

Utrecht University
Master psychology, Social Psychology

THESIS

Listening to the Past When the Present is Boring:

Nostalgic Music as a Meaning-Regulator.

Koen van der Swaluw, 4129008
May 5, 2014

Madelijn Strick

Abstract

This research investigates the meaning-regulating function of objectively determined nostalgic music. Boredom has previously been found to deprive one's sense of meaning (i.e., existential value). Also, nostalgia has previously been found to instill meaning. Therefore it was expected that objectively determined nostalgic music would alleviate boredom. A pilot study was performed to distinguish a nostalgic from a non-nostalgic piece of music. In a first study, the nostalgic piece of music was expected to alleviate boredom. No such effect was found. However, explorative analyses in Study 1 revealed that boredom heightened perceptions of nostalgic value attributed to the nostalgic piece of music. A second study was performed to confirm the explorative findings of Study 1 and to examine whether boredom would also increase *feelings* of nostalgia. The second aim of Study 2 was to examine whether objectively determined (in the pilot study) nostalgic music would alleviate meaninglessness evoked by boredom. In Study 2, boredom increased feelings of nostalgia via meaninglessness. Most importantly, when participants felt meaningless, nostalgic music as a medicine increased participants' sense of meaning. Objectively determined nostalgic music is an easy to implement and highly usable source in regulating boredom-evoked meaninglessness. Theoretical and practical implications are discussed.

Boredom is a distinct emotional state which deprives one's sense of meaning (Barbalet, 1999; Fahlman, Mercer-Lynn, Flora, & Eastwood, 2013; Van Tilburg & Igou, 2012). As such, boredom decreases personal indexations of one's existential value. More specifically, boredom leaves us with the impression that our situation and even our life in whole is meaningless (Barbalet, 1999; Van Tilburg & Igou, 2012). Being bored thus motivates individuals to "engage in something meaningful" (Van Tilburg & Igou, 2011; Van Tilburg & Igou, 2012; Van Tilburg, Igou, & Sedikides, 2013). To this end, humans use a variety of methods to reestablish their deprived existential value (see: Arndt, Routledge, Greenberg, & Sheldon, 2005; Routledge et al., 2011; Van Tilburg et al., 2013). The current research is aimed at examining the novel function of objectively determined nostalgic music as a meaning regulating, and thus boredom alleviating entity. It is hypothesized that nostalgic music will alleviate boredom because of its meaning containing characteristics. In order to understand the hypothesized process, it is important to first understand the characteristics of all aspects involved.

Boredom

When stuck in traffic, processing data or waiting in line at the grocery store, boredom can be a common and agitating experience. Boredom is described as the unfulfilled desire for satisfying activity (Eastwood, Frischen, Fenske, & Smilek, 2012) or as simply having the desire for desires (Tolstoy, 2003). Research has revealed that boredom is an emotional state which is distinct from other negatively valenced emotions and experiences (Fahlman et al., 2013; Leary, Rogers, Canfield, & Coe, 1986). Robust patterns of affective, cognitive and behavioral responses to boredom have highlighted its experiential uniqueness (e.g., Barbalet, 1999; Leary et al., 1986; Van Tilburg et al., 2013). The emotional state of boredom arises in situations holding no purpose or meaning (Barbalet, 1999; Perkins & Hill, 1985; Van Tilburg & Igou, 2011; Van Tilburg & Igou, 2012), low arousal, no challenge or interest

(Csikszentmihalyi, 2000; Martin, Sadlo, & Stew, 2006; Mikulas & Vodanovich, 1993), high monotony and high repetition (Berlyne, 1960; Mikulas & Vodanovich, 1993; O'Hanlon, 1981). Feelings associated with boredom are restlessness combined with lethargy (Martin et al., 2006), low self-esteem (Svendson, 2005; Van Tilburg & Igou, 2011), having a wandering mind, being disengaged from the world, and feeling to have no existential value or meaning (Fahlman et al., 2013; Van Tilburg & Igou, 2012). As with many emotions, the state of boredom can elicit several behaviors aimed at regulating it. As such, boredom has been linked to many behaviors, such as acts of aggression (Van Tilburg & Igou, 2012), substance abuse (Harris, 2000; Lee, Neighbors & Woods, 2007), and (pathological) gambling (Blaszczynski, McConoghy, & Frankova, 1990; Zeelenberg, Landsmeer, Krijnen, Evers, & Nelissen, 2013).

Boredom alleviating behaviors are typically aimed at immediately making the situation less boring. Making the situation fun and exciting, or putting something at stake, can reduce the monotony and low level of challenge of our current lives (e.g. Harris, 2000; Blaszczynski et al., 1990). However, people also alleviate boredom without changing their situation. Merely cognitive and affective tactics are not aimed at altering the current situation but are directly aimed at reestablishing a lost sense of meaning caused by boredom (Van Tilburg et al., 2013; Van Tilburg & Igou, 2011; Van Tilburg & Igou, 2012). For example, boredom can increase valuation of one's ingroup, and devaluation of one's outgroup, hereby bolstering one's social identity and sense of meaning (Van Tilburg & Igou, 2011). Hence, when bored, our perceptions and judgments are altered to assist in a search for meaning. It seems that the existential threat of boredom motivates us to increase our existential value, resulting in various meaningful affections, cognitions and behaviors.

Meaning and nostalgia

In search of the characteristics of meaning, two fields of research can be distinguished. One line of research culminated in the *Meaning Maintenance Model*, by Heine, Proulx &

Vohs (2006). Heine and colleagues describe meaning as an individuals' expectations of how things relate to other things in the world. As such, meaning can be described as the framework through which an individual perceives the world. A different line of research describes meaning as a personal sense of significance and purpose (Frankl, 1997; Frankl, 1992). In this definition, meaning can be described as having existential value, or as mattering to the world. Frankl, psychotherapist and survivor of Auschwitz, emphasizes the importance of meaning by testifying that "He who has a 'why' to live for can bear with almost any 'how'" (Nietzsche in Frankl, 1992, p.37). It is this definition which is relevant in relation to boredom and nostalgia.

Perceiving our lives as meaningful contributes to our psychological well-being (Steger, Frazier, Oishi & Kaler, 2006) and, according to some, is "a hallmark of healthy psychological functioning" (Routledge et al., 2011, p. 638). Perceiving one's life as meaningful is also positively related to coping with stress and can contribute to the effectiveness of mental health treatment (Routledge, Wildschut, Sedikides, & Juhl, 2013). Additionally, lack of meaning in one's life is associated with depression and excessive drinking (Routledge et al., 2013).

In their pursuit of determining boredom's unique characteristics, Van Tilburg & Igou (2012) assigned a key role to meaning. As stated, boredom deprives our existential value and thus our sense of meaning. Hence, we look for meaning when we are bored. The research performed by Van Tilburg and colleagues illustrated several meaning reestablishing tactics such as outgroup derogation (2011), or aggression (2012). These tactics were aimed at increasing one's social identity, hereby increasing one's sense of meaning. Another social meaning-restoring construct is nostalgia (Routledge et al., 2011; Sedekides, Wildschut, & Baden, 2004; Van Tilburg et al., 2013).

Nostalgia is described as affect that can accompany autobiographical memories (Routledge et al., 2011), and as a "sentimental longing for the past" (Zhou, Wildschut,

Sedikides, Shi & Feng, 2012, p. 39). Feeling nostalgic reminds us of important times with significant others (Wildschut, Sedikides, Routledge & Arndt, 2006) and increases our perceptions of social connectedness (Sedikides et al., 2008). Since nostalgia reminds us of important experiences with valuable others, it can be stated that nostalgia is predominantly a social emotion (Sedikides et al., 2008; Zhou, Wildschut, Sedikides, Shi, & Feng, 2012). Also, social connectedness is found to be a key determinant in perceiving one's life as meaningful (Baumeister, 2005; Routledge et al., 2011; Steger et al., 2006). Consequently, Routledge and colleagues (2011) found that social connectedness mediates the link between nostalgia and meaning. Nostalgia's social characteristics thus explain the findings that threatened meaning can increase nostalgia (Routledge et al., 2011; Sedikides, 2008; Wildschut, et al., 2006). Thus, when threatened in our sense of meaning (e.g., by boredom), we may be using nostalgia to enhance our social connectedness, this way restoring our lost sense of meaning.

Relating nostalgia to boredom, Van Tilburg et al. (2013) found that meaning deprivation as a result of boredom, too, causes more nostalgia. Nostalgia is stated to reinject meaningfulness into one's life and this way protect us against the existential threat of boredom. To summarize, boredom decreases an individual's sense of meaning, in which social connectedness plays an important role. The previous process instigates a search for meaning, which causes more nostalgia, known to be an affective response to an autobiographical memory, enhancing feelings of social connectedness and thus meaning.

Researchers investigating nostalgia as a meaning reestablishing emotion have used several methods for creating or assessing nostalgia. For example, Van Tilburg and colleagues (2013) asked participants to write down a memory and rate its nostalgic value. Other researchers have analyzed narratives (Wildschut et al., 2006) or asked participants to listen to self-chosen music from their past (Routledge et al., 2011). These studies offer important insights by showing that nostalgia can in fact be used to bolster our existential value.

The current study uses these insights in trying to determine an objective source of nostalgia to reinforce lost meaning. The current approach offers a valuable extension to the previous research. First, studying self-generated memories can have its limitations. Self-generated recall can be subject to systematic biases such as hypothesis guided recall, or selective encoding (Wildschut et al., 2006). Moreover, establishing an objective source of nostalgia, capable of restoring meaning, expands the practical value of previous insights. Having the ability to induce meaning, an objective source of nostalgia could for example be used to support laborers with highly repetitive jobs, or overcome feelings of meaninglessness in the elderly.

In the current study, music is studied as an objective nostalgia inducing mean, having the opportunity to reestablish a lost sense of meaning and alleviating boredom. Music is known for its emotion evoking characteristics (e.g., Blood & Zatorre, 2001) and nostalgia evoking characteristics (Krumhansl & Zupnick, 2013; North, Hargreaves, & Hargreaves, 2004). Is objectively determined nostalgic music then a tool in regulating meaning?

Music

Music can have a major impact on the human body and mind. Examples of the positive impact of music are enhanced alertness, an increase in performance, and a decrease in errors (Fox, 1971; Fox & Embrey, 1972). Music can activate brain structures which are linked to emotion, arousal and motivation. The same brain regions are known to be active in behaviors such as eating, using drugs or having sex (Altenmuller, Schurmann, Lim, & Parlitz, 2002; Baumgartner, Esslen, & Jancke, 2005; Blood, Zatorre, Bermudez, & Evans, 1999).

Not surprisingly, music also has the ability to evoke nostalgia. In fact, a frequently mentioned aspect of music in daily life is as a reminder of a valued past (North, et al., 2004). In their research linking nostalgia to music, Janata, Tomic, & Rakowski (2007) found that 30% of the 30 song presentations (randomly chosen out of 1515 songs) evoked

autobiographical memories, and about the same number of songs also evoked feelings of nostalgia. Similarly, in their attempt to characterize and classify emotions evoked by music, Zentner, Grandjean & Scherer (2008) established that “nostalgia occupies a major role in the spectrum of music-induced feelings” (p.513). Furthermore, as mentioned before, self-chosen music which reminds us of the past can create a sense of meaning in our lives (Routledge et al., 2011). Self-chosen nostalgic music thus has the potential to create feelings of nostalgia, thereby enhancing feelings of meaning. However, it remains unclear whether objectively determined nostalgic music has similar effects.

The current research.

Boredom can decrease our sense of meaning. Also, a benchmark for meaning in our lives is the degree to which we feel socially connected. Nostalgia can make us feel socially connected and thereby enhance our sense of meaning. Furthermore, self-chosen music from the past can make us feel nostalgic and thus create meaning in our lives. Hence, one would presume that objectively determined nostalgic music can also reestablish a lost sense of meaning. Also, since meaning is such an important aspect of boredom, one would presume that nostalgic music alleviates boredom. However, the distinct effect of objectively determined nostalgic music as a meaning reestablishing and thus boredom alleviating device is yet to be established. Since music is a nostalgia and -therewith- meaning container, the current research uses objectively determined nostalgic music as a potential boredom alleviator. Establishing an objective source of nostalgia as a mean to overcome boredom has several implications. First, boredom is an aversive emotion resulting in several undesirable cognitions and behaviors to individuals and society. Therefore, playing an objectively determined nostalgic song (able to alleviate boredom) could, as mentioned earlier, easier than other nostalgia evoking methods, prevent such cognitions and behaviors. Second, an objective source of nostalgia has benefits as opposed to subjective sources of nostalgia when

concerning the scale of its practical implications. Put differently, finding one ‘musical medicine’ against boredom for a large group of people is far more practical than letting everyone determine its own medicine. Third, if music can be determined as having an objective nostalgic value and having the possibility to reestablish meaning and overcome boredom, this aids future research examining other entities such as nostalgic products or pictures as meaning reestablishing and thus boredom alleviating devices.

Pilot study

Nostalgic music

To establish a link between objectively determined nostalgic music and boredom, the first step is to determine what types of music are in fact experienced as nostalgic, and which are not. Krumhansl & Zupnick (2013) established that individuals aged 20 rate music from 15 years earlier as most nostalgic. Besides 15 year old music, Krumhansl & Zupnick found that music experienced as nostalgic by an individual’s parents can also elicit nostalgic feelings. Expecting the average participant having the age of 20, and this study being performed in 2013, several songs released in and around 1998, and two songs from the 1970’s were chosen as possibly nostalgic. As potential controls, several songs released in 2013 were used.

Method

Participants and design. Utrecht University undergraduates, ($N = 32$, 8 (25%) male and 24 (75%) female; $M_{\text{age}} = 21.00$ years, $SD = 2.19$) participated in return for €2 or course credit. Participants all rated the same pieces of music, but in a different, random order.

Procedure and materials. The pieces of music expected to be rated as nostalgic were: “Let it be” (The Beatles, 1970), “Bohemian Rhapsody” (Queen, 1975), “Ave Maria”, (Andrea Bocelli, 1995), “The Vengabus” (The Vengaboys, 1998), “I Will Survive” (Hermes House Band, 1998), “Heyah Mama” (K3, 1999), “L’amour Toujours” (DJ Gigi D’Agostino, 2000),

“Played Alive” (Safri Duo, 2001), and “Drops of Jupiter” (Train, 2001). The control songs, expected to cause little nostalgia were: “Wrecking Ball” (Miley Cyrus, 2013), “The Spark” (Afrojack, 2013), and “Waves” (Mr. Probz, 2013). All songs appeared at least once in the Dutch top-40 music charts.

Upon entering the lab, participants were seated in a cubicle with a computer. Participants were asked to put on a headset and after listening to a 30 second fragment of each song, asked to fill out a music-nostalgia survey ($\alpha = .91$) based on nostalgic features established by Wildschut, Sedikides, Routledge & Arndt (2006). On a six-point scale (1 = *Absolutely not*, 6 = *Absolutely*) participants rated to what degree they experienced the fragment as nostalgic and meaningful (e.g., “This music is meaningful to me”, “This music reminds me of times with valuable others”, see Appendix A). Also, current feelings of nostalgia after each piece of music were assessed with a three-item ($\alpha = .91$) nostalgia measure (e.g., “I feel nostalgic”).

Results

Table 1 (Appendix B) presents an overview of the pilot study. On average, participants experienced low levels of nostalgia ($M = 2.43$, $SD = 0.79$). Taking music as the unit of analyses, differences in nostalgic value between songs were significant $F(1, 11) = 20.49$, $p < .001$, $\eta^2 = .380$. Post hoc comparisons using the Tukey-Kramer HSD revealed significant differences in nostalgic value between “Played Alive and “The Vengabus”, between “Played Alive” and “I Will Survive”, and between “Played Alive” and “Ave Maria”. Significant differences were also found between “Let it be” and all songs but “The Vengabus”. Furthermore, following the pattern in the data, a post hoc contrast analysis (-1,-1,-1,-1,-1,-1,-1,-1,-1,-1,11) revealed that “Waves” differed significantly from all other songs $t(373) = 12.44$ $p < .001$.

Discussion

The goal of the pilot study was to select one nostalgic and one non-nostalgic piece of music. Starting from the least nostalgic piece of music, namely “Played Alive”, several songs could be chosen as relatively nostalgic. To keep as many factors constant as possible, the music; “The Vengabus” was chosen as the nostalgic counterpart. Both kinds of music are upbeat, of the same genre (Dance) and the same tempo (130 beats per minute), excluding suchlike characteristics as alternative explanations for potential future effects. The two pieces of music differed significantly on the nostalgic-perceptions scale, $t(31) = 4.81$ $p < .001$, and the nostalgia-feeling scale, $t(31) = 2.38$ $p = .023$.

Study 1

In the first study, the aim is to establish a link between nostalgic music and boredom. More specifically, to answer the question whether objectively determined nostalgic music will alleviate state boredom. In order to assess boredom (dependent variable), the Multidimensional State Boredom Scale (MSBS; Fahlman et al., 2013, $\alpha = .93$) was used. The MSBS measures five validated components of boredom (e.g., disengagement, inattention, and altered time perception, see Appendix C). In the current study, six conditions differing in nostalgia and boredom were used.

Hypothesis

Participants who listen to nostalgic music after being induced with boredom will be less bored than participants who listen to non-nostalgic or no music after being induced with boredom.

Method

Participants and design. Utrecht University undergraduates, ($N = 130$, 61 (46.9%) male and 69 (53.1%) female; $M_{age} = 21.43$ years, $SD = 3.47$) participated in return for €2 or

course credit. The sample size was determined using an a-priori power analysis. Previous research by Van Tilburg et al. (2013) studying the effects of state boredom on nostalgia using the same induction as conducted in the current study established significant results with $\eta^2 = .12$ (Studies 1 & 2). Using $\eta^2 = .12$ to determine an anticipated Cohen's f^2 effect size of .37, desired statistical power ($1 - \beta$) of .8 and a probability level (p) of .05, the desired sample size was determined as $N = 128$. Participants were randomly assigned to the conditions of a 2 (boredom: high vs. low) x 3 (music: no music vs. low-nostalgic music vs. high-nostalgic music) between subjects design.

Procedure and materials. To induce boredom, a manipulation introduced by Van Tilburg et al. (2013, Studies 1 & 2) was used. Participants copied either 10 (high boredom) or 2 (low boredom) APA references about machine learning (e.g., “Koch, M., Moya, M., Hostetler, L., & Fogler, R. (1995). Cueing, feature discovery and one-class drawing for synthetic aperture radar automatic target recognition. *Neural Networks*, 8:7/8, 1081–1102”). Next, to induce various levels of nostalgia, participants were instructed to listen to either a 30-second fragment of “The Vengabus” (high-nostalgic music), “Played Alive” (low-nostalgic music) or no music (control condition). Participants in the no-music condition immediately continued to the next part of the experiment. After the music manipulation, participants completed the MSBS. Participants indicated for 29 items (e.g. “I feel bored,” “I feel empty,” “It feels like time is passing by slowly,” and “My mind is wandering”) the extent to which these applied to them at that moment (1 = *I totally disagree*; 7 = *I totally agree*). As a manipulation check, and to exclude alternative explanations, participants answered three questions indicating to what extent they felt the piece of music was fun, nostalgic and meaningful (e.g., “The music I just heard was nostalgic”; 1 = *I totally disagree*; 6 = *I totally agree*). The sum of all items of the MSBS served as the manipulation check, and as the dependent variable (see: Results).

Results

Manipulation check. On average, participants experienced medium levels of boredom ($M = 3.28$, $SD = 0.92$). To check the success of the boredom induction, a one-way ANOVA was performed with the sum of the MSBS (Fahlman et al., 2013) as dependent variable and the boredom conditions (high vs. low) as the independent variable. Differences between the boredom groups were significant $F(1, 128) = 10.50$, $p = .002$, $\eta^2 = .076$. Participants in the high boredom conditions experienced more boredom ($M = 3.53$, $SD = 0.84$) than participants in the low boredom conditions ($M = 3.03$, $SD = 0.94$). Preceding results show that the boredom manipulation was successful.

To check the success of the nostalgia manipulation, three one-way ANOVA's were performed with the answer to the questions "The music I just heard was nostalgic", "The music I just heard is fun", "The music I just heard is meaningful to me" as the dependent variable, and music as the independent variable. Likeability (or fun) did not differ for the two types of music $F(1, 85) = 1.55$, $p = .216$, $\eta^2 = .178$. Also, meaningfulness did not vary for the two types of music $F(1, 85) = 0.87$, $p = .352$, $\eta^2 = .011$. Likeability or meaning could therefore be excluded as explanation for potential effects. Differences in the nostalgic value of both songs were marginally significant $F(1, 85) = 3.40$, $p = .07$, $\eta^2 = .043$. Although with caution, the music manipulation can be considered successful.

Hypothesis. To test the hypothesis of the current research, a two-way ANOVA was performed, with music (no music vs. low-nostalgic music vs. high nostalgic music), and boredom (low vs. high) serving as the independent variables. The sum of the MSBS served as the dependent variable. In accordance with the manipulation check, there was a main effect of boredom $F(2, 128) = 10.19$, $p = .002$, $\eta^2 = .076$. There was no main effect of music $F(1, 128) = 0.65$, $p = .53$, $\eta^2 = .011$. Also, the Music x Boredom interaction was not significant $F(1, 128) = 0.25$, $p = .78$, $\eta^2 = .004$. The results are not in line with the hypothesis of the current

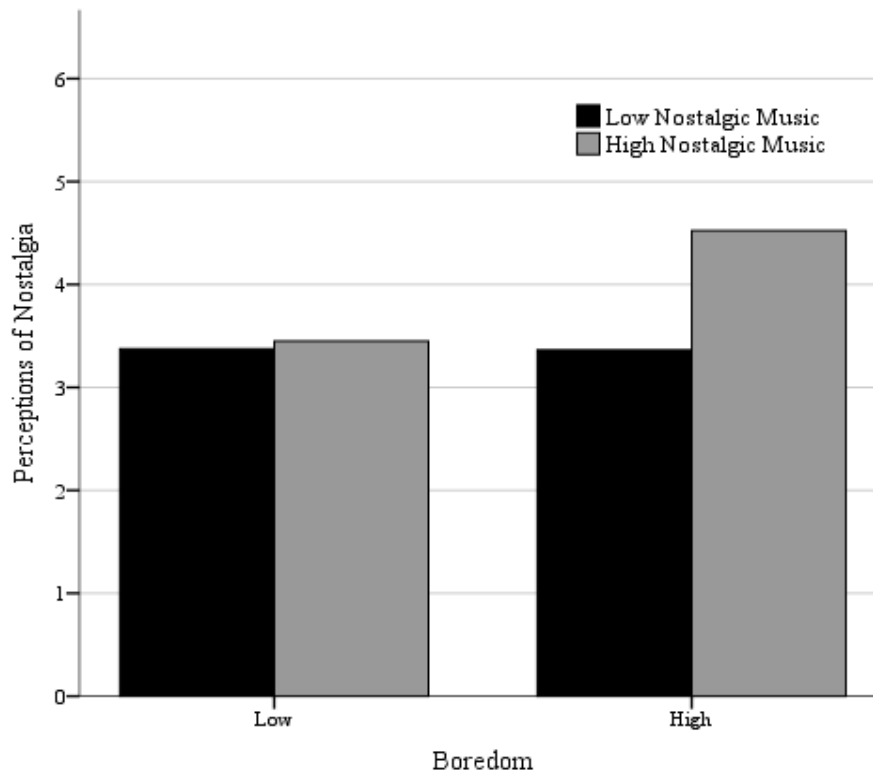
study. These results implicate that thus far, it cannot be stated that nostalgic music has the ability to alleviate boredom better than non-nostalgic or no music.

Explorative analyses. The current research was aimed at establishing a link between nostalgic music and boredom. Previous research showed that nostalgia increases a sense of meaning (Routledge et al., 2011; Van Tilburg et al., 2013). Therefore it was hypothesized that nostalgic music could alleviate boredom. No such effects were found. To account for this unexpected result, research on boredom and nostalgia was again consulted. As mentioned before, previous research also showed that boredom as a meaning-threat can increase nostalgia, and perceptions of one's memory as nostalgic (Van Tilburg et al., 2013). Interestingly, nostalgia was found to mediate the link between boredom and perceived meaning (Van Tilburg et al., 2013). Explorative analyses were performed to assess similar patterns in the current data.

First, it was tested whether participants' perceptions of nostalgia became higher as a result of boredom. As can be seen in Figure 1, the ratings of the nostalgic value of music (nostalgic perceptions) were highest when participants were bored. To test this effect of boredom on perceived nostalgia, a two-way ANOVA was performed with perceived nostalgia ("The music I just heard was nostalgic") as the dependent variable. Music (low-nostalgic vs. high-nostalgic) and boredom (low vs. high) were entered as the independent variables. The Boredom x Music interaction was not significant, $F(1, 83) = 2.72, p = .10, \eta^2 = .032$. However, as Figure 1 illustrates, nostalgic perception seems to pique in the high boredom/high-nostalgic cell of the design. Therefore, following the pattern shown in Figure 1, a direct polynomial contrast analysis (-1,-1,-1,3) was performed to test whether the high boredom/high nostalgia condition differed significantly from the other three conditions. Perceptions of nostalgia were significantly higher in the high nostalgic-music/high boredom condition than in the other conditions $t(44) = 3.40, p = .001$. These results suggest that

boredom alters nostalgic perceptions of potentially nostalgic music. Results show an interesting effect of boredom which is discussed in the Discussion section.

Figure 1. *Boredom heightens perceptions of nostalgia.*

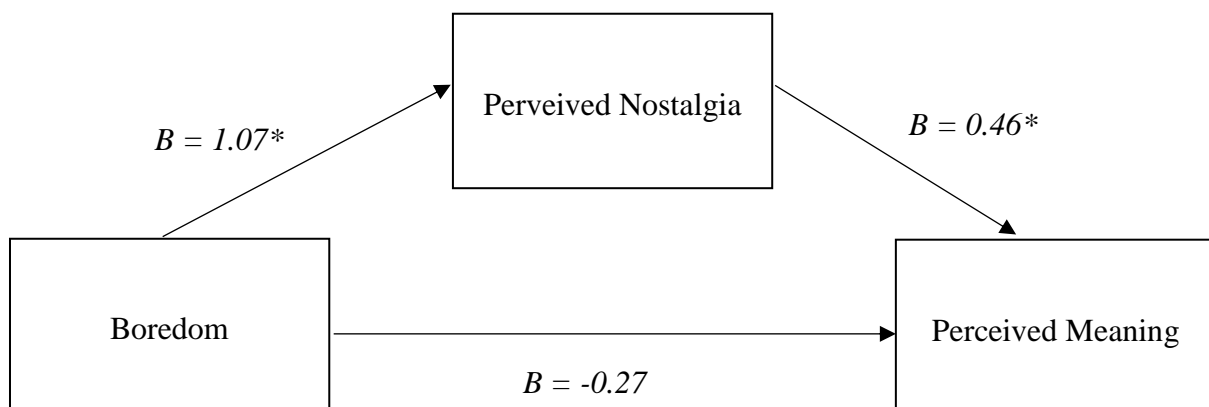


To examine nostalgic perceptions (ratings of the nostalgic value of music) as a mediator in the effect of boredom on perceived meaning (“The music I just heard was meaningful to me”), a mediation analysis using Preacher and Hayes’s macro (2008) was performed. Preacher and Hayes’s macro performs bias-corrected and accelerated bootstraps for estimating proposed indirect effects. First it was found that boredom was positively related to perceived nostalgia ($B = 1.07, t(40) = 2.39, p = .021$) (a-path). Also, perceived nostalgia was positively related to perceived meaning ($B = 0.46, t(40) = 3.28, p = .002$) (b-path). There was no significant direct effect (c or c’- paths). Results of the mediation analyses confirmed

the mediating role of perceived nostalgia in the link between boredom and perceived meaning ($B = 0.49$), 95% CI = [0.11 to 1.15] $SE = 0.25$, see Figure 2. The 95% confidence interval of the indirect effect was determined with 5000 bias corrected and accelerated bootstraps (Preacher & Hayes, 2008).

The performed mediation analysis suggests that perceived nostalgia serves as a mediator between boredom and perceived meaning. These findings are in line with the conception of nostalgia as a meaning container (Routledge et al., 2011; Van Tilburg et al., 2013). Boredom leads to an elevated nostalgic perception, which leads to an elevated perception of meaning.

Figure 2. *Perceived nostalgia as a mediator between boredom and perceived meaning.*



Note: * Significant at $p = .05$

Discussion

The aim of this study was to establish a causal link between boredom and nostalgic music. The hypothesis that nostalgic music would alleviate boredom was not confirmed. However, explorative analyses revealed an important effect of boredom. It seems that boredom can alter one's perception of nostalgia in music. More specific, nostalgic music is perceived as more nostalgic when participants are relatively bored. These findings coincide

with findings by Van Tilburg et al., 2013. Participants in their research were asked to write down an unspecified memory and bored participants perceived their memories as more nostalgic than non-bored participants. Van Tilburg et al. explain their findings by stating that bored participants use “cognitive elbow room” to increase their feelings of nostalgia in order to retain a sense of meaning. It could be that more or less the same mechanism is at work here. When bored participants have the opportunity to increase their feelings of nostalgia (because they heard a relatively nostalgic song), they make use of this opportunity to reestablish their lost sense of meaning. Exclusive and novel contributions of the current study are the findings that nostalgia induced by music can, when people are bored, cause heightened perceptions of meaning, and that boredom amplifies perceptions of the nostalgic value of potentially nostalgic music.

Study 2

In Study 1, nostalgic music did not directly alleviate boredom, but the results of Study 1 did suggest that nostalgic perceptions increase perceptions of meaning, and that boredom amplifies perceptions of nostalgia. Because this tentative conclusion was based on explorative analyses of the data of Study 1, it was important to confirm that boredom has the ability to increase nostalgia in a second study. The first aim of Study 2 was thus to reveal that boredom increases nostalgia. Since meaninglessness has shown to be the working ingredient in the effect of boredom on nostalgia (Routledge et al., 2011, Van Tilburg et al., 2013), it was also tested whether boredom would evoke meaninglessness. The second aim of Study 2 was to examine whether nostalgic music would be able to instill meaning when it was lost as a result of boredom. Put differently, the goal was first to reveal and corroborate the notion that boredom-evoked meaninglessness increases nostalgia, and second to examine if nostalgic music could cause a sense of meaning when it was lost as a result of boredom. In Study 1, participants were asked to rate the nostalgic value of music (nostalgic perceptions) and

meaning attributed to music (meaning perceptions). These measures were originally included as a manipulation check but served as the dependent variables in the explorative analysis. In Study 2, participants were asked for real time feelings of nostalgia. Feelings of nostalgia were assessed to extend the findings of Study 1 in showing that not only perceptions, but also feelings of nostalgia could increase as a result of boredom.

Previous research has already shown that various kinds of meaning threats result in higher levels of nostalgia (Routledge et al., 2011; Van Tilburg et al., 2013; Wildschut et al., 2006). The same research also positively linked nostalgic memories (Van Tilburg et al., 2013; Wildschut et al., 2006) and self-chosen nostalgic music (Routledge et al., 2011) to perceptions of meaning in life. The current study was aimed at combining, corroborating and extending the existing research on this topic. As in Van Tilburg et al. (2013), boredom was used as a meaning threat, and as in Routledge et al. (2011) music was used as a source of nostalgia. In addition, the current study uses objectively determined nostalgic music as a source of nostalgia.

In Study 2, the independent variables were boredom (high vs. low) and music (high-nostalgic vs. low-nostalgic). In answering the question whether boredom-evoked meaninglessness would cause nostalgia, the assessment of nostalgic feelings served as the dependent variable. In answering the question whether objectively determined nostalgic music could reestablish a lost sense of meaning, meaning served as the dependent variable. Research has shown that current affect can serve as a heuristic to answer complex questions (Gilovich, Griffin & Kahneman, 2002; Zajonc, 1980; Zajonc, 1982). This cognitive tactic can explain why boredom is found to decrease not only current feelings of meaning, but also perceptions of meaning in life (Van Tilburg & Igou, 2012). In line with the preceding conception are the findings that enhanced perceptions of meaning can result in a greater sense of meaning in life (Van Tilburg et al., 2013). Asking participants about levels of meaning in their lives (a

complex question), can result in an answer based on their current feelings of meaning, which can be deprived by boredom. As such, participants' answers about meaning in their lives can be used to assess current states of meaning. Hence, meaning was assessed by asking participants to answer the five questions of the Presence subscale of the Meaning in Life Questionnaire (Steger et al., 2006, see Appendix D).

Hypotheses

H1: Bored participants experience a stronger sense of meaninglessness than non-bored participants.

H2: Bored participants feeling meaningless will feel more nostalgic than other participants.

H3: Nostalgic music will result in higher ratings of meaning in life by bored participants feeling meaningless than by other participants.

Method

Participants and design. Utrecht University undergraduates, ($N = 118$, 44, (37.3%) male and 74 (62.7%) female; $M_{\text{age}} = 21.27$ years, $SD = 2.32$) participated in return for €2 or course credit. The desired sample size ($N = 111$) was determined using an a-priori power analysis, using $\eta^2 = .076$ (Study 1) to determine an anticipated Cohen's f^2 effect size of 0.29, desired statistical power ($1 - \beta$) of .8 and a probability level (p) of .05. Participants were randomly assigned to the conditions of a 2 (boredom: high vs. low) x 2 (music: high-nostalgic vs. low-nostalgic) between subjects design.

Procedure and materials. Participants were seated in a cubicle with a computer. To induce different levels of boredom, the same reference-copy inducement as in Study 1 was employed. Next, different levels of nostalgia were again induced by a 30-second fragment of "Played Alive" (low-nostalgic music), or a 30-second fragment of "The Vengabus" (high-nostalgic music). The answers to the questions "The music I just heard was nostalgic", "This

music gave me a sense of meaning” and “The music I just heard was fun” served as a manipulation check (1 = *I totally disagree*, 6 = *I totally agree*). As the dependent variable of the second hypothesis, nostalgic feelings were assessed by asking participants to rate on a six-point scale to what extent they agreed (1 = *I totally disagree*, 6 = *I totally agree*) with the following two statements: “Right now, I am feeling nostalgic”, “Right now, I’m having nostalgic feelings” (Wildschut et al., 2006, $\alpha = .92$). As the dependent variable of the third hypothesis, meaning in life was next assessed by the Presence subscale of the Meaning In Life Questionnaire (Steger et al., 2006; 1 = *Absolutely untrue*, 7 = *Absolutely true*; $\alpha = .86$). Next, an adjusted version of Lee’s Job Boredom Scale (Krijnen, 2012, $\alpha = .89$) was used as a boredom manipulation check. For seven statements (e.g., “I feel bored”, “I would rather do something else”, and “It feels like time is passing by slowly”, see Appendix E) participants indicated the extent to which these applied to them at that moment (1 = *Not at all*, 7 = *Very much*). Loss of meaning was finally assessed by asking participants to rate on a five-point scale (1 = *Not at all*, 7 = *Very much*) the answer to the following two questions about the reference-copying task: “The task made me feel meaningless”, “The task seemed to serve no purpose” ($\alpha = .74$).

Results

This study was directed at identifying the meaning regulating function of objectively determined nostalgic music in three steps. It was first tested whether boredom would cause meaninglessness. Second, it was tested whether boredom-evoked meaninglessness would increase nostalgia. Third, it was tested whether nostalgic music would provide a sense of meaning when it was lost as a result of boredom. Boredom was expected to evoke meaninglessness, and boredom-evoked meaninglessness was expected to increase nostalgia. Also, boredom-evoked meaninglessness was expected to positively influence the link between nostalgic music and meaning in life.

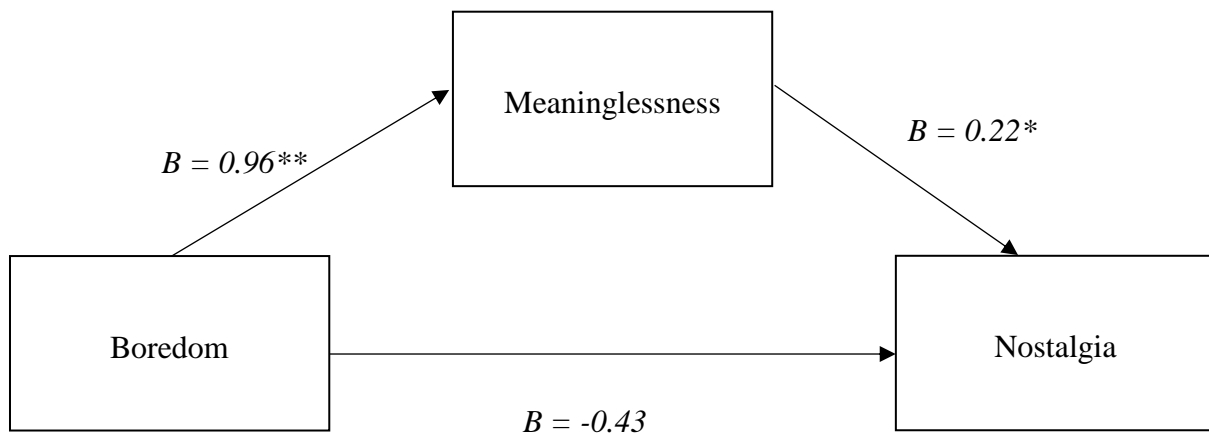
Manipulation checks. To check the success of the boredom manipulation, a two-way ANOVA was performed with the mean score on the Boredom Scale (Krijnen, 2012) as the dependent variable, and boredom (high vs. low) and music (high-nostalgic vs. low-nostalgic) as independent variables. Differences between the two boredom groups were significant $F(1, 114) = 35.50, p < .001, \eta^2 = .237$. Participants in the high boredom conditions experienced more boredom ($M = 5.65, SD = 1.03$) than participants in the low boredom conditions ($M = 4.47, SD = 1.11$). Boredom did not vary across the music conditions $F(1, 114) = 1.44, p = .23, \eta^2 = .012$. The Boredom x Music interaction was also not significant $F(1, 114) = 0.34, p = .56, \eta^2 = .003$. The boredom manipulation was thus successful.

To check the success of the nostalgia manipulation, three two-way ANOVA's were performed with the answer to the questions "The music I just heard is nostalgic", "The music I just heard is fun", and "The music I just heard is meaningful to me" as the dependent variables. Music (high-nostalgic vs. low-nostalgic) and boredom (high vs. low) served as the independent variables. Differences in nostalgic perceptions between the music groups were significant $F(3, 114) = 5.34, p = .02, \eta^2 = .044$, indicating that "The Vengabus" ($M = 4.51, SD = 1.32$) was perceived as more nostalgic than "Played Alive" ($M = 3.92, SD = 1.47$). Meaningfulness did not vary between the two types of music $F(1, 114) = 0.04, p = .95, \eta^2 = .000$. Contrary to Study 1, likeability differed between the two types of music $F(1, 114) = 5.77, p = .02, \eta^2 = .048$. Interestingly, the nostalgic music (The Vengabus) was perceived as less likeable ($M = 4.07, SD = 1.29$) than the non-nostalgic music (Played Alive, $M = 4.59, SD = 1.09$). Hence, potential positive effects of nostalgic music can safely be stated not to be caused by high likability of the music. In all three of the performed ANOVA's, neither boredom, nor the Boredom x Music interaction significantly predicted the relevant dependent variable. The nostalgia manipulation was thus successful.

Meaninglessness. Boredom was expected to cause meaninglessness. This was tested

in a two-way ANOVA with the composite of the two questions assessing meaningfulness as the dependent variable and boredom (high vs. low) and music (high-nostalgic vs. low-nostalgic) as the independent variables. Participants in the high boredom condition experienced more meaningfulness ($M = 5.44$, $SD = 1.40$) than participants in the low boredom condition ($M = 4.48$, $SD = 1.50$) $F(1, 114) = 12.70$, $p < .001$, $\eta^2 = .101$. Music did not predict meaningfulness $F(1, 114) = 2.22$, $p = .13$, $\eta^2 = .019$. Also, the Music x Boredom interaction did not significantly predict meaningfulness $F(1, 114) = 0.02$, $p = .89$, $\eta^2 = .000$. Preceding results confirm H1.

Boredom, meaningfulness and nostalgia. Boredom-evoked meaningfulness was expected to increase nostalgia. Preceding was tested using a mediation analysis (Preacher & Hayes, 2008). It was tested whether boredom would cause nostalgia via meaningfulness. Boredom predicted meaningfulness ($B = 0.96$, $t(117) = 3.58$, $p < .001$) (a-path). Also, meaningfulness predicted nostalgia ($B = 0.22$, $t(117) = 2.65$, $p = .009$) (b-path). The total indirect effect ($B = 0.21$), determined using 5,000 accelerated and bias corrected bootstraps, was significant 95% CI [0.07, 0.42], $SE = 0.09$ (see Figure 3). There was no significant direct effect (c or c' - paths), indicating that the relation between boredom and nostalgia is a result of boredom-evoked meaningfulness. Preceding results confirm H2, that bored participants feeling meaningless would feel more nostalgic than other participants.

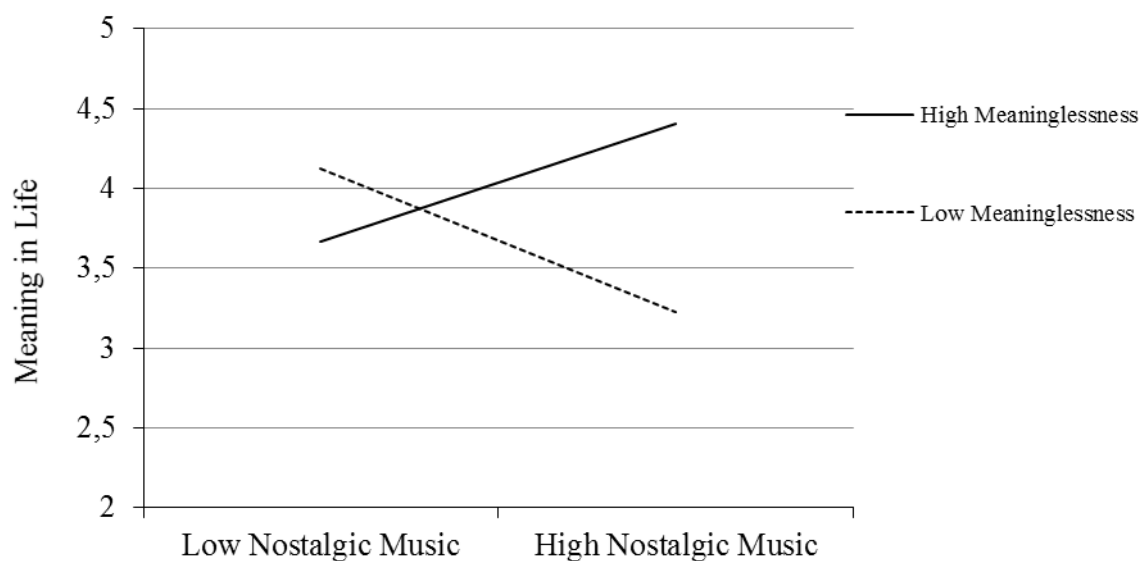
Figure 3. *Meaninglessness as a mediator between boredom and nostalgia.*

Note: * Significant at $p = .05$, ** Significant at $p = .001$

Meaning in life. The second aim of the current study was to determine whether nostalgic music could increase meaning in life when meaning was deprived by boredom. This was tested with a two-way ANCOVA. Boredom, music, and their interactions were entered as predictors of meaning in life. Meaninglessness was entered as a covariate. There were no main effects of music $F(1, 113) = 0.92, p = .76, \eta^2 = .001$, or boredom $F(1, 113) = 0.25, p = .62, \eta^2 = .002$, or meaninglessness $F(1, 113) = 0.47, p = .49, \eta^2 = .000$. Also, the interaction Boredom x Music $F(1, 113) = 0.10, p = .92, \eta^2 = .000$ and the interaction Boredom x Meaninglessness $F(1, 113) = 1.14, p = .29, \eta^2 = .010$ did not predict meaning in life. The Music x Meaninglessness interaction however, significantly predicted meaning in life $F(1, 113) = 5.67, p = .02, \eta^2 = .049$. The three way interaction Boredom x Music x Meaninglessness did not predict meaning in life $F(1, 113) = 2.63, p = .10, \eta^2 = .023$. However, further analysis comparing the low boredom and the high boredom conditions revealed that the Music x Meaninglessness interaction was only significant in the high boredom condition, $F(1, 54) = 8.15, p = .006, \eta^2 = .131$, not in the low boredom condition,

$F(1, 56) = 0.28, p = .59, \eta^2 = .005$. Within the high boredom condition, the unstandardized simple slope for music predicting meaning in life at 1 *SD* below the mean of meaninglessness was $b_{\text{Music}} = -5.42, t(54) = -1.92, p = .06$, the unstandardized simple slope for boredom at the mean level of meaninglessness was $b_{\text{Boredom}} = -0.49, t(54) = -0.28, p = .78$, and the unstandardized simple slope for boredom at 1 *SD* above the mean of meaninglessness was $b_{\text{Boredom}} = 4.44, t(54) = 2.13, p = .04$. Figure 4 illustrates the effect of music and meaninglessness on meaning in life, within the high boredom condition. These results indicate that when participants are bored, and meaninglessness is high, objectively determined nostalgic music has the ability to create a sense of meaning in life. These findings confirm H3, that nostalgic music results in higher ratings of meaning in life among bored participants feeling meaningless than among other participants. Interestingly, albeit marginally significant, high nostalgic music lowers meaning in life when participants did not feel meaningless as a result of their boredom.

Figure 4. *Nostalgic music bolsters meaning in life when boredom and meaninglessness are high.*



Note. Low Meaninglessness = -1 *SD*, High Meaninglessness = +1 *SD*.

Discussion

As in previous studies, boredom was found to cause meaninglessness. Also, meaninglessness is found to play a key role in the link between boredom and nostalgia. In fact, the performed mediation analysis revealed that boredom only increased feelings of nostalgia via meaninglessness. Another aim of this study was to examine whether nostalgic music would increase a sense of meaning in life. The significant two-way interaction between music and meaninglessness indicated that high nostalgic music and high meaninglessness resulted in relatively high ratings of meaning in life. Although the three-way interaction between boredom, music and meaninglessness was not significant, further analysis revealed that the Music x Meaninglessness interaction was only significant in the high boredom condition. So first, boredom-evoked meaninglessness increased nostalgia. And second, objectively determined nostalgic music increased meaning in life when bored participants felt meaningless.

General Discussion

The initial aim of the current research was to examine whether music, as an objective source of nostalgia, is capable of overcoming boredom. Objectively determined nostalgic music (according to the pilot study) did not directly alleviate boredom in Study 1. Explorative analyses then indicated that boredom did increase perceptions of nostalgia of potentially nostalgic music. Also, the explorative mediation analysis in Study 1 replicated the existing belief that nostalgia is a meaning-container. Although in Study 1 nostalgic music did not lower boredom, Study 2 was performed to replicate the explorative findings of Study 1, and to explore the meaning regulating function of objectively determined nostalgic music. Study 2 first revealed that boredom has the ability to cause meaninglessness. Second, boredom was found to increase feelings of nostalgia via meaninglessness. These findings confirm and

extend the explorative findings of Study 1. In Study 1, nostalgic perceptions, as opposed to feelings in Study 2, increased as a result of boredom. However, this was only the case in the high nostalgic-music condition. In Study 2, boredom increased nostalgia (via meaningfulness) independent of the type of music played. In Study 2, it became clear that meaningfulness is requisite for boredom to increase nostalgia. The fact that meaningfulness was not assessed in Study 1, could explain why a specific contrast analysis was needed to reveal that boredom increases nostalgic perceptions.

Study 2 further revealed the ability of objectively determined nostalgic music to increase meaning in life when bored participants had lost their sense of meaning. In total, the current research thus provides evidence for the notion that boredom as a meaning-threat increases feelings of nostalgia. Also, the notion that nostalgia contains a sense of meaning has again been corroborated. Most importantly, the current research provides evidence for the notion that objectively determined nostalgic music can be used to instill meaning when it was lost.

Unique to the current research was the use of predetermined objective nostalgic music to overcome meaningfulness evoked by boredom. Also, the range of existing studies on lost meaning resulting in nostalgia (Routledge et al, 2011), and subsequent studies of nostalgia resulting in high meaning in life (Van Tilburg et al., 2013) offered a great opportunity to test the entire process in one study. Theoretically, this offers valuable contributions to the research field on boredom, meaning and the triggers and functions of nostalgia (see: Nostalgic Music). Practically, the current approach offers insights to the conditions necessary for nostalgia to regulate meaningfulness as a result of boredom (see: Practical Implications).

Measuring nostalgia

Nostalgia is a complex emotion, bittersweet in that it reminds us of what is lost, but makes us feel happy with what we once had (Barett et al., 2010; Wildschut et al., 2006).

Nostalgia can cause sympathy and optimism, but also irritation and anger (Barett et al., 2010) and is described as to arise from high-level cognitive processing (Oatley, 1989). In the current research, feelings of nostalgia were assessed by asking participants widely used (e.g., Routledge et al., 2011; Van Tilburg et al., 2013; Wildschut et al., 2006) and explicit questions about their nostalgic feelings. However, nostalgia being difficult to define and demarcate, could be hard for participants to rate on a six-point scale. Furthermore, it could occur that participants are unwilling to admit that a source of nostalgia had made them long for their past, and left them feeling sad and happy at the same time (i.e., that the source made them feel nostalgic), due to a phenomenon known as impression management (e.g., Greenwald, Poelhman, Uhlmann & Banaji, 2009). Future research examining valid measures for feelings of nostalgia would, together with the current research on the topic, support the findings on boredom in relation to nostalgic music and meaning.

Nostalgic Music

As mentioned, the social connecting characteristics of nostalgia probably play a key role in the meaning regulating process. This is supported by the findings that boredom as a meaning threat can result in attempts to enhance one's social identity (Van Tilburg & Igou, 2011) and that social connectedness can mediate the effect of nostalgia on meaning (Wildschut et al., 2006). However, in the current research it is not directly measured why boredom-evoked meaninglessness increased nostalgia, and why nostalgic music increased meaning. Thus, in the current research, the working ingredient of nostalgia is very likely to be social connectedness, but it was not directly assessed. Future research linking objectively determined nostalgic music to meaning could thus expand the current research by also assessing social connectedness.

An advantage of the use of a predetermined objective source of nostalgia in the current research is first that it contributes to the objectivity of the results. For example, memories

evoked by “The Vengabus” stem from roughly the same year (1998) across participants. Also, characteristics of the music (e.g., valence and tempo) used to evoke nostalgia are similar for all participants. Another advantage of first objectively determining a source of nostalgia, is that it contributes to the content validity of the manipulation. Put differently, the current approach increases the probability that the working ingredient of the manipulation is actually nostalgia. Besides the theoretical advantages, the use of a single source of nostalgia offers valuable implications for the practical use of nostalgic music as a meaning regulator (see: Practical Implications).

Nostalgia as a medicine

The current research thus provides evidence for the conception that objectively determined nostalgic music has the ability to provide a sense of meaning in life. However, as can be seen in Figure 4, listening to high nostalgic music (as opposed to listening to low-nostalgic music), led to relatively low levels of meaning in life when bored participants did not feel meaningless. This could be explained by the bittersweet character of nostalgia. Barrett et al., (2010) found that sadness and disappointment are common emotions that accompany nostalgia. Perhaps these emotions gain in dominance when meaninglessness is low, and nostalgia is therefore not ‘needed’. In this context, nostalgic music could be medicine with side effects, to be handled with care. Since this speculation was not the prior aim of the current research, future research could provide more clarity in exactly when nostalgic music could have possible negative effects on meaning.

Another unanswered question remains whether nostalgic music can actually terminate boredom. Meaninglessness is a core aspect of boredom, and can be regulated by an objective source of nostalgic music, but perhaps there are other aspects of boredom that need to be regulated in order for it to really be terminated. The current research provides evidence for the notion that at least one highly uncomfortable aspect of boredom can be overcome by an

objective musical source of nostalgia. If in the future nostalgic music can be found to actually overcome boredom, this would confirm all intuitions. There is now evidence that nostalgic memories, narratives and objectively determined nostalgic music can be used to regulate meaning. Future research establishing other objectively determined sources of nostalgia (e.g., pictures, videos, scents) as meaning regulators, would also valuably expand the research field of nostalgia in relation to boredom and meaninglessness.

Practical implications

Boredom has many negative consequences for individuals and society. For example, boredom in job contexts decreases performance (Kass, Vodanovic & Callender, 2001; O'Hanlon, 1981) and increases accident rates (Drory, 1982). Other negative consequences of job boredom are illustrated in the documentary "Gnadenlos Billig" (Mercilessly Cheap) by the German broadcaster ZDF (2012). ZDF highlighted that the laborers shipping orders for online fashion warehouse Zalando (1.8 billion turnover in 2013) suffered mentally from their highly repetitive jobs. Objectively determined nostalgic music could relatively easily enlighten the meaningless aspect of these repetitive jobs. Besides engaging in something repetitive, boredom-evoked meaninglessness can also arise from loneliness or social isolation (e.g., Fahlman et al., 2009). Loneliness and social isolation are common threats of well-being amongst the elderly (Cohen, 2000). Playing predetermined nostalgic music in retirement homes could relatively easily provide a sense of social connectivity and provide some meaning in inhabitants' lives. Furthermore, it could be that nostalgic music prevents the harmful consequences of boredom such as aggression (Van Tilburg & Igou, 2012), substance abuse (Harris, 2000; Lee, Neighbors & Woods, 2007), or gambling (Zeelenberg et al., 2013).

Other uses of predetermined nostalgic music could be in waiting rooms or in traffic jams, where it can alleviate the boredom-evoked meaninglessness of the experience and possibly avoid frustration. Finally, nostalgia has already been found to change consumer

preferences (e.g., Schindler & Holbrook, 2003). Perhaps using nostalgic music in promoting boring but essential products (e.g., insurances) will increase interest or engagement for the advertised products. Predetermined nostalgic music is thus an easy to implement, and highly usable source of meaning.

In conclusion

The current research provides evidence for the notion that listening to the past can make the present meaningful. Boredom increases meaninglessness which increases nostalgia and, nostalgic music can increase meaning in life when bored people feel meaningless. Nostalgic music could be used to overcome the harming effects of boredom-evoked meaninglessness, or to increase engagement in important but boring activities or products. More research on the working ingredients, negative side effects, and other sources of nostalgia in relation to boredom-evoked meaninglessness would valuably contribute to the current research.

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Appendix A

The six statements of the music-nostalgia survey based on the contents of nostalgia as established by Wildschut et al. (2006).

1. Deze muziek herinnert me aan iets dat me overkomen is.
2. Deze muziek herinnert me aan waardevolle tijden.
3. Deze muziek herinnert me aan momenten met waardevolle mensen in mijn leven.
4. Ik heb nu even heimwee naar vroeger.
5. Deze muziek herinnert me aan een belangrijk moment in mijn leven.
6. Deze muziek herinnert me aan een verlies of teleurstelling.

Appendix B

Table 1
Perceptions and feelings of nostalgia

Music	Scale			
	Nostalgic perceptions		Nostalgic feelings	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Wrecking Ball	3.08	0.91	2.22	0.93
Waves	5.66	1.08	4.39	1.12
The Spark	2.93	1.07	2.02	0.92
Bohemian Rhapsody	3.13	1.06	1.64	0.75
Let It Be	4.44	0.95	3.75	0.98
Drops of Jupiter	3.08	0.91	2.01	1.01
The Vengabus ^a	3.64	1.02	2.39	0.90
L'amour Toujours	3.28	1.00	2.11	0.81
Played Alive ^a	2.59	1.02	2.03	0.86
Heyah Mama	3.41	1.05	2.21	0.84
I Will Survive	3.51	1.13	2.18	1.00
Avé Maria	3.55	0.97	2.15	0.84

Note: means were fitted to a six-point scale.

^a Chosen as nostalgic and non-nostalgic.

Appendix C

The 29 translated statements of the Multidimensional State Boredom Scale (Fahlman et al., 2013).

1. De tijd gaat langzamer dan normaal.
2. Ik zit vast in een situatie waarvan ik voel dat deze irrelevant is.
3. Ik ben snel afgeleid.
4. Ik voel me eenzaam.
5. Alles lijkt me nu te irriteren.
6. Ik wou dat de tijd sneller zou gaan.
7. Alles lijkt nu een sleur voor mij.
8. Ik voel me down.
9. Ik lijk te worden gedwongen om dingen te doen die geen waarde hebben voor mij.
10. Ik voel me verveeld.
11. De tijd lijkt zich langzaam voort te slepen.
12. Ik ben humeuriger dan normaal.
13. Ik ben besluiteloos over wat nu te doen.

14. Ik ben onzeker over wat ik nu zou willen doen.
15. Ik voel me leeg.
16. Het is moeilijk mijn aandacht ergens op te richten
17. Ik wil iets leuks doen, maar niets lijkt geschikt.
18. De tijd gaat heel langzaam.
19. Ik wou dat ik iets spannends aan het doen was.
20. Mijn aandachtsspanne is korter dan normaal.
21. Ik ben op dit moment ongeduldig.
22. Ik ben tijd aan het verspillen die beter aan iets anders besteed had kunnen worden.
23. Ik heb dwalende gedachten.
24. Ik wil dat er iets gebeurt, maar ik weet niet wat.
25. Ik voel me afgesneden van de rest van de wereld.
26. Op dit moment lijkt het alsof de tijd langzaam voorbij gaat.
27. Ik ben geïrriteerd door de mensen om me heen.
28. Ik voel me alsof ik hier zit te wachten op iets dat gaat gebeuren.
29. Het lijkt alsof er niemand in de buurt is om mee te praten.

Appendix D

The five translated statements of the Presence subscale of the Meaning in Life Questionnaire (Steger et al., 2006).

1. Ik begrijp de betekenis van mijn leven.
2. Mijn leven heeft een helder doel.
3. Ik heb een goed idee van wat mijn leven betekenisvol maakt.
4. Ik heb in mijn leven een bevredigend doel ontdekt.
5. Mijn leven heeft geen helder doel (inverted).

Appendix E

The seven statements of the Boredom Scale; an adjusted, shortened, and translated version of Lee's Job Boredom Scale (Krijnen, 2012).

1. Ik raakte verveeld tijdens de taak.
2. Ik vond de taak erg eentonig.
3. Ik raakte vermoeid door de taak.
4. Ik vond de taak saai.
5. Het leek alsof de tijd langzaam voorbij ging tijdens de taak.
6. Ik voelde tijdens de taak dat ik iets anders had willen doen.
7. Ik vond de taak leuk (inverted).