Original Research Article

Retention of Positive and Negative Memories of School from the COVID-19 Pandemic for High School Juniors

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ABSTRACT

The retention of memories from the COVID-19 pandemic has been studied across various age groups to understand the impact of trauma on memory. While the majority of research indicates that older adults retain more positive memories of the pandemic and younger adults retain more negative or balanced memories, previous studies have not examined memory retention for those under 18 at the onset of the pandemic. This study addressed this gap through an exploratory qualitative phenomenological approach, conducting interviews with eight female high school juniors from one narrowly defined school context to explore whether students retained more positive or negative memories and sentiments from the pandemic. The study found that participants retained far more negative than positive memories, highlighting an adolescent tendency to recall more negative memories of this period. Rather than establishing direct clinical applications, these exploratory findings suggest that the relationship between age, trauma, and memory retention warrants further investigation to help inform future research on adolescent counseling and support services.

Keywords: Adolescent memory retention; COVID-19 pandemic; Trauma; Memory bias; Age-related memory differences; Phenomenological study

INTRODUCTION

Significant events, particularly those associated with strong emotions, have the potential to affect one's memory. Brewin found in a study on memory in PTSD patients that traumatic events can have a profound impact on memory, often causing memory loss as a coping mechanism (1). The COVID-19 pandemic that began in 2020 is one such traumatic event, as evidenced by Oyejide *et al*.'s findings in an emotional response study showing that COVID-19 significantly increased reports of anxiety and depression from 2020-2021 (2). These negative impacts were further demonstrated by NYU Langone Health's discovery that the pandemic induced traumatic stress reactions in many children, impacting their ability to cope (3). Fan and Kang found that one common way children cope is through unconscious memory loss to prevent reliving traumatic emotions (4). However, Pisano *et al*. suggested that the pandemic may have impacted this coping mechanism, finding that lockdown led to decreases in working and prospective memory (5). Therefore, the COVID-19 pandemic can be classified as a traumatic event that significantly impacted children's memories and coping mechanisms (2, 3).

When examining how specific types of memories persist over time, Porter and Peace found that traumatic experiences remained in patients' memories for years and were more factually consistent over time than positive memories (6). Despite this persistence, Wetherell *et al*.

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noted that traumatic events early in life may negatively impact cognitive function and memory (7), leading children to encounter wider ranges of negative feelings and cope through avoidance (3).

Regarding memory retention of the pandemic specifically, age plays a significant role. Ford *et al*. found that older adults are more likely to remember positive than negative events compared to younger adults, demonstrating a positive correlation between age and positive recall of the pandemic (8). Aizpurua *et al*. suggested this occurs because older adults exhibit a positivity effect where they react less to negative situations and recall more positive stimuli (9).

In educational settings, Fivush noted that students who experienced the pandemic reported higher levels of anxiety, depression, academic distress, loneliness, and isolation (10). Brown predicted an increase in autobiographical memory availability at the onset of the pandemic followed by a decrease during the lockdown period (11). Autobiographical memory, which was defined by Hjuler *et al*. as the ability to remember, relive, and place personal experiences in a real-life context, is typically biased toward positive emotional memories (12). Although Hjuler *et al*. hypothesized that memories retained during lockdown are more negative, they also noted that memories often lose details and emotional content over time, which may lead to a decrease in negative affect (12).

Thus, the COVID-19 pandemic and subsequent lockdown had a significant impact on people's memories, including those of current high school juniors who primarily experienced the pandemic during elementary and middle school. Currently, the retention of memories from the COVID-19 pandemic for those under the age of 18 has not been studied. Although Ford *et al*. studied positivity bias across adult age groups, children were not included in the sample (8). Therefore, there is a need to study whether current high school students retain more positive or negative memories to understand the impact of traumatic events on adolescent memory retention.

Thus, the gap in knowledge this study addressed was the lack of research on the retention of positive and negative memories for those under the age of 18 during the 2020-2021 COVID-19 pandemic. It did so by studying students at a high school, hereafter referred to by the pseudonym "Seacrest High School," who previously attended a particular elementary school, hereafter referred to by the pseudonym "Northpine Elementary School". This gap was investigated with the following research question: How did the COVID-19 pandemic impact the retention of positive and negative memories of school from 2020-2021 for current Seacrest High School juniors who attended Northpine Elementary School?

Based on the literature indicating that autobiographical memory is primarily biased toward positive emotional memories (12) and that young adults agreed with more positive than negative statements in positivity bias research (9), the hypothesis for this study was that current juniors from Seacrest High School would retain more positive than negative memories of school from 2020-2021 during the COVID-19 pandemic.

METHODS AND MATERIALS

Research Design

The purpose of this study was to investigate whether students retained more positive or negative memories of school from 2020-2021 during the COVID-19 pandemic. Institutional Review Board approval was obtained before the study began, as was informed consent from the parents and guardians of the student participants; moreover, all participant data was de-identified to protect participant confidentiality by using pseudonyms for all participant names.

For this study, "negative memories" were defined as memories associated with negative emotions, such as sadness, fear, and anger; while "positive memories" were defined as memories associated with positive emotions, such as happiness, hope, and excitement. These definitions were largely derived from Ford *et al*.'s definitions of "positive aspects" as including feelings of "community, hope, and interconnectedness," and "negative aspects" as including feelings of "fears, social isolation, and financial uncertainty" (8). Furthermore, to account for statements without strong emotional connections, a "neutral memories and sentiment" category was established based on Aizpurua *et al*.'s observation that participants occasionally transform positive or negative statements into neutral ones (9). This study focused on current high school juniors who were in elementary school when the pandemic first began. Although these students were in high school during data collection, they drew on their memories from 2020-2021, when they were in elementary and middle school as 5th and 6th-graders. Due to the qualitative nature of this study, it did not include traditional independent and dependent variables; instead, it focused on students' memories as the primary variable.

In order to explore the retention of students' memories of school during the pandemic, a small-scale phenomenological study was conducted. While survey research also appeared to be a strong methodology option, Leedy and Ormod found that phenomenological research aims to understand participants' perspectives on events, while survey research's goal is to determine the frequency or distribution of population characteristics (13). As the goal of this study was to understand the participants' lived experiences, a qualitative research methodology was necessary, and as survey research is primarily quantitative, phenomenological research was a better alternative. Phenomenological research also involves interviews, which are generally more useful for gaining in-depth information about participants' experiences than surveys, as surveys often yield shorter responses to open-ended questions.

To recruit participants, flyers about the study were posted around Seacrest High School. When students scanned the QR code on the flyer, it led them to an interest form that asked for their contact information, provided a brief overview of the study, and determined their eligibility.

After they had filled out the interest form, eligible students were emailed to ask whether they were still interested in participating in the study. Upon receiving confirmation, their assent was requested via the Student Assent Form, and their parents' or guardians' consent via the Parent/Guardian Consent Form. Once assent and consent had been received, the student was emailed again to schedule a one-on-one in-person interview at a public library. During the interview, participants were asked questions about their experiences, memories, and feelings from the COVID-19 pandemic from 2020 to 2021.

After conducting the interview, the recordings and the transcripts generated by Otter AI, an automatic transcription tool, were reviewed and refined by playing back the recordings and manually correcting any errors or discrepancies in the transcripts. Although it was planned for notes to be taken during interviews and reviewed afterward for any participants who did not give permission for Otter AI to be used, no participants refused the use of Otter AI, so Otter AI generated transcripts and recordings for all participants that were later reviewed. Finally, the information from the interviews was synthesized, and a qualitative deductive coding analysis was conducted on the transcripts.

In order to protect participants' privacy, pseudonyms were used for participants' names when sharing results to keep their identities anonymous. Aside from participants' genders, which were reflected in their pseudonyms, all personally identifying information was removed. Additionally, the recordings and transcripts of interviews were kept securely on a password-protected phone, with access restricted to ensure data security. Re-identification risk was minimized by removing nonessential contextual information and details that could potentially permit deductive identification.

Sampling

Seacrest High School juniors who attended Northpine Elementary School were eligible to be participants. This unit of analysis was appropriate because focusing on Northpine Elementary School alumni standardized the school experiences of all participants from 2020-2021, preventing some participants from leaning toward recalling either positive or negative memories due to different school experiences. Moreover, focusing solely on Seacrest High School juniors who attended Northpine Elementary School further narrowed the study's scope. Additionally, juniors from Seacrest High School were specifically chosen because the pandemic affected students of every grade differently, so focusing on one grade ensured that the findings reported were not generalized to groups that might not have had the same experiences.

8 participants were recruited, which fits within Ahmed's recommended sample size of 5-25 participants for phenomenological research (14). Thus, the first 8 students who followed the steps to participate in the study were chosen. A sample of 8 participants was considered appropriate because qualitative saturation was achieved, with the latter interviews yielding recurring themes rather than novel concepts, suggesting that the sample size used was adequate. Moreover, each interview maintained significant thematic depth, with participants providing detailed accounts of their lived experiences.

Limitations

One limitation of this study was the possibility of participants not retaining memories from the pandemic. If during the interview a participant claimed not to recall anything, this was addressed by continuing to ask relevant interview questions to gather data on what, if anything, they did remember. This was also noted as a limitation in the paper's study findings.

Additionally, participants may have had unconscious bias in the memories they recalled, which could have skewed the results regarding whether they remembered

more positive or negative memories and why. For example, participants may have recalled more positive memories from the pandemic if their most recent memories of the pandemic were positive, suggesting that it is easier to recall more recent memories rather than highlighting a tendency to recall more positive or negative memories from the pandemic. This bias was mitigated by asking participants to consider as wide a range of their pandemic memories as possible.

Moreover, this study was limited by the specific participant demographics. Although the study aimed to include participants of both genders, all potential participants who followed the steps to participate were female, resulting in a sample consisting solely of females.

Ethical Considerations

One ethical concern this study had was the potential to cause psychological harm to participants if they remembered traumatic experiences they had during the COVID-19 pandemic. To mitigate the potential for harm, participants were not required to share any experiences they were not comfortable discussing. Moreover, at the start of each interview, the participant was given a brief overview of what would be discussed and told they could stop at any time if they were uncomfortable answering a question or would like to skip it.

Another ethical concern arose from the recording and transcription of the interviews using Otter AI. Using AI to generate transcripts of potentially sensitive information raised ethical concerns and was a limitation, but this was mitigated by reviewing the interview recordings and manually editing the AI-generated transcripts to ensure accuracy and remove personally identifiable information. Additionally, participants were encouraged not to share any information they would not be comfortable with being transcribed by AI during the interview. Students and parents/guardians were also offered the option to opt out of their interviews being recorded and transcribed by Otter AI within the consent and assent forms. If they chose not to have the interviews recorded and transcribed using Otter AI, the interviews would not have been recorded or transcribed, and notes would have been typed manually during the interview; however, no participants chose this option. For students and parents who consented to their interviews being recorded and transcribed with Otter AI, the student participant was also reminded at the start of their interview that their interview was being recorded with AI, providing them with another opportunity to refuse recording.

RESULTS

A deductive coding analysis was performed on the qualitative data collected through interviews on the basis of three pre-set themes defined in the Methods section: positive memories and sentiment, negative memories and sentiment, and neutral memories and sentiment. Each code was also limited to memories and sentiments from school during the pandemic, given the scope of the research question.

Positive Memories and Sentiment

Overall, 32 positive memories of school from the COVID-19 pandemic were retained from the 8 participants. 3 participants (Sasha, Jennifer, and Ella) recalled their last few days of school before the start of distance learning positively. These students described how they were originally excited for distance learning, as they then believed distance learning would be a fun and short experience, leading them to recall excitement as a positive sentiment from the few days before distance learning began. For instance, Jennifer stated that she recalled her and her friends "Just being at school during lunch and like, wanting school to get canceled and being like, 'I'll see you in two weeks. See you in two weeks.' [...] But like, so much, you know, talking, and then, like, packing up and being excited."

Others described positive experiences that they had had during the pandemic, including 2 participants (Isabella and Reagan) who recalled their fifth-grade graduation ceremony positively, and 1 participant (Olivia) who noted spending time with friends online during classes. Participants also described other perceived benefits of the pandemic; for instance, 1 participant (Reagan) noted that the pandemic helped her learn to use technology better. Another (Kara) described how distance learning taught her maturity and responsibility, in addition to allowing her to spend more time with her family and learn the value of building stronger relationships: "I think I appreciate it now, like five, six years later, because I think it did a lot to like my personal growth journey and like forced me to be more mature and responsible, then maybe I would have been if it hadn't happened."

Negative Memories and Sentiment

Conversely, 4 of the students (Sasha, Ella, Jennifer, and Olivia) mentioned feeling as if school during the pandemic didn't matter and not caring about doing what

they were supposed to or about their grades because the experience did not feel like they were actually in school. Additionally, 5 participants (Sasha, Jennifer, Olivia, Ella, and Kara) felt extremely bored due to having nothing else to do, 1 (Reagan) stressed about adapting to a new learning environment, 4 (Reagan, Jennifer, Chloe, and Kara), felt lonely due to a lack of social interaction, and 4 (Sasha, Reagan, Olivia, and Isabella) were upset about missing events and experiences they were looking forward to.

One such experience that 4 out of 8 of the participants (Sasha, Reagan, Olivia, and Isabella) were upset about missing was the Outdoor Education experience in 5th grade (Figure 1). 3 of the 8 participants (Reagan, Olivia, and Isabella) recalled the anger and sadness they felt at the trip being canceled, while 1 participant (Sasha) reflected on her experience and stated that while she originally did not want to attend, in hindsight, she wished that she had had the opportunity to do so. Reagan described how she felt about missing Outdoor Education, and how it impacted her perception of the pandemic: "I remember missing Outdoor Ed. I was really upset that it [the initial COVID-19 pandemic lockdown] was going to be like the week we were supposed to be going. I literally, like, practiced rolling my suitcase around the house like they told us to do. And I was really excited, because my family is, like, really big on camping. And then I remember when they were, like, closing the schools and stuff, and we had to stay home. That was definitely like, the first thing I think that I was disappointed about that really hit like, 'Oh, this is gonna, like, have a big impact.'"

Moreover, 5 of the 8 participants (Sasha, Jennifer, Olivia, Ella, and Kara) described feeling bored during the pandemic (Figure 1) and expressed negative feelings about the boredom they experienced. In addition to feelings of boredom, 4 participants reported feeling that nothing was important or engaging during school (Sasha, Olivia, Jennifer, and Ella), leading many of them to take a disinterested view of school, as they felt their effort did not matter. Sasha noted how her feelings around grades shifted during the pandemic due to the boredom she felt: "I wasn't very educationally focused, which is a contrast to how I was like as soon as we got back from COVID, and how I was like in early elementary school. Because I did care a lot about my grades, and I still care a lot about my grades, but I remember during, like, sixth grade and COVID, it didn't matter to me, and I didn't care about classes, because it was, like, all easy stuff and all busy work."

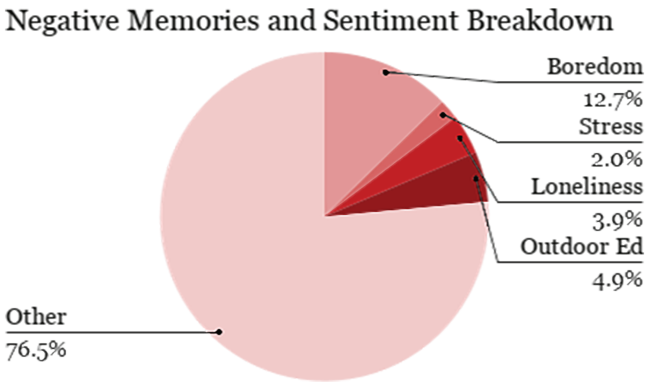

Figure 1. *Chart showing the breakdown of coded negative statements representing negative memories and sentiment that participants recalled. Of the 102 statements coded as Negative memories and sentiment, 13 mentioned boredom during the pandemic, 2 mentioned stress, 4 mentioned loneliness, and 5 mentioned Outdoor Ed. The "Other" category consists of all other negatively coded memories that did not fit into one of the other marked categories.*

Overall, 102 negative memories were retained across the study, highlighting how participants recalled far more negative memories and sentiment from school during the pandemic than positive memories and sentiment. However, this trend was not reflected in every individual's experiences, as 1 participant (Chloe) maintained more positive than negative memories.

Neutral Memories and Sentiment

Few similarities were found between participants' memories and sentiment, which is a limitation of this study. Although no specific neutrally-coded memories, experiences, or feelings were mentioned across participant interviews, several patterns emerged in the types of memories that were coded as neutral from participant to participant.

Memories that students did not recall well were primarily coded as neutral, as were experiences that they later felt had become normalized during the pandemic. Additionally, 4 of the 8 participants (Reagan, Jennifer, Chloe, and Kara) noted differences between the experiences they believed that they would have had in person and those they did have online during distance learning. These statements used terms that did not express any particular positive or negative sentiment or feeling, and were therefore grouped as neutral.

DISCUSSION

The results of this study showed that negative memories retained often involved feelings of anger, difference, boredom, and loneliness, particularly in relation to events participants missed out on due to the pandemic. Conversely, positive memories retained were related to early feelings of excitement at the onset of the pandemic regarding distance learning and positive experiences, such as the participants' 5th-grade promotion ceremony. The primary finding of this study was that participants retained more negative memories than positive, which did not support the hypothesis that participants would retain more positive memories than negative.

In this study, negative experiences remained far more consistent in participants' memories than positive experiences, aligning with Porter and Peace's findings that positive emotional memories tend to deteriorate over time, unlike traumatic memories (6). This predominance of negative recall among adolescents mirrors Aizpurua *et al*.'s finding that younger people recall negative content more readily than older adults (9).

Participants frequently described feeling upset about missed experiences, bored and indifferent during school, and lonely during distance learning. Similar feelings were mentioned by Fivush, who noted that students reported loneliness, isolation, and a lack of motivation during the pandemic, aligning with the sentiments expressed by participants in this study (10). NYU Langone Health also highlighted similar patterns in negative feelings among children, including sadness, hopelessness, irritability, and anger (3).

However, Fivush also found that students recalled gaining a better understanding of the value of familial relationships, an idea also mentioned by one participant in this study (Kara) and coded as a positive memory (10). Additionally, participants specifically mentioned being excited about distance learning at the onset of the pandemic, which is a finding not documented in prior literature.

CONCLUSION

This study provided an exploratory qualitative account of eight female participants from one narrowly defined school context to understand whether high school juniors retained more positive or negative memories of school during the COVID-19 pandemic. The primary finding was that participants recalled significantly more negative than positive memories. This aligns with Porter and Peace's findings regarding the consistency of negative memories over time (6), as well as Ford *et al*.'s and Aizpurua *et al*.'s observations that younger populations recall negative content more readily than older adults (8, 9). By focusing on adolescents under 18, this study helped address a notable gap in adult-centered pandemic memory research (8, 9).

Future studies should investigate adolescent memories and general feelings at the onset of the pandemic to provide a broader context for memory retention. To address the limitation of participant memory recall, future research should utilize more detailed interview prompts to stimulate recall and explore general sentiment surrounding the pandemic.

Moreover, because this study included only eight female participants from a single school pathway, recruiting larger, gender-diverse samples across varied educational settings is necessary to yield generalizable results. Further exploratory work in this area may deepen understanding of the relationship between memory and trauma, which could eventually inform future research on counseling and therapeutic frameworks for adolescents.

CONFLICT OF INTEREST

The author declares that there are no conflicts of interest related to this work.

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