

The Erosion of Nostalgia Through Repeated Exposure

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Abstract: Over the past few centuries, nostalgia has been a topic of interest within fields like psychology, neuroscience, and sociology. The term nostalgia, coined by Johannes Hofer in 1688, was first used as a medical term for homesickness. Back then nostalgia was considered a physical disease. Over the years, the term's meaning evolved, going from a disease to a psychological disorder, and eventually a sentimental longing for the past. This thesis uses the latter interpretation as its starting point for its experiment. This experiment investigates the impact of repeated exposure of a nostalgic item, specifically a song or a snack, on the intensity of a participant's nostalgia. The participants were asked to consume their nostalgic item daily for a two-week period, keeping track of any changes in their experiences or emotions. Using both thematic analysis and a linear mixed effects model, the findings indicate a decline in the intensity of nostalgic feelings over the course of the experiment. This study aims to broaden the knowledge within the field of nostalgia and deepen the understanding of the relationship between repeated exposure and nostalgic stimuli.

Keywords: Nostalgia, Nostalgic feelings, Food-evoked nostalgia, Music-evoked nostalgia, Nostalgia erosion, Repeated exposure

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1 Introduction

A few years ago, I found a long-lost candy bar I had not had since my childhood. I had very fond memories eating it on school trips, so, on a whim, I decided to buy a pack. Whenever I ate a bar that week it reminded me of those school trips, which made me feel connected to my childhood and gave me a burst of happy energy. This experience was so good that when I ran out of these bars, I decided to buy another pack, and another. However, after a while I seemed to lose touch with those memories as they faded away. Now, I was just left with a chocolate bar that was alright, but not different from the rest. I was a little upset at first, but it also piqued my interest. Why had the candy bar lost its meaning? My memories hadn't changed, I had still eaten that candy bar on my school trips, so why were the emotions I felt different now? These questions inspired the research question of my thesis: *How does repeated exposure influence an individual's level of nostalgia for a specific food item or song over time?* The hypothesis is that the repeated exposure to a nostalgic item will diminish the intensity of an individual's nostalgia, which will influence the individual's emotional response, and strength of the memories associated with the item. There are no predictions whether song and snack will differ in this effect, but it will be considered.

Research into the field of nostalgia has spanned centuries. What started out as a disease with many physical symptoms (Hofer, 1688), transformed into a bittersweet emotion that bridges the gap between loss and love (Van Tilburg, 2023). With the shift of nostalgia to a psychological phenomenon also came research into what potential triggers of nostalgia could be. The most common triggers are negative affect (e.g. loneliness), sensory input, and social interaction (Wildschut et al., 2006). Sensory input is what this thesis will focus on. More specifically, it will focus on music- and taste-evoked nostalgia. Music (Barrett, et al., 2010; Sedikides, Leunissen & Wildschut, 2022) and food (Desmet & Schifferstein, 2008; Reid, et al., 2023; Vignolles & Pichon, 2014) have been proven to contain strong emotional and nostalgic connections. However, previous research has mainly focused on nostalgia as a static experience, rather than exploring it as something that can evolve due to repeated exposure. This leaves a significant gap in literature that calls for further exploration of the possible dynamic nature of nostalgic emotions and memories.

To achieve these research goals and answer the research question, this thesis will involve an experiment designed to investigate the influence of repeated exposure on an individual's level of nostalgia, emotional response and memories connected to a nostalgic item. By collecting data on the participants' subjective experiences at different points throughout the experiment, the research aims to uncover insights into the possible dynamic nature of nostalgia and its evolution over time. By delving into this dynamic nature, this thesis aims to contribute to a more comprehensive understanding of the processes underlying nostalgic experiences. This methodology will be discussed further in Chapter three of this thesis. Before this, a more detailed background will be given in Chapter two. This chapter will discuss the history behind the term 'nostalgia', while also diving into the relationships between nostalgia and music, and nostalgia and food. It will close with a review of methodologies surrounding habituation due to repeated exposure. Chapter four will feature the results of the experiment. It will provide a detailed analysis of the data collected and will highlight any notable findings or patterns. Subsequently,

chapter five will discuss the previous results and put them in the broader context of the literature. Finally, chapter six will offer a conclusion that mentions the key insights, acknowledges the limitations, and discusses future research.

2 Background

This chapter discusses the history of nostalgia, the connection between music and nostalgia, the connection between food and nostalgia, and the possibility of influencing memories due to repeated exposure.

2.1 History behind the term

In 1688, the term 'nostalgia' was invented by Johannes Hofer (1688). It was derived from the Greek words 'nostos' meaning return home, and 'algos' meaning pain or ache. If nostalgia did not catch the reader's fancy, he also had to alternatives namely 'nosomanias' and 'philopatridomania'. However, nostalgia seemed to be the preference. Hofer introduced nostalgia as a medical term for homesickness, which was considered a disease at the time. The disease originated in the brain, where the remembrance of one's homeland would push the 'living spirits' in the brain through uncommon pathways (this was the common idea of how brains worked in the 1700s), which results in both physical and emotional reactions. Frequent contemplation of one's homeland would only worsen these reactions. In his dissertation, Hofer describes multiple cases of nostalgia on which he bases his description of the disease. Symptoms of nostalgia include sadness, insomnia, lack of appetite and thirst, decrease in strength, frequent sighs, and stupidity of the mind. Due to these symptoms the sufferers would waste away and sometimes even die. The cure would be to counteract the symptoms and try to distract the sufferer from their nostalgic thoughts, or to return them to their homeland.

The idea of nostalgia as a disease remained this way for a long time. However, in the mid-1800s, a new way of viewing the disease came to light (De Rham, 1841). De Rham was tasked with diagnosing a client and upon investigating her symptoms he ruled out a bodily disease but diagnosed her with nostalgia. He called nostalgia a 'diseased state of the mind'. Roberts (1863), a military surgeon, described that he encountered nostalgia-stricken soldiers a lot, and considered it a mental disease. However, there were others who still viewed it as a disease, since it had bodily effects (Tuke, 1892). Eventually, support for viewing nostalgia as a disease dwindled, and the idea of it as a psychological disorder solidified. For example, Frost (1938) studied nostalgia in immigrant servants and describes it as a complex psychological condition that can cause mental health issues like suicidal tendencies. He also references Jaspers' (1910) research on the link between criminal behavior and nostalgia, highlighting more extreme nostalgia cases that included, for example, infanticide or pyromania. Research into nostalgia stagnated slightly in the early twentieth century but picked back up later in the same century.

Mid- to late twentieth century, heralded the beginning of another shift in the meaning of nostalgia. There were still supporters for nostalgia being a psychological disorder, like Rosen (1975), but there had been a tentative step towards something new a few years before (Starobinski & Kemp, 1966). Starobinski & Kemp (1966) had written a paper on the

history of nostalgia but ended it by giving the term a new meaning. Instead of having nostalgia refer to homesickness and being tied to a physical place, they had it mean a longing towards one's childhood. This new interpretation of nostalgia still had a slightly negative edge to it. This is emphasized by Peters (1985), who characterized nostalgia as a feeling that ranges from slight sadness to a debilitating craving for the past. However, that is not where the evolution of the term ends. In 1987, Kaplan picked up the term and refuted it as a variant of depression, which it was described as in that time, and gave it a more bittersweet meaning tied to warm memories with depressive notes. This interpretation is the one that most people follow today.

Still, nostalgia is an ever-evolving topic with researchers trying to unravel the complexities that come with it to this day. The bittersweet feeling proposed by Kaplan (1987) was further explored and it was established by Bassin (1993) that nostalgia was almost like mourning but then over the loss of one's past. Van Tilburg (2023) built upon that by saying that nostalgia works like a bridge between love and loss, offering solace in the face of loss and relief in the form of love. This research, in combination with other papers confirming more positive emotions being called forth by nostalgia than negative ones (Layous, et al., 2022; Leunissen et al., 2021; van Tilburg et al., 2019), is what this thesis will base its definition of nostalgia on: a bittersweet emotion that is based in a sentimental longing for the past akin to dealing with love and loss.

2.2 Music and nostalgia

Music has long been brought in connection with nostalgia. Zwinger (1710) brought this connection to light as an addendum to Hofer's (1688) paper. In his twelfth chapter, Zwinger mentions a Swiss song that brought out nostalgia in every Swiss person who listened to it. Still, in that time nostalgia was equated to homesickness (Hofer, 1688), so the connection between music and nostalgia has changed along with the term itself. Nowadays, researchers even go as far as to using an fMRI to identify the regions of the brain that are used when nostalgia is experienced (Yang, et al., 2022). Based on these images, Yang, et al. (2022) deduced that autobiographical memory, self-reflection, emotional regulation processing, and reward processing are the key components to nostalgia. In simpler terms, nostalgia is an emotion focusing on personal memories that are mainly positive and can make someone feel better and more motivated. This view is supported by others who describe nostalgia as a self-relevant emotion containing mainly positive, and significant autobiographical memories (Sedikides, et al., 2015; Van Tilburg, Wildschut & Sedikides, 2018). Music can do this very well.

It is very well-documented in psychological literature that music can evoke autobiographical memories. Janata, Tomic & Rakowski (2007) had their participants listen to a long list of songs, and many reported vivid autobiographical memories evoked by one or more songs on the list. They also had to fill out the emotions those songs brought out in them, and they were mostly positive with nostalgia being the third most common emotion they reported. Platz, et al. (2015) were also interested in the connection between music and autobiographical memories, however they were focused on the music's characteristics. They found that music from a person's adolescence to early adulthood (between the ages of 15 to 24) were more likely to evoke autobiographical memories than

songs from other time periods. This is due to the reminiscence bump effect (Rubin & Schulkind, 1997). The effect means that people have more memories connected to their adolescence and early adulthood than of other life stages.

As well as a vivid memory trigger, music is also a strong emotional trigger. Barrett et al. (2010) tested this by having their participants listen to excerpts of popular music from different time periods and letting them rate their nostalgia and other emotions. Just like Janata, Tomic & Rakowski (2007) they found that the emotions elicited by the songs were mostly positive like happy, loved, excited, but also negative sometimes like sad, lonely, and depressed. Another interesting discovery made by Barrett et al. (2010) was that participants in a negative mood had stronger nostalgic reactions to the songs, turning their negative mood into a more positive one. A boost in a person's mood isn't the only psychologically beneficial effect of music-evoked nostalgia (Sedikides, Leunissen & Wildschut, 2022). They found that it stimulates social-connectedness, self-esteem, and optimism just to name a few.

The effects and benefits gained from music-evoked emotions and memories is in line with Yang et al. (2022), Sedikides et al. (2015), and Van Tilburg, Wildschut & Sedikides (2018) their definition of nostalgia. Meaning that, even though the definition of nostalgia changed over time, the connection is still present and relevant to this day. Music is and always has been a strong evoker of nostalgia, which is why it was chosen as one of the focal points of this research.

2.3 Food and nostalgia

One of the most famous instances of food-evoked nostalgia is Proust's experience with a tea-soaked madeleine (Proust, 1913-1927). At first it is just a swell of emotions, warmth and joy flooded through him, but he could not pinpoint the source. After trying it twice more, the intensity of the emotions lessens, and he stops trying it in fear of lessening the intensity even more. Instead, he meditates on the feeling from the first experience and unlocks the memory it was tied to: Sunday mornings at Combray with his aunt Léonie, who would dunk the madeleines in tea and share them with him. Proust does not describe it as a nostalgic experience, but based on today's understanding of nostalgia it certainly qualifies (Yang et al., 2022; Sedikides et al., 2015; Van Tilburg, Wildschut & Sedikides, 2018).

As Proust (1913-1927) illustrated, food can be a powerful trigger of autobiographical memories. Green et al. (2023) even based their paper on 'the Proust effect', which refers to the experience of having sudden autobiographical memories triggered by a scent or taste. By way of three experiments, Reid et al. (2023) dive deeper into this effect on food-evoked nostalgia. The results showed that the memories evoked by the experiment were autobiographically salient and the experience had a positive effect on social connectedness, self-esteem, and meaning in life. An interesting discovery was that food-evoked nostalgia, in contrast to other sense-evoked nostalgias like music or scent, gave people more positive emotions. In two of the three experiments, where people were asked to visualize the food, they only reported positive emotions. The third experiment, which

contained actual tasting of food, negative emotions were also reported, but they were overshadowed by the positive emotions.

The link between food and positive emotions has been explored quite thoroughly. Desmet & Schifferstein (2008) had also found the phenomenon of a predominantly positive affect after eating certain snacks. They believed this might be because “people will only taste or eat those products that they expect to have a pleasant emotional impact”. They do indicate these results only pertain to healthy individuals. For a lot of people, food also serves as a source of solace or relaxation in the face of adversity (Brown, Edwards & Hartwell, 2010; Shen et al., 2020; Stammer et al., 2020; Vignolles & Pichon, 2014). During an experiment with international students, Brown, Edwards & Hartwell (2010) found that these students not only found physical sustenance in dishes from their home country, but also emotional sustenance. The food gave them a sense of nostalgia and comfort, while they also used it to connect with others by cooking and sharing the meal with others.

While food-evoked nostalgia leans more towards the sweet than the bitter (Desmet & Schifferstein, 2008; Reid et al., 2023), it is in line with what one can expect from nostalgia (Sedikides et al., 2015; Van Tilburg, Wildschut & Sedikides, 2018; Yang et al., 2022). Green et al. (2023) and Vignolles & Pichon (2014) touch upon the autobiographical memories people can experience through food, while Reid et al. (2023) also talk about the social and emotional aspects of this form of nostalgia. It is clear that food is a strong evoker of nostalgia, which is why it will be a good second focal point for this research into the possible erosive nature of nostalgia.

Reframing, regulating, and reconsolidating of emotions and memories

This thesis addresses a notable gap in the literature on nostalgia concerning the effects of repeated exposure to nostalgic items. Even though there is any research into the topic, the study should still find some base in previous scientific methods and inquiry. That is why this section will focus on research in different, but connecting, fields to elucidate the empirical basis of this thesis. By examining empirical studies on memory, emotion, habituation, and reconsolidation, parallels and relevant underlying mechanisms can be identified that are usable in the field of nostalgia.

A part of this thesis' hypothesis is that participants might have decreased emotional responses to their nostalgic trigger due to repeated exposure. This phenomenon is also called ‘emotional habituation’ (Leventhal et al., 2007). Emotional habituation has been tested in the frame of suspenseful film fragments (Chun, Park & Shi, C., 2020), chill-inducing aesthetic stimuli (Schoeller et al., 2024), and pleasurable stimuli (Leventhal et al., 2007) to name a few. Participants would watch the film fragments, listen to chill-inducing songs or speeches, or see pleasurable images repeatedly and were asked to report on their emotional state after every instance they were exposed to the stimuli. All these stimuli fell victim to emotional habituation with people reacting less strongly to the stimuli over the course of the experiments.

In addition to emotional habituation, sensory habituation is another phenomenon that highlights the impact of repeated exposure on human response, this time that of their

senses like taste and smell. Lenne et al. (2021) explored this by giving their participants a granola bar to eat every day for a certain period of time and examined their enjoyment. The pleasure and novelty of the snack seemed to wear off, leaving the participants with a decline in enjoyment. Mignot et al. (2021) did a similar study, but with olfactory stimuli. They exposed young and old participants repeatedly to a certain smell and took note of their habituation to it. In both groups there was a reported decline in sensitivity to the smell possibly due to habituation.

Beyond habituation, memory reframing and reconsolidation play an important role in the alteration of response to a memory-evoking stimulus. Samide & Ritchey (2021) focused their study on emotional regulation due to memory reframing. By reactivating a memory, they believe it is possible to reframe it by altering the context or interpretation and regulating the emotions tied to it. They found that reframing memories can significantly alter the intensity of the emotional response. While their research was focused on negative memories and emotions, it might also be possible for nostalgic memory triggers. The concept of changing the context of a memory is supported by research done by Hupbach et al. (2007). However, their paper focuses on memory reconsolidation, rather than memory reframing. Reconsolidation, in this case, means that when a memory is recalled, new information or emotion can be stored with it. This could mean that a nostalgic memory can be modified more and more as it is recalled repeatedly.

3 Methodology

This chapter will go into the methodology behind the experiment. It will discuss such things as the research design, participant recruitment, ethical considerations, experimental design, and survey and interview design.

3.1 Ethical considerations

For this experiment, participants were asked to share personal information concerning their memories and emotions tied to certain songs or snacks. Due to the personal nature of the information, ethical approval had to be obtained before starting the experiment. The study was reviewed and approved by the Faculty of Sciences Ethics Review Committees, and it has been registered under code FWN2022-008.

The experiment followed the ethical procedures provided by the Review Board, so consent forms were provided and signed by the participants before they filled out the first survey. They were also informed about the nature of the experiment using an Information Sheet. After the participants finished the experiment, they were provided with a Debriefing Form, which they also filled out and signed.

3.2 Participants

This study made use of convenience sampling and snowball sampling. This was done through posts on personal social media such as Instagram and WhatsApp, and people

were encouraged to share the request. The Media Technology announcement page was also used to request participants.

Participants were selected if they were over the age of 18 and had a fitting nostalgic item. Whether a nostalgic item fit was judged based on the availability (mostly of snacks) and the impact of the item on the participant's diet. In this context, availability means whether the snack was still available in stores, or if the music could be easily streamed. The impact on a participant's diet was also important, because snacks can be unhealthy or rich which could impact a person negatively. If this was the case, it would be recommended that the participant should not participate.

The final sample was made up of 8 participants, 5 of which had chosen a song and 3 who had chosen a snack. The ages ranged between 22 and 55, the average being 29 years of age. Finally, the gender division was 5 female participants and 3 male participants.

3.3 Research design

The participants had to first fill out a survey on their more general experiences with and feelings of nostalgia, while also providing a song and/or a snack that made them feel nostalgic. They were asked to describe their feelings and memories to the best of their ability. The participants who were selected would then move on to the next stage, which was the actual experiment.

Firstly, the participants would be interviewed with the goal to dive deeper into their nostalgic item and the feelings or memories behind that. Then they would start the experiment, which would take up two weeks. This timeframe was selected both because of the limited time available and previous habituation experiments by Lenne et al. (2021) and Mignot et al. (2021) had a similar timeframe. Every day, the participant would listen to or eat their nostalgic item and fill out a short survey based on that experience and what it called forth. After the two weeks, a final interview was held to evaluate the participant's current feelings towards the nostalgic item and whether anything had changed concerning their feelings or memories.

3.4 Survey and interview design

The first survey participants had to fill out was based on the Southampton Nostalgia Scale (Barrett, et al., 2010). It is made up of seven questions with six of those having a seven-point Likert scale as answers. All questions are about the person's own experience with nostalgia. The rest of the questions were concerning the participant's contact information and their personal nostalgic item. The every-day survey was based on the Personal Nostalgia Scale (Merchant et al., 2013), which could be answered on a five-point Likert scale. It was shortened to make it more convenient for the participants to fill out every day. The 'Physiological reactions' part was left out, because the focus of this study lies with changes in emotions and memories and not physiological responses. Questions from the part 'Past imagery' were cut for convenience and some questions were very similar.

The first interview was semi-structured to elaborate on the feelings and memories connected to the nostalgic item. The structure left room to ask follow-up questions and elaborations by the participant themselves. The final interview was semi-structured as well, but this one was more focused on the experience of the previous two weeks. Questions were centered around personal experience and possible changes in emotions or memories concerning the nostalgic item. The exact surveys can be found in the appendix.

3.5 Data collection and data analysis

The surveys were created in Qualtrics, which is where the answers were also stored. It is a university approved tool, which has its own privacy regulation to keep the data safe. The interview answers were saved in a password protected folder on the researcher's personal computer.

Since the experiment yielded both quantitative and qualitative data, a mixed methods approach to analysis is needed. For the interviews, the data will undergo a thematic analysis to identify patterns and themes in the participants answers. The quantitative data will be analyzed using a linear mixed methods model. This model works well with analyzing repeated measures from participants, which is the case since participants answer the same questions over the course of two weeks. It accounts for random effects by including random intercepts for each participant, which captures individual differences and the correlation between repeated measures. Finally, it could also take into account a possible difference between the participants who consumed snacks and those who consumed songs.

4 Results

This section will provide an insight into the data obtained from the experiment. Both qualitative thematic analyses and a quantitative approach using linear mixed effects models were used to analyze and interpret the data. The findings of these methods will be discussed below.

4.1 Surveys

4.1.1 First survey

Before the participants could take part in the study, they had to fill out a survey based on the Southampton Nostalgia Scale (Barrett, et al., 2010). These questions could be answered on a seven-point Likert scale. The answers could be translated to numbers, which could be turned into an average score for every participant. The questions were designed to measure the participant's nostalgia proneness. The average score is a representation of this. All participants had relatively high scores (mean = 4.10, SD = 0.44). There was no significant difference between the participants in the condition with snacks and those with songs for the first survey.

4.1.2 Daily survey

For the two-week experiment, participants had to consume their nostalgic item every day and then fill out a short survey. The statements were based on the Personal Nostalgia Scale (Merchant et al., 2013) (see appendix). The answers were analyzed with linear mixed effects model with maximum likelihood estimation using the *lme4* package (Bates et al., 2015). P-values for fixed effects were calculated with t-tests using Satterthwaite's method (Kuznetsova et al., 2017). Variance across subjects was modeled as random intercepts in all models. Individual models were fit for each question to quantify the change in nostalgia judgements over the course of the two-week period, with Day (1-14) and Condition (Snack or Song) as fixed effects.

Condition	Estimate	Std. Error	df	t value	Pr(> t)***
Q1:Day	-0.12	0.03	92.92	-4.59	<0.001
Q2:Day	-0.08	0.02	93.06	-3.46	<0.001
Q3:Day	-0.05	0.03	93.20	-1.71	0.09
Q4:Day	-0.13	0.03	93.07	-4.63	<0.001
Q5:Day	-0.12	0.02	93.02	-4.69	<0.001
Q6:Day	-0.03	0.02	93.01	-1.29	0.200
Q7:Day	-0.01	0.02	93.17	-0.56	0.579
Q8:Day	-0.04	0.02	93.09	-1.64	0.105
Q9:Day	0.03	0.02	93.11	1.17	0.24575
Q10:Day	-0.02	0.01	92.65	-1.93	0.056194
Q11:Day	-0.01	0.01	92.51	-1.26	0.211
Q12:Day	-0.01	0.01	92.69	-0.91	0.364
Q13:Day	-0.01	0.01	92.84	-0.58	0.566
Q14:Day	-0.01	0.01	93.72	-0.99	0.3243
Q15:Day	-0.003	0.01	92.88	-0.38	0.70617

Table 1: Summary of Fixed Effects Estimates for the Effect of Day on Responses to Questions Q1 to Q15, *** $p < 0.001$.

In Table 1 it is shown that Q1, Q2, Q4, and Q5 had a significant effect of Day on nostalgia reports. Respectively, the statements were: I was transported to the past; I remembered a specific event; images came to mind; the images were clear. Q1 had an average reduction of -0.12 per day ($b = -0.12 \pm 0.03 \text{ SEM}, p < 0.001$). Q2 had an average reduction of -0.08 per day ($b = -0.08 \pm 0.02 \text{ SEM}, p < 0.001$). Q4 had an average reduction of -0.13 per day ($b = -0.13 \pm 0.03 \text{ SEM}, p < 0.001$). Finally, Q5 had an average reduction of -0.12 per day ($b = -0.12 \pm 0.02 \text{ SEM}, p < 0.001$). These statements were focused on the nostalgic experience of evoking memories, so it is interesting to see only these had a significant diminishing effect. Q6 to Q9 represented positive emotions, while Q10 to Q15 represented negative emotions. Every statement, aside from Q9, had a negative estimate, meaning that the nostalgia score, on average, is reduced by the Estimate every day. In Figure 1, the slight diminishing effect is illustrated by the average response to all questions over the entire two-week period.

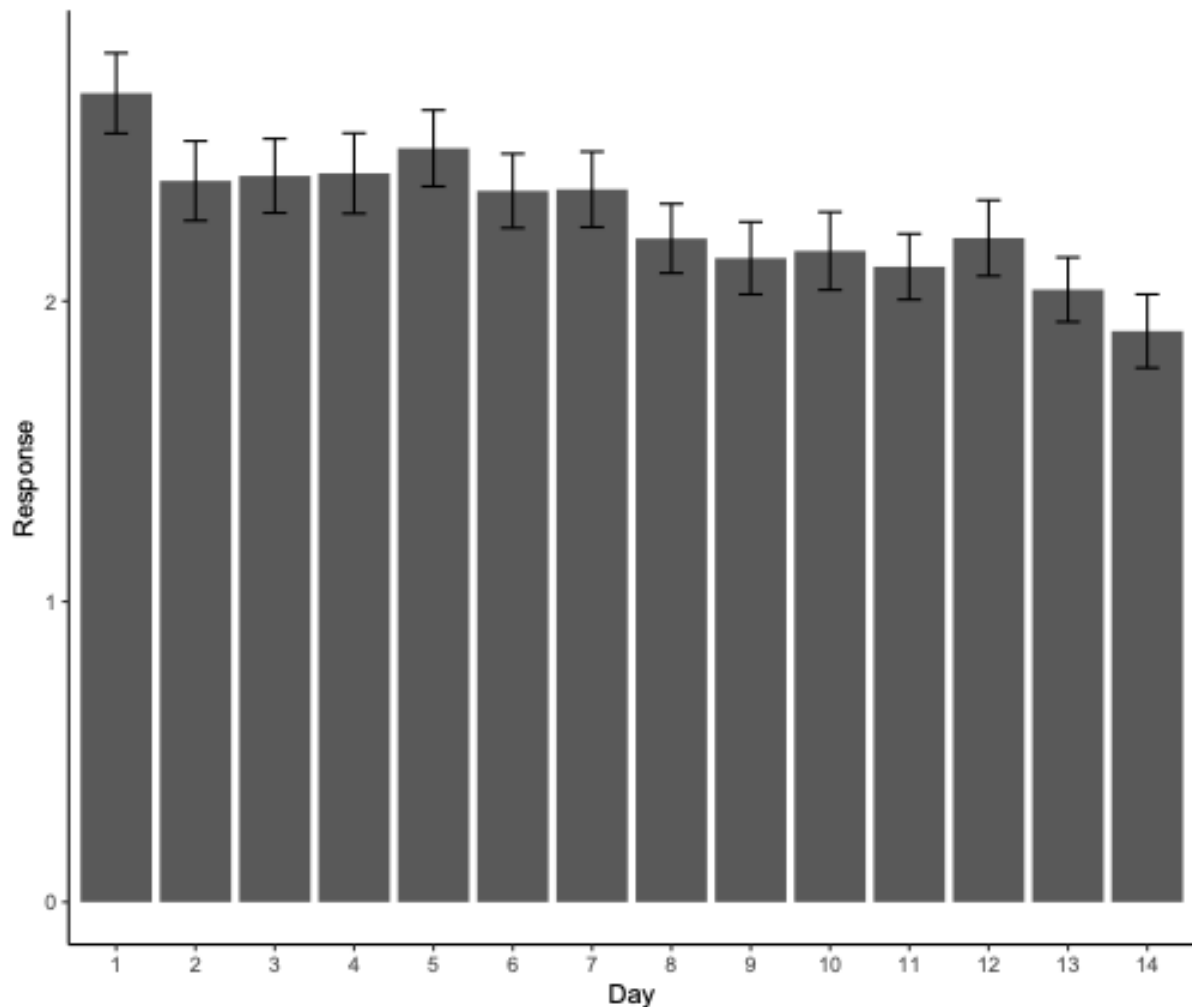


Figure 1: Mean response by day with error bars

Whether someone had chosen a song or snack was added into the model as a fixed effect. This variable was called Snack and did not significantly impact the nostalgia reports. There was, however, a significant interaction effect between Day and Snack for Q9 ($b = -0.12 \pm 0.04 \text{ SEM}, p < 0.01$) and Q10 ($b = 0.07 \pm 0.02 \text{ SEM}, p < 0.01$), which represented the emotions Relaxed and Sad. Participants who had chosen a snack had, on average, a significantly more negative effect of Day than those who had chosen a song. For Q10, it was the opposite. Here the snack participants had, on average, a significantly more positive effect of Day. This means snack participants were less relaxed and sadder over time on average than song participants.

4.2 Interviews

4.2.1 First interview

The first interview was mainly to get to know more about the participant's nostalgic item and the experiences tied to it. There was a slight difference between those who had chosen a song and those who had chosen a snack. The snack participants had only chosen snacks from their childhood, while the song participants had chosen songs from their childhood, adolescence, and early adulthood. When asked if the item evoked more

memories or more emotions, the answers were mixed. There were those that mostly recalled memories, those who mostly felt emotions, and those who experienced a mix. There was no difference between songs or snacks. The memories that were evoked were described as centered around themselves with all the participants also mentioning other people playing small roles in those memories. Finally, one of the participants, without knowing about the hypothesis, mentioned that they had repeatedly listened to a nostalgic song before resulting in a loss of nostalgia, which had made them more careful with other nostalgic songs and how much they listened to them.

4.2.2 Final interviews

The final interview was a moment to evaluate the participants' experiences over the course of the experiment. All participants reported a gradual loss of intensity of emotions and memories the item evoked. The intensity would reach its lowest point around the 5-to-7-day mark. Three participants did mention that they suspected that memories of the experiment would be evoked if they consumed the nostalgic item in the future. Additionally, there were two other participants who believed that the intensity of the nostalgic experience would restore itself given enough time, so they believed the effect to only be temporary. Another observation made, was that the circumstances surrounding the consumption of the item mattered. One person had chosen a song connected to a childhood holiday, and they felt more connected to the song when they listened to it while the sun was shining. Two other participants had a set time when they would consume their items, and they reported a quicker loss of intensity of nostalgia than others with a difference of 2 to 3 days. They also mentioned that it felt like consuming the item had become a habit, like it was part of their routine. Overall, there did not seem to be a difference between the experiences of those who had listened to songs and those who had eaten snacks.

5 Discussion

The goal of this research was to examine the relationship between nostalgia and repeated exposure. To do this, a short-term, mixed-methods study with surveys and qualitative interviews was conducted. The interviews were at the start and end of the experiment, while there was a survey to measure the participants' nostalgia proneness before the experiment and a daily survey during the two-week period of the experiment to measure any changes in their nostalgic feelings concerning their nostalgic item, either a song or a snack.

The thematic analysis revealed that the participants did experience a diminishing effect in the intensity of their nostalgic feelings. Both emotional responses and the evoked memories were experienced as less intense, which is in line with the hypothesis. However, multiple participants predicted that the nostalgic experience would return to its previous state of intensity if they avoided consuming their nostalgic item for a period of a year or longer. It was also observed that participants who made the consumption part of their routine reported a slightly earlier loss of intensity compared to those who consumed their item at different times during the day. The thematic analysis only revealed one small

difference between the snack and song categories related to the age at which the nostalgic item was first consumed. For the snack category the item was from the childhood of the participant, while those from the song category had a mix of items from their childhood and adolescence.

The linear mixed effects model showed that there was an overall diminishing effect in nostalgic response to the nostalgic item over the course of the experiment with only four questions showing this significantly. Those questions all had to do with the nostalgic memories instead of emotions, which could indicate that memories are more prone to fading due to repeated exposure. Still, it is important to note that evoking memories might be more specifically tied to the nostalgic item, while emotions have more outside factors affecting them. Another thing to note is that most participants rated all the negative emotions a '1' from the start, leaving no room for a significant diminishing effect. This is in line with previous research describing nostalgia as a mainly positive emotion (Layous, et al., 2022; Leunissen et al., 2021; van Tilburg et al., 2019).

Furthermore, there was a significant interaction effect for Q9 and Q10, which showed a slight difference between people who had chosen snacks and those who had chosen songs. The difference was that snack participants were less relaxed and sadder over time. This could be because after the experiment two of the snack participants admitted to not enjoying the snack anymore, while only one of the song participants said their enjoyment of the song had decreased. The decrease of enjoyment for the snack participants could have led to the decrease in relaxation and increase in sadness over time. No other significant differences were found, however, the non-significant results showed an overall more negative effect of Snack and the interaction effect between Snack and Day. This means that, overall, snack participants had lower results per question on average, while also have a larger diminishing effect over time.

The hypothesis has not been significantly proven, but the results do suggest there might be a negative relationship between repeated exposure and the intensity of an individual's nostalgia. This effect came forward more clearly with the memories associated with the nostalgic experience than the emotions tied to it. An explanation for this could be that memories are subject to reconsolidation when recalled (Hupbach et al., 2007). Upon reactivation, the memory becomes temporarily unstable, meaning it can be modified or updated then it reconsolidates and becomes stable again. Hupbach et al. (2007) showed that this was also possible with episodic memories, which are memories of specific events or experiences from one's past (Tulving, 2002). This could mean that the nostalgic memories were subject to reconsolidation, leading to a shift from the original memory and a loss of vividness of that memory. As for the emotional side, the non-significant diminishing effect might be due to the complexity of emotions. There are a lot more factors influencing one's emotions than there are for the memory side of the nostalgic experience like someone's mood (Perrig & Perrig, 1988), the weather (Denissen et al., 2008), how they slept (Tomaso, Johnson & Nelson, 2020), etc. That is why more detailed research is needed to verify the preliminary findings and to understand the mechanisms driving the negative relationship between repeated exposure and nostalgia.

5.1 Limitations

One of the primary limitations of this study is the small sample size and the sampling methods due to limited time and resources. Both could introduce biases that may affect the generalizability and representativeness of the study. Secondly, the reliance on self-report measures could also result in biases. Participants' mood, social desirability, and recall accuracy may affect the reliability of the responses. Finally, the subjective nature of nostalgia and emotional experiences makes it difficult to standardize and compare the collected data across individuals.

5.2 Future research

Since this thesis is the first to explore the relationship between nostalgia and repeated exposure, it is important to explore this more fully. By employing random sampling and a bigger sample size, the main limitations of this study would be mitigated. Future research could also benefit from using different timeframes either longer or shorter. It would also be interesting to see in a study if the participants' prediction was correct that their nostalgia would return to normal after a longer period of not consuming it. Finally, they could also investigate different types of nostalgic items like videos, scents, or pictures to broaden the field.

6 Conclusion

In this thesis, the first controlled experiment to study the link between repeated exposure and nostalgia was done. Drawing on previous work from nostalgia research and empirical methods in memory to outline both what nostalgia is (Layous, et al., 2022; Leunissen et al., 2021; van Tilburg et al., 2019) and how to set up an experiment testing emotional and sensory habituation (Lenne et al., 2021; Mignot et al., 2021). This led to the discovery of a possible negative effect of repeated exposure on nostalgic intensity. The outcome could help deepen the understanding of nostalgia as a whole and could be used in further studies. Practically, these findings could help industries that use nostalgia, such as marketing, psychology, and entertainment, highlighting the need to carefully manage the frequency and context of nostalgic stimuli to maintain their effectiveness. For instance, in marketing, brands might reconsider strategies that rely on repeated nostalgic appeals, and in psychological settings, practitioners might tailor nostalgic interventions to avoid habituation.

7 References

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8 Appendix

8.1 Southampton Nostalgia Scale

1. How valuable is nostalgia for you?

Not at all - Very much

2. How important is it for you to bring to mind nostalgic experiences?

Not at all - Very much

3. How significant is it for you to feel nostalgic?

Not at all - Very much

4. How prone are you to feeling nostalgic?

Not at all - Very much

5. How often do you experience nostalgia?

Very rarely - Very frequently

6. Generally speaking, how often do you bring to mind nostalgic experiences?

Very rarely - Very frequently

7. Specifically, how often do you bring to mind nostalgic experiences? (Please check one.)

At least once a day

Three to four times a week

Approximately twice a week

Approximately once a week

Once or twice a month

Once every couple of months

Once or twice a year

8.2 Personal Nostalgia Scale

Past imagery (strongly disagree - strongly agree)

I was transported to the past

It was like a flashback

The images were distinct

I remembered a specific event

The memories were in bits and pieces

I could see many images

The image(s) were vivid

Positive emotions (not at all – extremely)

Warm

Peaceful

Pleasant

Relaxed

Calm

Negative emotions

Sadness

Anxiety

Tensed

Guilty

Depressed

Regret