated," "excited/festive," "peaceful/relaxed," "unsettled/disconcerted," as well as rating specifically pleasantness and arousal (from 1 = *not at all* to 7 = *very much*). Finally, 12 statements were adapted from North et al. (2004) to examine the consequences of experiencing music (e.g., in terms of hindering or helping attempts to achieve a concurrent task; whether or not the music raised the salience of memories; whether the music made the participant 'look good'). Participants rated each statement on a seven-point Likert scale (from −3 to +3), which employed negatively- and positively-valenced versions of each consequence respectively as anchors.

Results and discussion

In total, participants completed 2,375 entries during the week (of 2,375 messages sent, a 95.84% sample response rate), and had recently encountered music on 46.3% of those occasions on which they received a message.

Factors for analyses

In order to reduce the number of items for analysis, two varimax factor analyses were conducted concerning the mood items and the consequence items respectively. For each of the six mood items, a pre- and post-exposure change score was calculated by subtracting the participants' mood rating on each dimension after exposure to music from their mood rating on that same dimension before exposure to music. These change ratings were entered into the factor analysis, which produced two factors that accounted for 58.59% of the variance. The loadings are displayed in Table 1. With regard to Factor 1, bored/unstimulated, unsettled/disconcerted and sleepy loaded positively, while excited/festive and pleasant mood loaded negatively. This factor was therefore labeled "lethargy." With regard to Factor 2, peaceful/relaxed and pleasant mood loaded positively while unsettled/disconcerted loaded negatively, and so this factor was labeled "contentment." These factors reflect arousal and pleasantness, the two main dimensions of the circumplex model. Although a good deal of previous research has yielded similar factors in relation to responses to music, the present data are perhaps the first to do so with such ecological validity, lending support to their use when investing affective responses to music in everyday life.

With regard to the factor analysis of the ratings of the consequences of exposure to music, the rotated principal components solution yielded three factors with eigenvalues greater than one, which accounted for 55.66% of the variance. The loadings are presented in Table 2. Given the three highest loading items on Factor 1 – helping concentration, motivation, and assisting with what the participant was trying to do – this factor was labeled "purposive listening." The highest loadings on Factor 2 concerned bringing back memories, wanting to hear the music for longer, learning about the music and enjoying the music, so it was consequently labeled "actively engaged listening." Finally, only two statements loaded on Factor 3, which appears to reflect of a very specific type of listening and was labeled as "validation seeking listening." The actively engaged factor most clearly represents the feeling of enjoyment that can result from listening to music. However, the existence of the other two factors provides further evidence (obtained in this case from naturalistic listening episodes) that music serves several other functions also.

Table 1. Factor analysis on the mood questionnaire items.

Mood questionnaire items	Factors	
	1	2
Bored/unstimulated	0.66	
Unsettled/disconcerted	0.30	−0.71
Sleepy	0.73	
Peaceful/relaxed		0.83
Pleasant	−0.48	0.63
Excited/festive	−0.74	
Eigen values	1.86	1.65
% of the variance	31.03	27.56

Table 2. Factor analysis on the consequence statements.

Effect questionnaire items	Factors		
	1	2	3
It hindered what I was trying to do – It helped me with what I was trying to do	0.78		
It hindered my concentration/thinking – It helped me to concentrate/think	0.76		
It did not motivate me – It motivated me	0.72	0.34	
It did not help the atmosphere – It helped create the "right" atmosphere	0.68		
It annoyed me – I enjoyed it	0.58	0.5	
It did not help to pass the time – It helped to pass the time	0.58	0.4	
I wanted to get away from the music – I wanted to hear the music for longer	0.48	0.58	
It prevented or lessened an emotion – It helped create or accentuate an emotion	0.44	0.4	
I learned nothing about the music – I learned more about the music		0.7	
It did not bring back memories – It brought back memories		0.67	
It made me look bad – It made me look good		0.3	0.58
It hindered my worship – It helped me worship			0.84
Eigen value	3.32	2.13	1.24
% of the variance explained	27.67	17.71	10.29

How the music was heard

To answer the first research question, which asked how people experience music in terms of the particular devices involved, participants selected how they heard the music from a list of 17 options, representing the range of devices available to play music. Tablet, stereo-record, stereo-cassette and mobile cassette devices were nominated in fewer than 15 cases, and thus were removed from further analyses. As Table 3 indicates, the radio was overwhelmingly the most popular device, accounting for more than a quarter of all listening experiences. Mobile MP3 players were the second most frequently cited devices, followed by owned music listened to on a computer and via TV. Mass media, namely the radio and TV, together accounted for just over a

Table 3. Reported device frequencies.

Device	Frequency	%	Valid %
Mobile MP3	147	13.4	13.7
Mobile phone	52	4.7	4.9
Mobile CD	16	1.5	1.5
Computer – own	118	10.7	11.0
Computer – stream	64	5.8	6.0
Computer – cloud	28	2.5	2.6
Stereo – MP3 device	53	4.8	4.9
Stereo – CD	102	9.3	9.5
Radio	294	26.7	27.4
TV	108	9.8	10.1
In public – live	41	3.7	3.8
In public – recorded	49	4.5	4.6
Total	1,072	97.4	100.0
Removed:			
Tablet	1	.1	
Stereo – record	5	.5	
Stereo – cassette	3	.3	
Mobile cassette	0	.0	
Missing	19	1.7	
Total	1,100	100	

third of the experiences (37.5%), and so the remaining two-thirds of the music experiences occurred with a variety of other devices. Exposure to music in public (either live or recorded) accounted for only 8.4% of the total experiences. Developments in music technology were clearly evident: record players and cassette devices each accounted for less than 1% of nominations, and even mobile CD players accounted for only 1.5% of participants' music experiences. The lower prevalence of more modern devices could be a consequence of several factors, such as cost, lower social acceptability of modern technology in certain contexts, or the availability of radio via more than one type of device (i.e., radio can be accessed via a mobile digital device, a computer, as well as a conventional analogue radio). Therefore, with regard specifically to research question 1, a range of devices were involved in everyday listening, at varying frequency, but with the radio, mobile MP3 players, and computers featuring prominently. A more comprehensive examination of how the devices are involved in daily listening follows from the consideration of the remaining research questions.

Individual differences

Only 17% of the sample rated the importance of music in their life at the midpoint of the scale or lower, indicating that the clear majority regarded it as important. Similarly, 74% of participants reported listening to music for more than 1 hour per day. These results clearly demonstrate that most participants interacted with music regularly and regarded that interaction as significant to them. A multiple regression analysis was conducted to examine whether various characteristics of the participants were associated with the likelihood that they would be exposed to music. This multiple regression used the percentage of times that participants were

exposed to music in the 2 hours prior to receiving a text message prompt as the outcome variable, and the predictor variables were gender, age, whether the participant was a student (1 = *a student*, 0 = *non-student*), level of musical training/experience, the rating score for how important music was considered to be in the participant's life, and reported average daily hours listening to music. The analysis was significant ($F_{6, 170} = 4.75$, $p < .001$, adjusted $R^2 = .11$). Standardized beta weightings indicated that there was a single significant positive relationship between the percentage of incidences on which music could be heard and how important the participants rated music to be in their lives ($\beta = .275$, $t\,(170) = 3.44$, $p < .001$), indicating that the more that participants rated music as important, the more often they experienced music during the study week. Given that participants' self-reports of time spent listening to music were not related to the percentage of occasions on which they experienced music, it might imply a certain lack of self-awareness of everyday listening practices. It is also interesting that, when allowing for variations in the importance of music to the individuals concerned, there was no relationship between likelihood of experiencing music and specifically age, gender, musical training, and student status: any relationships between these variables and propensity to experience music are likely a function of variations between groups defined in terms of age, gender, musical training, and student status in simply the importance that they place on music.

Means of access

In order to address research questions 2–6, a MANOVA was carried out to investigate whether different devices used to access music (entered as the grouping variable) were associated with the part of the week (*weekday* = 1, *weekend* = 2); four time periods during the day (8:00–8:59, 9:00–16:59, 17:00–20:59, and 21:00–23:00, coded 1–4); age; gender (*females* = 1, *males* = 2); student status (1 = student, 0 = non-student); level of music education; ratings of the importance of music; average hours spent listening to music daily; ratings of the extent to which the participant had choice in what music they heard; ratings of attention paid to the music; ratings of liking for the music; and ratings of the extent to which the music was arousing; consequence factor scores; and mood change factor scores (which were entered as dependent variables). The MANOVA was significant ($F(187, 10065) = 5.68$, $p < .001$, partial $\eta^2 = .10$), and the univariate results ($DF = 11, 921$ in each case) are displayed in Table 4.

Research question 2 concerned the relationship between participant characteristics and the devices involved in everyday listening. Table 4 indicates a striking contrast between the tendency of younger participants to gravitate to devices that played music via modern digital formats (e.g., mobile MP3 players and mobile telephones) and that of older individuals (as well as those who are not students) to still use CD players. This supports the hypothesis as well as recent findings, such as those by the Nielsen company (2012), which indicate the existence of a similar age gap in the means of accessing music. Neither does this imply that we might expect digital hegemony in the future, since the radio remained the most popular device even among younger participants.

As hypothesized, hearing live music in public occurred most commonly among those participants who had a greater level of musical experience and those who self-rated music as more important in their life. This could reflect attempts to actively seek out encounters with music (as distinct from passively and incidentally encountering music) as TV incidences tended to be reported by those who rated music as less important in their lives and listened to less music on average daily. Computer related devices were mentioned quite often by those who considered music to be important, by those who listened to more music on average, and by those with a

Table 4. One-way MANOVA results concerning device.

Variable	*F* Value	Mobile MP3 player		Mobile telephone		Mobile CD		Computer – own collection		Computer – streaming		Computer – cloud source		Stereo – MP3 device		Stereo – CD		Radio		TV		In public – live		In public – recorded	
		Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*	Mean	*SE*
Part of week	1.6	1.14	0.04	1.18	0.06	1.27	0.11	1.26	0.04	1.15	0.06	1.24	0.08	1.24	0.06	1.26	0.04	1.19	0.03	1.30	0.04	1.29	0.07	1.29	0.06
Part of day	8.12***	2.41	0.07	2.29	0.12	2.47	0.20	2.83	0.08	2.52	0.11	2.56	0.16	2.66	0.11	2.55	0.08	2.35	0.05	3.12	0.08	2.79	0.14	2.60	0.12
Age	12.24***	26.98	1.15	26.71	1.97	43.33	3.42	26.52	1.30	27.48	1.80	29.96	2.65	28.74	1.87	39.94	1.40	37.10	0.83	33.20	1.40	31.74	2.27	32.62	2.04
Gender	2.68**	1.34	0.04	1.49	0.07	1.60	0.13	1.36	0.05	1.50	0.07	1.40	0.10	1.62	0.07	1.55	0.05	1.48	0.03	1.33	0.05	1.44	0.08	1.38	0.08
Student status	18.08***	0.59	0.04	0.53	0.07	0.07	0.12	0.70	0.04	0.57	0.06	0.40	0.09	0.64	0.06	0.07	0.05	0.23	0.03	0.29	0.05	0.47	0.08	0.43	0.07
Music education rating	4.53***	1.72	0.06	1.62	0.10	1.33	0.18	1.77	0.07	1.72	0.09	1.92	0.14	1.62	0.10	1.83	0.07	1.53	0.04	1.61	0.07	2.21	0.12	1.55	0.11
Importance rating	3.27***	5.78	0.11	5.58	0.18	5.67	0.32	6.04	0.12	5.96	0.17	6.16	0.25	5.98	0.17	5.79	0.13	5.62	0.08	5.21	0.13	6.12	0.21	5.76	0.19
Average daily listening amount	4.09***	3.28	0.18	2.66	0.32	2.50	0.55	3.75	0.21	3.68	0.29	3.66	0.43	3.15	0.30	2.47	0.23	3.16	0.13	2.28	0.23	2.59	0.37	3.61	0.33
Choice rating	50.71***	6.11	0.17	5.89	0.29	5.27	0.51	6.15	0.19	5.57	0.27	6.36	0.39	5.32	0.28	5.84	0.21	3.55	0.12	2.63	0.21	3.06	0.34	1.12	0.30
Attention rating	22.95***	5.03	0.13	5.02	0.22	5.20	0.38	5.12	0.14	4.89	0.20	4.72	0.29	4.64	0.21	4.96	0.16	3.74	0.09	3.66	0.16	5.97	0.25	2.69	0.23
Liking rating	31.78***	6.19	0.10	5.89	0.18	5.60	0.31	6.16	0.12	5.74	0.16	6.24	0.24	5.88	0.17	5.96	0.13	4.79	0.08	4.39	0.13	5.82	0.21	3.90	0.18
Arousal rating	9.21***	4.69	0.13	4.22	0.23	5.40	0.39	4.67	0.15	4.91	0.21	5.00	0.31	4.66	0.22	4.89	0.16	3.85	0.10	3.98	0.16	5.18	0.26	3.43	0.24
Consequence factor 1: Purposive listening	10.55***	0.20	0.08	−0.04	0.14	0.09	0.24	0.37	0.09	0.04	0.13	0.85	0.19	0.27	0.13	0.14	0.10	−0.19	0.06	−0.57	0.10	0.15	0.16	−0.68	0.14
Consequence factor 2: Actively engaged listening	8.54***	0.23	0.08	0.06	0.14	0.27	0.25	0.42	0.10	−0.07	0.13	−0.11	0.19	0.11	0.14	0.22	0.10	−0.28	0.06	−0.23	0.10	0.48	0.17	−0.74	0.15
Consequence factor 3: Validation seeking listening	6.48***	−0.29	0.08	0.16	0.14	−0.01	0.23	0.15	0.09	−0.12	0.12	−0.19	0.18	−0.15	0.13	0.16	0.10	−0.15	0.06	−0.02	0.10	0.98	0.16	0.17	0.14
Change in mood factor 1: Lethargy	4.29***	−0.19	0.09	−0.08	0.15	−0.17	0.25	−0.27	0.10	−0.30	0.13	−0.32	0.20	0.00	0.14	−0.04	0.10	0.18	0.06	0.20	0.10	−0.10	0.17	0.56	0.15
Change in mood factor 2: Contentment	5.28***	0.19	0.09	0.33	0.15	0.03	0.25	0.30	0.10	0.10	0.13	0.00	0.20	0.25	0.14	0.21	0.10	−0.18	0.06	−0.36	0.10	−0.18	0.17	−0.47	0.15

Note. * $p < .05$; ** $p < .01$; *** $p < .001$.

greater level of music education. This indicates that those more engaged with music are taking advantage of computer technology (both in terms of a means of organizing a personal music collection and streaming) in order to actively engage in music listening. In terms of the second research question then, a pattern of results can be seen in terms of both demographics and musical engagement such that those who are younger and those more interested in music tend to rely on modern digital formats.

An additional finding evident in Table 4 is that the time of day (as divided into four periods, 8:00–8:59, 9:00–16:59, 17:00–20:59, and 21:00–23:00) was associated significantly with device. Addressing the third research question, the means suggested that music was heard more often later in the day on TV, and earlier in the day on a mobile telephone. This could reflect device usage in terms of common locations or activities throughout the day, such as commuting to work in the morning and leisure time spent at home in the evening, for example. In turn, it seems that time might relate to how we interact with music, partly as a consequence of what else is taking place at a certain time.

Research question 4 concerned the potential relationship between mood and how people experience music. Table 4 indicates that the two mood factors, lethargy and contentment, were associated with devices in a somewhat contrasting pattern. While recorded music in public, TV, and radio devices were associated with the most negative changes for contentment, these devices were associated with the most positive shifts in lethargy scores: participants felt less content and more lethargic after hearing music via these devices. Though the lethargy results might initially suggest that music experienced by radio and TV may promote relaxation, the negative effect on contentment scores suggests that this reduced level of arousal may not always be experienced positively. In contrast, the highest positive effects on contentment scores were associated with mobile telephones and personal computer collections; and hearing music from a cloud and computer sources reduced feelings of lethargy. These devices, which offer the user a potentially vast and individualized collection seem to present the opposite mood responses. Mobile MP3 players were also associated with positive contentment responses; however, in terms of the hypothesis, they were not associated with the greatest positive changes. Overall, these findings do seem to link control to positive mood outcomes, as anticipated by the fourth research question.

Exposure to music in public rather than via individually-controlled devices was also associated with different scores on the consequences factors. In response to research question 5 concerning the consequences of usage of differing devices, recorded music in public was associated with low negative means for actively engaged listening and purposive listening; high positive means for purposive listening were associated with cloud devices, mobile MP3 players, personal computer collections, and MP3 stereo devices; and high scores for actively-engaged listening were associated with live music in public and personal computer collections. In this manner, it seems that devices relying on controlled input by individuals promote *both* actively engaged listening and purposive listening, whereas recorded music (out of the listener's control) does not promote these kinds of listening. These particular individually controlled devices similarly were associated with higher ratings of liking for the music, which indicates a relationship between enjoyment of music and engaged listening. Moreover, the recorded music heard in public was considered the least arousing and was given the least attention, augmenting the more general pattern of results concerning purposive listening. This is logical as purposive consequences involve motivating and assisting an individual, and as recorded music heard in public does not rely on an individual's input, it then follows that such music would not give rise to this type of consequence.

Interestingly, the third type of consequence of exposure to music, validation-seeking listening, was associated very differently with the devices. Mean scores for the validation seeking factor were highest for live music in public and lowest for music experienced via a mobile MP3 player. If the validation is sought from others (which is implied by the specific nature of the items loading onto the factor), it follows that music heard in public can contribute to this factor, whereas a mobile MP3 player simply does not allow others to hear and validate what one is listening to. An alternative explanation is simply that music for the purpose of worship is unlikely to be listened to via an MP3 player and much more likely to be experienced while in the presence of others (e.g., via a church organ during a religious ceremony). In summary, regarding the fifth research question, devices do relate to the perceived consequences of hearing music. In particular, there appears to be a contrast in pattern between the purposive and actively engaged types of consequences compared to the validation-seeking consequence, which may be related to the level of user input involved with the device in question.

The final research question concerned how having choice in what is heard might relate to the device via which people hear music. The data in Table 4 show that in this respect there appear to be differences between both recorded music in public and TV in comparison to devices that require user input. As expected, recorded music in public and music experienced via the TV gave rise to the lowest mean ratings for choice. In contrast, hearing music from a computer cloud source, one's own collection on a computer, or an MP3 player was associated with a very high degree of choice.

Conclusion

Little previous research has concerned how individuals encounter music in everyday life. The present findings demonstrated that the device by which music was heard was related to issues inherent to the music itself (e.g., choice) and also to one's response (e.g., mood and the perceived consequences of exposure to the music). Two more general conclusions to arise from the data deserve particular comment. First, the pattern of overall results suggest that user control and choice may relate to multiple aspects of our musical interactions: evidence arose linking user control/input to the device concerned and positive mood response (e.g., contentment), experiencing positive consequences as a result of listening, and liking what was heard. As such, a general pattern was that experiences involving music that was *chosen* were more positive than were those involving music that was not chosen. For example, an MP3 player was associated with a very high degree of choice and also positive purposive consequences, whereas music heard in public was not associated with being liked or personally chosen and was negatively associated with actively engaged listening consequences. An alternative explanation of the positive findings associated with chosen music may follow from choice leading to a greater degree of attention and engagement with the music in question. Unsurprisingly, for example, although hearing music performed live was associated with a high degree of choice, it was also associated with the greatest degree of attention and was also considered highly arousing. It is also possible that choice, engagement, and arousal in relation to music are subtly intertwined, and future research may attempt to tease out the differences between these.

Second, North et al. (2004) speculated that, while technology may have increased access, a consequence of this might be that people have developed a more passive attitude toward music: in contrast, the present study suggests that a subtler interpretation may be more accurate, namely that the device people use to listen to music is related to their degree of engagement. In particular, there were striking differences between how individuals reacted to music they heard

broadcast in public and on TV to that they heard via digital devices. In terms of mood shifts and perceived consequences, more positive responses were associated with digital devices, in contrast to the more negative portrayal of the effects of these suggested by North et al. In the present research, mobile devices and computer collections, for instance, appeared to be associated with participants actively constructing their listening, or at least drawing on the advantages afforded by a greater degree of choice, which in turn creates a much different experience from passively encountering music. As this investigation offers preliminary evidence considering how music is heard in everyday life, it also must serve as a prompt for future research to continue to account for how we access music as an important variable in the discussion of our relationship to music in our daily lives. The digital revolution means that the findings here concerning choice, engagement, and device selection may have interesting implications.

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Appendix

Response entry

Time that the text message was received: _____

Time when completing this entry: _____

☐ Tick here if you did not hear music within a 2-hour period prior to receiving the text message. Remember, you do not need to complete the rest of the questions if you did not hear any music within those 2 hours.

If you heard music multiple times within the 2-hour block prior to receiving the text message, please fill out this entry about the most recent listening episode.

Directions: Please select what best applies and mark only one answer with an "X."

How did you hear the music?

_____ Mobile MP3 player
_____ Mobile telephone
_____ Mobile gaming device
_____ Mobile CD player
_____ Mobile cassette player
_____ Computer – own collection (iTunes, Winamp, etc.)
_____ Computer – online streaming (Spotify, LastFM, etc.)
_____ In public – live artist/group/ensemble
_____ In public – recorded music
_____ Stereo – MP3 device
_____ Stereo – CD
_____ Stereo – cassette
_____ Stereo – record
_____ Radio
_____ TV
_____ Tablet

How much choice did you have in what you heard?

None __ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 Total

How much attention were you paying to the music?

None __ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 Total

How much did you like what you heard?

Dislike very much __ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 Like very much

How arousing was the music you heard?

(Arousing in this case means how loud/fast/energizing/etc. was the music?)

Not at all __ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7 Highly arousing

How did you feel BEFORE hearing the music and AFTER hearing the music?

(1 = not at all, 7 = very much)

Bored/unstimulated	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7
Excited/festive	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7
Peaceful/relaxed	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7
Unsettled/disconcerted	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7
How pleasant was your mood?	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7
How sleepy were you?	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7	__ 1 __ 2 __ 3 __ 4 __ 5 __ 6 __ 7

The effect of this music was...

Please mark your answer with an "X" on the scales below. If you feel that the music did not have the listed effect, mark the middle, otherwise mark your answer closer to one of the two end points on each of the scales.

It hindered my concentration/ thinking	−3 −2 −1 0 1 2 3	It helped me to concentrate/think
It did not help to pass the time	−3 −2 −1 0 1 2 3	It helped to pass the time
It prevented or lessened an emotion	−3 −2 −1 0 1 2 3	It helped create or accentuate an emotion
It did not help the atmosphere	−3 −2 −1 0 1 2 3	It helped to create the 'right' atmosphere
It did not motivate me	−3 −2 −1 0 1 2 3	It motivated me
It hindered what I was trying to do	−3 −2 −1 0 1 2 3	It helped me with what I was trying to do
It did not bring back memories	−3 −2 −1 0 1 2 3	It brought back memories
It made me look bad	−3 −2 −1 0 1 2 3	It helped me look good
I learned nothing about the music	−3 −2 −1 0 1 2 3	I learned more about the music
It annoyed me	−3 −2 −1 0 1 2 3	I enjoyed it
I wanted to get away from the music	−3 −2 −1 0 1 2 3	I wanted to hear the music for longer
It hindered my worship	−3 −2 −1 0 1 2 3	It helped me worship
Other (please specify)	−3 −2 −1 0 1 2 3	Other (please specify)