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Nostalgia and Music-Evoked Autobiographical Memories:
Salience and Content in Musicians versus Non-Musicians

Taylorlyn Mehnert

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Abstract

This paper examines a subsection of data from a larger study conducted by Alycia Sterenberg titled, “The determinants of affect, emotional arousal, and autobiographical memories on music-evoked nostalgia”. The question being examined was: when examining musicians and non-musicians, what difference is there in the intensity of nostalgic memories between the two groups; what elements of a memory are either group more likely to be nostalgic about when listening to music they have labeled as nostalgic for themselves? The data was acquired from questionnaires participants filled out after listening to music generated to be similar to that which they had labeled as nostalgic for themselves. Analysis showed no significant difference in the levels of music-evoked nostalgia between musicians and non-musicians. The content of nostalgic memories displayed trends in line with current research such as a “reminiscence bump” around the ages of 15-25 years old (Janssen et al., 2005), and in the highest reported content of nostalgic memories: “people” was the most frequent category, and in the “place” category, the highest response was a particular “event” for both musicians and non-musicians (Wildschut et al., 2006).

Introduction

At its conception as a scientific term, “nostalgia” was considered a neurological disease. A Swedish medical student named Johannes Hofer first coined the term in his “Medical Dissertation on Nostalgia” in 1688 (Anspach, 1934). Since then, the term “nostalgia” has modified and expanded away from this definition, but in many different directions. A definition of nostalgia that matches the current thinking about nostalgia, and the one used for this study, is “a wistful or sentimental longing for the past, and typically involves a particular time or place with some personal association”.

The purpose of this paper is to examine a subsection of data from a study done at the Brain Research and Interdisciplinary Neuroscience (BRAIN) Lab called “The determinants of affect, emotional arousal, and autobiographical memories on music-evoked nostalgia” by Alycia Sterenberg. The question being examined in this paper is: When examining musicians and nonmusicians, what difference is there in the intensity of nostalgic memories between the two groups; what elements of a memory are either group more likely to be nostalgic about when listening to music they have labeled as nostalgic for themselves?

Literature Review

In order to comprehensively examine the research surrounding this topic, this literature review will be organized according to the Rational-Scientific Mediating Model (RSMM). The RSMM was designed by researcher Michael Thaut as an “epistemological model” to regulate

and catalogue music-related research (Thaut & Hoemberg 2016), however, it will here be used to organize a review of research related to this topic. There are 4 levels to the RSMM but as the present study is a level three study, we will only discuss the first three. The levels are as follows: level one, “musical response models”, which discusses the effect of music on the domains being examined; level two, “parallel non-musical response models”, which examines these domains outside of music; and level three, “mediating models”, which determines whether there is a foundation for clinical research. (Ibid)

Level One

Music and memory. Humans’ memory for music can span decades (Bartlett & Snelus, 1980). While, the ability to recall detailed information about songs deteriorates over time (Schulkind, Hennis, & Rubin, 1999), in this study, we were not searching, necessarily, for specific information about a song or even of a memory associated with a song. Another study by Janata Tomic, and Rakowski (2007), showed that musical fragments can serve as retrieval cues not only for details about music but also for autobiographical memories.

Musicians versus non-musicians. If one is to compare musicians and non-musicians, it is important to define what qualifies a “musician”. A popular method of defining musicians versus non-musicians is by utilizing college populations and separating music majors from others such as in Fredrickson and Coggiola (2003). Many studies simply have their own criteria such as a study done by Angulo-Perkins et al. (2014) which specified criteria of having at least five years of musical training and playing an instrument daily. Some studies (such as Shaal, Banissy and

Lange (2014)) have taken a broader view of an individual's interaction with music, and used the Goldsmith Musical Sophistication Index (Gold-MSI) (Müllensiefen, Gingras, Musil, & Stewart, 2014) or the Music Use (MUSE) questionnaire (Chin & Rickard, 2012). The Gold-MSI and MUSE questionnaires take a more holistic view of musicality including other forms of musical engagement and perception such as concert attendance and dance. For the purposes of the present study, the participants were asked if they had more than one year of musical training, or any training within the last three years (Chin & Rickard, 2012, Müllensiefen et al., 2014).

It is clear that there is a difference in the way music affects and is perceived by musicians versus non-musicians. Musicians show earlier sensitivity in neurological processing of musical sounds than non-musicians (Angulo-Perkins, 2014) and higher recognition of “emotion-conveying music” (Nolden, Rigoulot, Jolicoeur, & Armony, 2017). Musicians and those with high musicality are able to better recall Western rhythmic and pitch patterns (Schaal, Banissy & Lange 2014).

Beyond performance in music-related tasks, other studies show that musical training affects non-musical cognitive processes. Musicians display higher recognition of emotion in the human voice (Nolden et al., 2017), and have a better recall of all vocabulary, not only auditory-stimulus related words (Brandler & Rammsayer 2003; Taylor & Dewhurst 2017). The neural networks that allow musicians to display higher working memory performance when presented with tonal rather than atonal sequences also influences the strategy-based, working memory for non-verbal auditory information (Schulze, Mueller, & Koelsch, 2010).

Most notably, according to a meta-analysis by Talamini Altoè, Carretti, and Grassi (2018), musicians have better overall memory recall, including long term memory. The study

noted that the results are somewhat inconsistent regarding the degree to which musicians outperform non-musicians, but overall the performance of musicians was statistically significantly higher than non-musicians. Another study by Groussard et al., (2010), found that there is a difference plasticity in the hippocampus of musicians (those with musical expertise) from non-musicians that allows for different levels of long-term memory processing.

Level Two

Nostalgia outside music. Nostalgia is experienced regularly by the majority of people across age, gender, and culture (Hepper et al., 2014; Wildschut et al., 2006). Many studies have shown that autobiographical memory is necessary to the nostalgic experience (Batcho, 2007; Wildschut, Sedikides, Arndt, & Routledge, 2006; Sedikides et al., 2015). Davis (1979) would argue that the experience of nostalgia is predominantly positive because even when the associated memory is a negative one, nostalgia allows for a broader view which “[encourages] an appreciative stance towards former selves” (pp. 35-36). Wildschut et al. (2006) also found that autobiographical memories typically contain the self in interaction with others, and common triggers for these memories include social interaction and sensory input.

Level 3

Basis for clinical research. A study by Barrett et al. (2010), which this study was modeled after, showed that autobiographical salience of the memory and familiarity with the

song and self-reported nostalgia proneness are directly correlated to the intensity of the nostalgic experience when listening to music. The emotional experience of music-induced nostalgia is predominantly positive (Barrett et al., 2010; Batcho, 2007).

Janssen, Chessa and Murre (2005) showed that most of the memories related to the nostalgic experience are from ages 15-25. Krumhansl and Zupnick (2013) saw an increase in nostalgic experiences for music from the time period when participants' parents would have been in their twenties, suggesting that parents' preferred music is often nostalgic. They found that older music is more nostalgic for people than newer music, and that a person's enjoyment of a song was a strong predictor of how nostalgic that song would be.

Methodology

Participants

Participants between the age of 18-28 years were recruited for this study from Western Michigan University's campus. Participants were prompted to contact the lead researcher to schedule a time to go through the informed consent process in order to participate in the study. Ultimately, 15 musicians and 15 non-musicians were recruited for the study.

Measures

Survey. A survey prior to the study prompted participants to create a 5 digit code used to later access participant information and preserve anonymity. The survey then requested demographic information (age, gender, ethnicity, music experience) as well as the three genres of music the participant listened to most in their childhood. The survey then offered a list of 100 top songs from the Top 100 Billboard from the participants' late childhood to early adulthood. This list was to help participants as they were asked to list five songs that they found to be nostalgic for themselves (nostalgic was defined for them as "a wistful or sentimental longing for the past, and typically involves a particular time or place with some personal association" (Michels-Ratliff and Ennis, 2016), though they were not required to pick from the suggested song list.

Electrodermal activity. Electrodermal activity (EDA) was measured to assess clients level of arousal. The BRAN lab manager applied two electrodes to the participants third and fourth finger tips of the non-dominant hand (the dominant hand was needed to operate the laptop and answer questions following each song) and attached the wireless transponder to the participants wrist via velcro strap. The BRAIN Lab manager put a towel over the participants non-dominant hand to ensure the hand did not get cold and interrupt the EDA signal. Another researcher was seated at a 27 inch 2012 iMac computer just outside the room and assisted in calibrating the EDA from the computer on the BioNomadix MP150 (model 507) data acquisition and analysis system.

SNS and PANAS. The Southampton Nostalgia Scale (SNS) (University of Southampton, 2017) and Positive and Negative Affect Schedule (PANAS) (Watson, Clark, & Tellegen, 1988) were used before the study and PANAS was also used after the participants had completed the study (Barrett et al., 2010). PANAS is a 5 level Likert scale that assess 10 points of positive

affect and 10 points of negative affect. SNS assesses a person's relationship to nostalgia; its use and meaning in their lives.

Questionnaire. After each song, the participants were prompted to fill out a questionnaire that had the participant rate their level of familiarity with and enjoyment of the song, their autobiographical association with the song as well as the songs effect on the participants excitement and level of nostalgia. Participants were asked to rate these variables by sliding a bar along a line, the left side of which was labeled “none” and the right side, “extremely”. The starting position of the bar was at the halfway point. The participants were then prompted to note which people, places, and times (if any) they associated the song with. The people and place categories, participants were able to select any that applied from a list of suggestions and were also given the opportunity to input an answer in the “other” box. Participants were able to select one from a suggested list of time frames.

Procedure

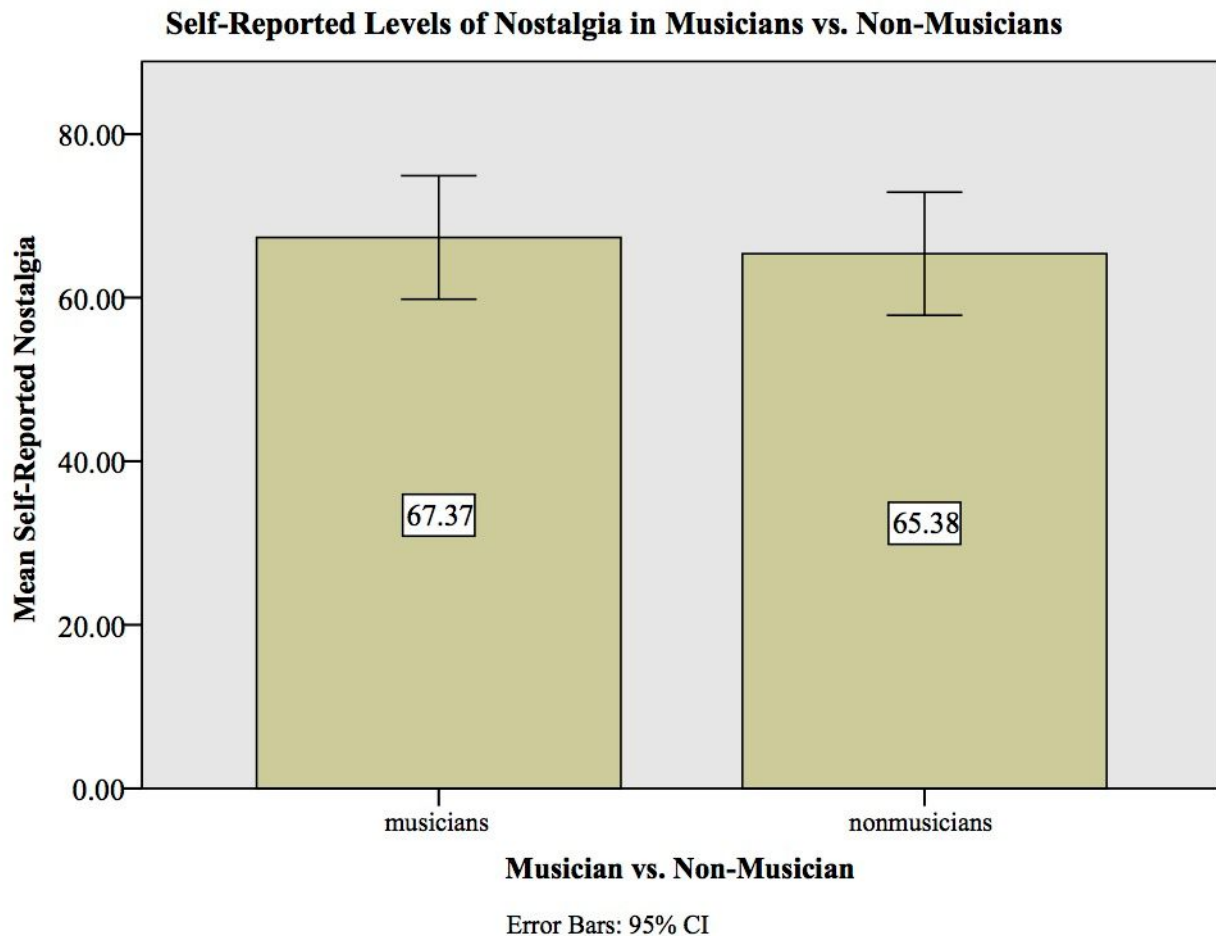
During the first session, participants came in to go over the informed consent process. If participants chose to participate in the study, they filled out a survey and scheduled a date and time for the second session. Five songs indicated by the participant as nostalgic in the survey were inputted into Pandora© (Michels-Ratliff and Ennis, 2016; Pandora Media, 2017) to generate a playlist of songs similar to those indicated by the participant. This playlist determined which songs the participant would listen to during the second session.

During the second session, participants were taken into a separate room when they arrived at the BRAIN Lab and were seated at a table with their back to the door. A laptop used for the study was open in front of them. The lead researcher read a script describing the instructions for the participant and asking them if they had any further questions before beginning the study. During this time, the BRAIN Lab manager was preparing and attaching the electrodes for EDA measure. The lead researcher then placed Sennheiser wireless headphones (Model #RS 120) on the participant and had another researcher slowly turn up the volume on a test song until the participant noted that the music was at their preferred volume. The researchers then informed the participant that they would begin the study and left the room.

The researcher operating the EDA software flagged the time of the sound of the door closing on the participants' EDA recording. The researcher flagged that point and all other significant events throughout the study including the participant beginning the questionnaires, SNS and PANAS; the beginning and ending of songs; the beginning and ending of questionnaires after each song; and any other significant events that happened unexpectedly throughout the study (i.e. the participant standing up or engaging in large body movements). After the participant had filled out the SNS and PANAS, a researcher began the first song. After filling out the following questionnaire, the next song was played. This process was repeated for all four songs. Participants were prompted to fill out the PANAS once again after completing the final questionnaire. After finishing the study procedure, participants were given their compensation.

Results

Levels of nostalgia. On average, musicians experienced greater levels of overall nostalgia ($M = 67.37$, $SE = 3.78$) than non-musicians ($M = 65.38$, $SE = 3.76$). This difference was not significant $t(118) = .372$, $p > .05$.



Footnote: Participants listened to four songs; after each song, participants were asked to rate their perception of the level of nostalgia they experienced while listening to the song. This graph displays the mean level of nostalgia for musicians and non-musicians.

Content of nostalgia. The content of the nostalgic memories of musicians and non-musicians are shown in Figure 1. The highest response in the “people” category for

musicians was “friends” with 48% of participants reporting some nostalgia, and the highest response for non-musicians was also “friends” with 45% reporting some nostalgia. The highest response in the “place” category for musicians was “no place” with 33.3% of participants reporting no nostalgia related to place, the second highest was a particular “event” with 21.7% of participants reporting some nostalgia, and the highest response for non-musicians was also a specific “event” with 33.3% reporting some nostalgia. The highest response in the “time” category for musicians was “high school” with 40% of participants reporting some nostalgia, and the highest response for non-musicians was “early 20’s (undergraduate college)” with 45% reporting some nostalgia.

The highest responses in each category also comprised the three highest responses overall for musicians. The next highest responses were “partners” (people) and “parents” (people). The three highest responses overall for non-musicians were “friends” (people), “partners” (people), and “early 20’s (undergraduate college)” (time).

Musicians reported some nostalgia about a “person” 79 times, some nostalgia about a “place” 59 times, and some nostalgia about a “time” 53 times. Non-musicians reported some nostalgia about a “person” 70 times, some nostalgia about a “place” 64 times, and some nostalgia about a “time” 56 times.

Figure 1

	Musicians		Non- Musicians	
	# responses	Percentage	# responses	percentage

PEOPLE				
No people	12	20%	10	16.7%
Friends	29	48%	27	45%
Partners	15	25%	21	35%
Parents	13	21.7%	9	15%
Siblings	9	15%	8	13.3%
Classmate related*	2	3.3%	1	1.7%
“Cousins”	2	3.3%	0	0%
“Ex-girlfriend”	1	1.7%	0	0%
“Guitar teacher”	1	1.7%	0	0%
“Praise band peeps”	1	1.7%	0	0%
“Books read”	0	0%	1	1.7%
“movie (10 things I hate about you)”	0	0%	1	1.7%
“mtv”	0	0%	1	1.7%
“papa (grandfather)”	0	0%	1	1.7%

PLACE				
No place	20	33.3%	17	28.4%
School	11	18.3%	16	26.7%
Work	2	3.3%	4	6.7%
Vacation	4	6.7%	5	8.3%
Event	13	21.7%	20	33.3%
City	9	15%	10	16.7%
Driving related*	5	8.3%	3	5%
“Choir”	1	1.7%	0	0%
“Church”	2	3.3%	0	0%
Friends related*	4	6.7%	0	0%
Home related*	6	10%	0	0%
Sports related*	1	1.7%	1	1.7%
Summer related*	1	1.7%	1	1.7%
“childhood”	0	0%	1	1.7%
Romantic Partners	0	0%	2	3.3%

related*				
“movie”	0	0%	1	1.7%
TIME				
No time association	7	11.7%	4	6.7%
Early childhood	3	5%	3	5%
Elementary school	2	3.3%	6	10%
Middle School	12	20%	7	11.7%
High School	24	40%	17	28.3%
Early 20’s (undergraduate college)	11	18.4%	22	36.6%
Late 20’s	1	1.7%	1	1.7%
<p>“” denotes write-in answer</p> <p>*denotes multiple related write-in answers- for raw data see appendix</p>				

Discussion

This subsection of data examines the difference in perceived intensity and content of nostalgia between musicians and non-musicians while they listened to music that they labeled as

nostalgic for themselves. While musicians did show a slightly higher mean level of nostalgia, this difference was not significant. This is not what we might expect after examining related research.

Previous research shows that musicians typically have better memory recall and stronger emotional sensitivity both in and out of the context of music (Angulo-Perkins, 2014; Groussard et al., 2010; Nolden et al., 2017; Schulze, Mueller, & Koelsch, 2010). This would suggest that musicians are more likely to experience higher levels of perceived nostalgia. One issue that may account for the the lack of a significant difference between musicians and non-musicians is the way the questionnaire categorized “musicians”. The questionnaire defined musician as having more than one year of musical training, or having any training within the last three years. When Groussard et al. (2010) concluded that musicians have higher levels of plasticity in the hippocampus leading to better long-term recall, the subjects had been playing an instrument consistently for at least 11 years and all had at least 7 years of music theory training. It is possible, if not probable, that the majority of musicians in this study did not have the same level of musical training as those in the Groussard et al. (2010) study (specific data on level of musicianship was not collected here), therefore they may not display the same signs of advanced long-term recall. The same applies to other studies where “musician” was defined more rigorously than this study.

Another limitation may have been that the participants were biased towards a nostalgic experience because they understood that the music was designed to be nostalgic for them. Throughout the entire study, there were only two songs during which a participant reported experiencing no nostalgia. While the generated playlists were designed to play music similar to

that which the participants indicated as nostalgic for themselves, it is unlikely that the playlists generated 118 songs that were nostalgic for participants and only 2 that were not.

The second analysis of the content of nostalgic memories shows some common trends between musicians and non-musicians. The most frequent response in the “people” category was “friends” for both musicians and non-musicians; the most frequent “time” category for musicians was “high school” and for non-musicians was “Early 20’s (undergraduate college)”. This tracks in accordance with research that suggests that people experience a “reminiscence bump” around the ages of 15-25 years old (Janssen et al., 2005). This age bracket would place participants reminiscence bump in “high school” and “early twenties (undergraduate college)” as we see. During that time, participants would have spent most of their time with their peers potentially explaining the frequency of the “friends” response.

The most frequently reported category of nostalgia was the “people” category. Wildschut et al. (2006) showed that the most common content of nostalgic memory is the self in relation to others. However, that study categorized the content of the nostalgic memories differently than in the present study. The categories used in Wildschut et al. (2006) were: persons, momentous events, settings, periods in life, animals, tangibles, and past selves (these categories were created by examining free response data rather than asking participants to place their memory in a predetermined category). There were two separate analyses done in that study and the first had the highest frequency of answers in the “persons” category and the second had the highest frequency in the “momentous events” category. In the present study, the highest reported category was “people” and the most frequent answer in the “place” category was a particular “event” for both musicians and non-musicians.

There are some limitations in the analysis of this subsection of data. The current presentation of the content of nostalgic memories is purely a frequency count and is not linked to the level of nostalgia experienced in conjunction with each category response. This could be significant if categories with a higher frequency have lower levels of perceived nostalgia or categories with a lower frequency of response have high levels of perceived nostalgia. Another limitation to this analysis is that each song is analyzed as a separate response and no significance was given to the relationship between the four responses given by each participant. Each participant was prompted to rate their level of nostalgia and note the content of their nostalgia after every song. It is possible that there are trends in the data relating to one person's bias in responses that are not evident in this analysis. For example, if all or most of the responses in one category came from one participant, the analysis may be skewed. The final limitation of this analysis regards some responses in the "other" write-in answers. Some participants input responses that were not applicable to the category they were under. For example, one response in the "place" category was "first serious crush", which would have more accurately fallen under the "person" category (see Appendix A for full list of responses).

Conclusion

More information about the measures and outcomes of this larger study can be found in Alycia Sterenberg's "The determinants of affect, emotional arousal, and autobiographical memories on music-evoked nostalgia". The analysis of this subsection of data showed no significant difference between the levels of perceived nostalgia between musicians and non-musicians, however this is not in line with suggested results of other related studies and is

not likely significant in this body of research. The content of nostalgic memories analyzed in this study are consistent with the results of previous studies but still contain some limitations.

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Appendix A

GROUPINGS	Musicians		Non- Musicians	
No people	12	20%	10	16.7%
Friends	29	48%	27	45%
Partners	15	25%	21	35%
Parents	13	21.7%	8	15%
Siblings	9	15%	8	13.3%
“Classmates”	2	3.3%	0	0%
“previous classmates”	0	0%	1	1.7%
“Cousins”	2	3.3%	0	0%
“Ex-girlfriend”	1	1.7%	0	0%
“Guitar teacher”	1	1.7%	0	0%
“Praise band peeps”	1	1.7%	0	0%
“Books read”	0	0%	1	1.7%

“movie (10 things I hate about you)”	0	0%	1	1.7%
“mtv”	0	0%	1	1.7%
“papa (grandfather)”	0	0%	1	1.7%
No place	20	33.3%	17	28.4%
School	11	18.3%	16	26.7%
Work	2	3.3%	4	6.7%
Vacation	4	6.7%	5	8.3%
Event	13	21.7%	20	33.3%
City	9	15%	10	16.7%

“A long drive I used to often take to Ontario”	1	1.7%	0	0%
“Driving, like on a long road trip”	1	1.7%	0	0%
“Late night road trips”	1	1.7%	0	0%
“long car rides at night”	1	1.7%	0	0%
“Road trips/friends”	1	1.7%	0	0%
“Car ride with my two sisters”	0	0%	1	1.7%
“driving in the car with my family as a kid”	0	0%	1	1.7%
“driving with dad”	0	0%	1	1.7%

“Choir”	1	1.7%	0	0%
“Church”	2	3.3%	0	0%
“hanging out with friends”	1	1.7%	0	0%
“Hanging out with friends & ex’s wedding”	1	1.7%	0	0%
“Watching a movie with friends”	1	1.7%	0	0%
“Road trips/friends”	1	1.7%	0	0%
“hometown”	1	1.7%	0	0%
“home”	5	8.3%	0	0%
“Home”	0	0%	1	1.7%

“Sports Practice”	1	1.7%	0	0%
“sporting event”	0	0%	1	1.7%
“Summer Camp”	1	1.7%	0	0%
“summer”	0	0%	1	1.7%
“childhood”	0	0%	1	1.7%
“first serious crush”	0	0%	1	1.7%
“guy wouldn’t tell people real reason we broke up, just crazy stories”	0	0%	1	1.7%
“movie”	0	0%	1	1.7%
Early 20’s/undergrad	11	18.4%	22	36.6%
Early childhood	3	5%	3	5%
Elementary school	2	3.3%	6	10%
High School	24	11.7%	4	6.7%

No association	7	11.7%	1	1.7%
Late 20's	1	1.7%	1	1.7%
Middle School	12	20%	7	11.7%