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UNIVERSITET

DEPARTMENT of PSYCHOLOGY

**The Role of Excessive Social Media Usage in
Autobiographical Memory**

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Master's Thesis (30 hp)

Spring 2022

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Abstract

The present study investigated the relationship between excessive social media usage in everyday life and autobiographical memory recollection. Previous studies have investigated the effect of social media on autobiographical memory in terms of distinct events, while research regarding the cumulative effect of this is lacking, which is the main focus of the present study. This was investigated by a cue-based memory recollection test, combined with a survey method consisting of different measures of autobiographical memory and social media usage. The results showed significant correlations between problematic social media usage and memory specificity, as well as differences between the autobiographical memory dimensions *rehearsal* and *narrative coherence* in terms of social media usage. In conclusion, problematic social media usage was to a moderate degree correlated with different aspects of autobiographical memory recollection, suggesting that individuals with higher levels of problematic social media usage tended to report a lower number of specific memories. Also, individuals with higher levels of problematic social media usage showed lower levels of coherent memories, as well as higher levels of rehearsal. These together contribute to the field by starting to answer the question regarding how everyday social media usage influences peoples' general autobiographical recollective ability.

Keywords: Autobiographical Memory, Autobiographical Memory Recollection, Autobiographical Memory Specificity, Autobiographical Memory Detail, Social Media, Problematic Social Media Usage, Social Media Usage Frequency.

Acknowledgments

First, I would like to say thank you to everyone who took time out of their day to help me collect data by participating in my study, especially those of you who shared the link with others. Also, I would like to express my gratitude to those who participated in my pilot study, whom all gave me great feedback before the launch of my study.

I want to thank the author Julian Barnes, who wrote the novel *The Sense of an Ending*, which came to be one of the largest points of inspiration for my idea development.

I would like to thank Chusi Xie for keeping me company all those long days at the library, throughout the process of writing this thesis.

I wish to show my appreciation for Robin Eriksson, who provided his assistance with the inter-rater reliability analysis as “Rater B”, in order to improve the reliability of my study.

Lastly, I would like to thank my supervisor, Yunhwan Kim. Your support and feedback have been tremendously helpful throughout the process of writing this thesis. This would not have been possible without you.

The Role of Excessive Social Media Usage in Autobiographical Memory

Autobiographical memory is most commonly defined as “knowledge about oneself and recollections of specific personal events” (Maswood et al., 2019, p. 3). In other words, how we remember our own lives. The way these memories are structured influence our sense of identity, our well-being, as well as our social relationships (Berntsen et al., 2019; Bunnell et al., 2020; Conway et al., 2004). What we experience, and how we remember these experiences, is an integral part of how we think about ourselves and the future (Conway et al., 2004). As a result of this, it becomes relevant to explore which factors influence which experiences we remember from our own lives, as well as how well we remember these experiences.

Considering that the younger generations spend more and more time online and that social media usage continues to increase (Rideout et al., 2010), it poses a question regarding how this affects autobiographical memory. It has been established by previous research that social media usage influences other aspects of memory (Dietz & Henrich, 2014; Martini et al., 2020; Sana et al., 2013; Sharifian & Zahodne, 2020), so why would the effects on autobiographical memory be any different? When the generations that grew up with social media become older and reflect back on their lives, how will it have influenced them, and how they remember their own experiences? With social media constantly in the background, overarching every experience, how does it influence how we remember our lives? If we attempt to understand the effects of excessive social media usage on autobiographical memory now, it creates an opportunity to increase awareness about its effects, in order to establish potential subsequent actions to deal with these effects.

There have been some studies regarding the link between autobiographical memory and social media usage (e.g. Henkel, 2014; Tamir et al., 2018). However, these studies

investigate how using social media during an event influences the recollection of that distinct event. For instance, how using social media while attending a wedding will influence how you remember that wedding. What seems to be lacking in previous literature, is the cumulative effect of this. At the time of writing, there is a large knowledge gap in terms of how social media usage in everyday life influences the individual's general autobiographical recollective ability. This leads to the question that the current study aims to answer, how does autobiographical memory differ between individuals who use social media in their everyday life very much, and those who use it less?

Theoretical Background

Autobiographical memory consists of a complex combination of both semantic and episodic memories (Purves, 2013). For instance, in order to remember your first day at a new job, you need to recall several semantic aspects such as the title of the job position, and the name of the company. Episodic aspects are also necessary, such as remembering your first lunch with your colleagues or how you performed your work tasks. These are combined with semantic knowledge about yourself, such as knowing that you are introverted and/or knowing that you like yoga; knowing facts that relate to your past, but independent of the context they occurred in (Prebble et al., 2013). These aspects together form autobiographical memories and shape how we remember our own lives.

The Structure of Autobiographical Memory

There are several different aspects of autobiographical memory, out of which the most studied one is *Autobiographical Memory Specificity* (e.g. Bunnell et al., 2020; Williams & Broadbent, 1986; Williams & Broadbent, 2012). Specificity refers to the time frame in which a memory occurred. Hence, an autobiographical memory is considered to be *Specific* when it is of an event that lasts less than 24 hours. Memories that last longer than 24 hours are

considered *Extended Overgeneral*, and memories of events that occur regularly are considered *Categorical*. If a memory was not reported, it was marked as *Omission*. When an individual presents a large proportion of overgeneral memories it is usually regarded as a limitation of cognitive resources in combination with emotion regulation (Bunnell et al., 2020). This recall style can be developed as a result of functional avoidance, as in distancing yourself from memories by avoiding them (Bunnell et al., 2020). Another distinguishing aspect of autobiographical memory is *Autobiographical Memory Detail* (Roberts et al., 2018). Memory detail can be studied by “counting the number of unique units of information within each memory” (Roberts et al., 2018, p. 3), such as places, people, actions, items, and thoughts. According to Roberts et al., (2021), the main difference between memory specificity and memory detail is in the processes in which they occur. The ability to recall specific memories is driven by differences in executive functioning related to the search process as well as the inhibition of irrelevant information, while the amount of detail recalled in these memories is driven by the associative strength of the details themselves.

Until recently, autobiographical memory has mostly been studied based on general mechanisms that apply across people, rather than individual differences (Berntsen et al., 2019). Berntsen et al. (2019) argues that there are seven different dimensions of autobiographical memory recollection, that differ between individuals: *vividness*, *narrative coherence*, *reliving*, *rehearsal*, *scene*, *visual imagery*, and *lifestory relevance*. *Vividness* refers to remembering many details, as well as experiencing the memories as lucid, clear, and vivid. *Narrative coherence* relates to remembering your memories as stories, and that different pieces of a memory connect in a coherent manner as a whole, not as separate fragments. *Reliving* encompasses the mental time travel back to the time that the memory occurred and feeling as if you were there again, thus reliving it, and experiencing the general atmosphere of the memory when remembering it. *Rehearsal* refers to thinking back to your memories and

talking about them; intentionally thinking about a memory in order to remember it. However, it also includes memories popping up in the mind by themselves. *Scene* corresponds to remembering the environment of the memory, where things are located spatially, and where you were in relation to other people and things. *Visual imagery* regards recalling clear visual details, as well as being able to visualize the memory and see it in front of you when you think about it. Lastly, *lifestory relevance* involves considering your memories to be part of your identity and lifestory, as well as feeling like your memories help you understand yourself and the world around you. These dimensions of autobiographical memory are well-motivated by the existing literature on autobiographical memory (Berntsen et al., 2019), and support the idea of a “unique underlying dimension of recollective experience that varies among individuals” (Berntsen et al., 2019, p. 4).

Autobiographical memory specificity, autobiographical memory detail, and the dimensions of autobiographical memory recollection are all important in studying autobiographical memory. This is because when memory performance is tested in different domains, it could provide a better picture of peoples’ ability to remember (Ward et al., 2017) and thus contribute to greater validity and reliability of the findings. Hence, the present study examines all of these.

Autobiographical Memory Processes

The organization of autobiographical memory can be explained by several theories. It can be understood in terms of theories that apart from autobiographical memory also explain other types of memory, such as memory consolidation. Moreover, autobiographical memory can be explained by event cognition, in which the main focus is memories of experiences, such as those of episodic and autobiographical nature. However, the theory of event cognition largely builds on transition theory, which is why all three are explained below. First,

autobiographical memory is like other types of memory, heavily reliant on memory consolidation. Memory consolidation is the collective name for the “neural processes relevant for transforming new information into longer-lasting representations” (Martini et al., 2020, p. 552). In other words, the process of stabilizing long-term memories after encoding (Purves, 2013). When people experience something, a certain pattern of brain activation occurs. When remembering, a similar pattern of activation occurs. Hence, consolidation is the process of strengthening the connectivity between these modules that are activated, so that when one is activated, so is the other (Purves, 2013). When these consolidation processes are disturbed, it influences what is remembered (Dudai et al., 2015)

Second, transition theory is based on the idea that autobiographical memories are categorized based on important life transitions. These transitions can be personal, such as moving to a new city or starting a new job. They can also be collective, such as war, or the Covid-19 pandemic. According to this theory, we are more likely to remember things that occur during these transitions, as opposed to the stable periods in between these transitions. Consequently, the “contents and organization of autobiographical memory mirror our experience” (Brown, 2016, p. 129). Transition theory can be useful when analyzing a more long-term life-story perspective of autobiographical memory, although in order to understand how autobiographical memory functions in everyday situations and distinct events, a more useful theory to emanate from would be event cognition. To clarify, transition theory refers to boundaries between lifetime periods, whilst event cognition refers to boundaries between specific events.

Lastly, event cognition constitutes how people “perceive, remember, think about, and respond to events” (Richmond & Zacks, 2017, p. 962). Event cognition is based on event models, which are mental representations that we have of the events we experience, that contain the features of a situation. Event models are structured around boundaries (Richmond

& Zacks, 2017), meaning that the features which are part of the same event are confined between boundaries, while features that are part of another event are confined between other boundaries. It has been found that event boundaries tend to be associated with increased attention, thus strengthening the memory within each set of boundaries, confining the memory to that particular event (Wang & Egner, 2022). Related to event cognition is the concept of boundary extension, meaning that there is a tendency for people to extend the boundaries of events. In other words, boundary extension refers to remembering events to have included more than what they actually did. For instance, remembering eating ice cream at the beach, even though you ate ice cream when you came home from the beach. This means that what constitutes one event model is determined by how many features we attribute to the same event (Richmond & Zacks, 2017).

Furthermore, how we remember these boundaries between events is closely linked to the concept of event segmentation, in which event models are updated in response to predictions. This is due to people having different expectations for different types of events. For example, when attending a lecture, you have a mental representation of how a lecture usually plays out, the lecturer talks and shows a PowerPoint, while the attendees sit quietly and take notes. However, if things start to happen that do not fit this representation, such as if the lecturer starts to sing into a microphone and music starts playing, a new event model starts to form that is more similar to the representation of a concert. In other words, when what is happening no longer fits the same event model, errors in prediction trigger an updated event model, and in turn create a new event boundary (Wang & Egner, 2022). Because of this, the binding of the different memory fragments is crucial for memory formation (Richmond & Zacks, 2017), as these influence what constitutes a boundary, and therefore, what is remembered (Wang & Egner, 2022).

Excessive Social Media Usage

People spend more and more time using electronic devices and social media (McNally et al., 1995; Rideout et al., 2010). This has led to new levels of multitasking (Rideout et al., 2010), which poses issues in terms of both dependency and distraction since people pay attention to their social media rather than what is happening around them (Spence et al., 2020). To clarify, the problem is not social media usage itself, but rather when its use becomes excessive and dysfunctional (van den Eijnden et al., 2016). It is noteworthy that social media and technology themselves do not directly change the cognitive mechanisms involved in memory, but rather create new situations that influence how these mechanisms work (Eliseev & Marsh, 2021).

There are different factors regarding what constitutes problematic social media usage, such as time or frequency. According to Riehm et al. (2019), using social media for three hours or more every day puts individuals at an increased risk to develop mental illness. Further, Hunt et al. (2018) found that limiting your social media usage to thirty minutes per day could significantly improve well-being. However, using estimated time to measure social media usage has shown to have relatively low validity and reliability compared to measuring the frequency of different types of social media usage (Rosen et al., 2013). Also, according to the *Social Media Disorder Scale* (van den Eijnden et al., 2016), when someone meets five out of the nine main items, their social media usage is considered problematic and excessive. In other words, social media usage is considered excessive when it interferes with different aspects of your everyday life. According to van den Eijnden et al. (2016), problematic social media usage can consist of many different subcategories. For instance, social media usage is considered problematic when it becomes a distraction from work or school, or if you prioritize social media over hobbies and social relationships. It would also be problematic if

people get withdrawal symptoms when they are not able to use social media, or repeatedly try to reduce their social media usage, but fail.

One of the aspects of daily life where social media usage is the most problematic is in terms of multitasking when social media is used while doing something else. This type of multitasking has often shown negative relationships with memory (Ophir et al., 2009). Important to note, is that the term multitasking does not actually refer to doing several things at once, but rather constant quick switching between tasks (Yantis & Abrams, 2017). This is noteworthy when considered together with the concept of event cognition, seeing as boundaries between events play an important role in what we remember. The consequences of the constant switching that multitasking is, are especially relevant considering that the period right after experiencing something is crucial for memory consolidation (Dudai et al., 2015). This is relevant in terms of social media usage since when social media is used right after an event, it interrupts the consolidation processes of the event since it averts the attention to something else, thus leading to decreased memory performance (Martini et al., 2020).

Previous Research

There are several studies on how social media usage influences aspects of memory other than autobiographical memory. For instance, a study about everyday memory was conducted by Sharifian and Zahodne (2020) with the aim of investigating the role of social media usage on memory failure, such as forgetting why you entered a room. This was studied by having participants write a diary for eight days, where they wrote about their social media usage during those days, as well as which memory failures they experienced. The study found that memory failures occurred significantly more frequently when participants used a lot of social media during that same day, as opposed to when they only used a little to no social media (Sharifian & Zahodne, 2020). Next, a study about immediate learning by Dietz and

Henrich (2014) was conducted to study the effect of text messaging on academic performance. This was tested by having participants watch a prerecorded psychology lecture, while half were told to turn off their phones, and the other half were told to send text messages continuously throughout the lecture. The findings suggest that those who texted remembered significantly less about the lecture, than those who did not (Dietz & Henrich, 2014). Texting is different from social media, but it is still relevant considering its similarities in terms of communication purposes and how it interacts with the boundaries in event models. There were many confounding variables in the study by Dietz and Henrich; for instance, the two conditions were in the room at the same time, so those who turned off their phone might have been distracted by their peers texting (Dietz & Henrich, 2014). However, similar results were found in a study by Sana et al. (2013), suggesting good reliability. This relates to a study conducted by Martini et al. (2020), who studied the effect of social media on memory after learning something. This was studied with a vocabulary test recall, where participants studied and learned a word list. Afterward, half were simply resting, and the other half used social media. The study found that those who used social media after learning, remembered significantly less at a later testing, as opposed to the group who rested (Martini et al., 2020). Most studies on this topic are on how media impairs encoding, so the study by Martini et al. (2020) contributes to the field by suggesting that the effects of social media persist even after learning.

Previous studies have investigated the effect of social media on different aspects of memory, such as vocabulary recollection and everyday memory failures, which generally suggests that social media usage interrupts and hinders one's memory function and ability. However, at the time of writing, only a handful of studies have investigated the role of social media usage on autobiographical memory. The investigation of autobiographical memory is

therefore relevant, considering its limited coverage and its influences on how we view ourselves.

In particular, a study was conducted by Tamir et al. (2018) about how using social media to record an event will influence how you remember that event. This was an experimental study where participants attended a memorial church. Half of the participants did not have their phones with them, and the other half were asked to record the event through pictures, to post on Facebook. The study found that those who used social media during the visit remembered significantly less of the visit than those who did not have their phone with them. This suggests that it is paradoxical to record an event in order to remember it, given that social media could prevent people from “remembering the very events they are attempting to preserve” (Tamir et al., 2018, p. 161). Similarly, a study was conducted by Henkel (2014), where it was investigated whether taking a picture of something influences how you remember it. This was conducted in an art museum, where some participants were instructed to take pictures of each art piece as a whole, some to take zoomed-in pictures of details of the art pieces, while some were asked to not take any pictures and not use their phone. The results suggested that those who did not take pictures remembered more about the exhibit compared to those who took pictures of the whole art pieces. However, those who took pictures of the art details remembered more than those who did not take pictures. This could be explained by the attention that is required when deciding which detail to photograph opposes the effect of taking the picture altogether (Henkel, 2014). Hence, the findings of these studies support the idea that using social media during an event negatively influences how you remember that particular event. As previously stated, what seems to be lacking in previous research is the cumulative effect of using social media while doing other things. How does social media usage in everyday life, influence an individual’s general autobiographical recollective ability?

Present Study

Given previous research and the gaps in the literature regarding general autobiographical recollective ability, the present study aims to investigate to what extent social media usage in everyday life influences autobiographical memory recollection. In order to investigate this aim, the present study explores the following research questions:

(RQ1) *To what extent does everyday social media usage explain differences in narrative recollection of autobiographical memory?* This question will be studied by investigating the differences in autobiographical memory specificity (RQ1a), as well as autobiographical memory detail (RQ1b), in relation to problematic social media usage and social media usage frequency. It is hypothesized that higher levels of social media usage, both in terms of frequency and problematic usage, will be related to lower autobiographical memory specificity (H1a), as well as reporting memories with fewer details (H1b). This is supported by previous research that suggests that media usage can affect memory of events (e.g. Dietz & Henrich, 2014; Sana et al., 2013; Tamir et al., 2018).

(RQ2) *To what extent does everyday social media usage influence autobiographical recollective experience?* This will be studied by exploring the different dimensions of autobiographical memory, in relation to problematic social media usage together with social media usage frequency. It is hypothesized (H2) that there will be a difference in the different dimensions of autobiographical memory related to social media usage, both in terms of problematic usage and excessive frequency. A difference is expected, seeing as individual differences in these dimensions have been established by Berntsen et al. (2019). However, this hypothesis is exploratory in nature given that there is no established study that can guide how these differences will look like.

Based on the research questions together with the previous research, it is overall believed that excessive social media usage will have a negative effect on autobiographical

memory recollection, given that previous studies have shown links between social media usage and impaired memory.

Control Variables

Some variables that will be controlled for in the present study are age, gender, occupation, education, English language level as well as experience of Covid-19. A question about the participants' English language skill level will be included and controlled for, since how the participants describe their memories could be influenced by their level of English. Also, a question about how the participants experienced the Covid-19 pandemic will be included, given that Brown (2021) argues that the pandemic has been a collective life transition that has differed from many others, and thus has had a larger impact on autobiographical memory compared to other events. More specifically, Brown argues that the effect the pandemic has on autobiographical memory depends on how much the pandemic has affected the individuals' everyday life (Brown, 2021).

Methodology

Design

The present study investigated the research questions in a quantitative manner, consisting of a cue-based memory recollection test, combined with a survey method. A quantitative approach was chosen in order to gain higher reliability in terms of generalizability and representativeness, given that this particular research question has not been previously studied. Due to the Covid-19 pandemic restrictions that were in place when this project started, the study was conducted completely online. If the situation had been different, the study would have been conducted in a laboratory setting in order to minimize confounding variables and thus increase the validity of the results.

Participants

The participants ($N = 101$) were 18-30 years old ($M = 23.5$, $SD = 3.4$), and they were recruited using convenience sampling across different social media platforms, link sharing, as well as through posters put up on the university campus. Since previous studies have found interactions between several mental health conditions and autobiographical memory (e.g. van Vreeswijk & de Wilde, 2004; Williams & Broadbent, 2012), participants with any current mental health conditions were excluded from participation.

Measures

Demographics and Control Variables

A short survey regarding the participants' demographic information and control variables (see Appendix B) was administered. Information about age, gender, occupation, education, English language level as well as experience with Covid-19, was collected and controlled for.

Autobiographical Memory

Autobiographical Memory Test (AMT; Williams & Broadbent, 1986) is a methodology in which the participant is presented with a set of cue words, one at a time, after which they are to recall a distinct memory from their own life, in 60-120 seconds. Five neutral cue words were used in the present study, based on the words used in a study with a similar method conducted by Gehrt et al. (2021): *plant*, *city*, *hammer*, *ship*, and *table*. These words are all similar in word length, level of frequency, and familiarity (Gehrt et al., 2021). The 5 words were presented in a randomized order for each participant, in order to avoid order effect. When 60 seconds had passed, the participant could click the “*Next Question*” button, but after 120 seconds Qualtrics automatically moved on to the next question. This

made sure that each participant had exactly 60-120 seconds per memory, as described in the original method (Williams & Broadbent, 1986).

AMT were used to measure both memory specificity and memory detail. First, the memories were categorized based on their time frame. Memories that last less than 24 hours were categorized as *Specific*, memories that last more than 24 hours were categorized as *Extended Overgeneral*, memories of events that occur regularly were categorized as *Categorical*, and if no memory was reported it was categorized as *Omission*. Second, to measure memory detail, the number of unique pieces of information within each memory was counted, such as places, people, items, and thoughts, as described by Roberts et al. (2018; 2021). To ensure the reliability of the obtained data, an inter-rater reliability analysis was conducted for autobiographical memory detail (see Procedure; see Appendix V). Each participant then got a score of their average number of details per memory. The number of words per memory was also measured, creating an average number of words per memory score for each participant.

Autobiographical Recollection Test (ART; Berntsen et al., 2019; see Appendix II) measures how well people think that they remember events from their own life, not how accurate these memories actually are. This is done with a 21-item scale, containing 3 items for each of the seven dimensions of autobiographical memory (*vividness*, *narrative coherence*, *reliving*, *rehearsal*, *scene*, *visual imagery*, and *life-story relevance*). A 7-point Likert scale is used to rate to what degree the participants agree with the statement provided in the item (*1 = Strongly Disagree*, *7 = Strongly Agree*). For the present sample, ART has a Cronbach's alpha of $\alpha = .87$ (subscales: *vividness* $\alpha = .89$, *narrative coherence* $\alpha = .84$, *reliving* $\alpha = .83$, *rehearsal* $\alpha = .82$, *scene* $\alpha = .83$, *visual imagery* $\alpha = .85$, *life-story relevance* $\alpha = .75$).

Social Media Usage

The subscale *General Social Media Usage* from the *Media and Technology Usage and Attitudes Scale* (MTUAS; Rosen et al., 2013, see Appendix D) will be used to measure the frequency of different types of social media usage. This subscale consists of 9 items (see Appendix D) that are all rated on a 10-point Likert scale (*1 = Never, 2 = Once a month, 3 = Several times a month, 4 = Once a week, 5 = Several times a week, 6 = Once a day, 7 = Several times a day, 8 = Once an hour, 9 = Several times an hour, 10 = All the time*).

According to the creator of the scale, Rosen et al. (2013), the separate subscales are valid and reliable on their own. Cronbach's alpha for this subscale in the present sample was $\alpha = .85$.

The *Social Media Disorder Scale* (SMD; van den Eijnden et al., 2016, see Appendix E) will be used to measure problematic social media usage. It is noteworthy that even though this scale originally was created for diagnostic purposes, it is not how the scale will be used in the present study. The scale consists of 27 items that are measured with "yes" or "no" questions, where each participant gets a score between 0 - 27 corresponding to the number of "yes"-responses, as well as a separate score for each of the 9 subscales (*preoccupation, tolerance, withdrawal, persistence, escape, problems, deception, displacement, and conflict*).

Cronbach's alpha for the full SMD scale for the present study was $\alpha = .81$ (subscales: preoccupation $\alpha = .38$, tolerance $\alpha = .42$, withdrawal, persistence $\alpha = .42$, escape $\alpha = .46$, problems $\alpha = .38$, deception $\alpha = .26$, displacement $\alpha = .31$, conflict $\alpha = .12$).

Procedure

The study was conducted using the platform Qualtrics, given that it is customizable to a large extent, as well as having good regulations regarding data protection. Once the study was set up in Qualtrics, a pilot study was conducted with 10 people, to ensure that the questions and instructions were clear. Some minor adjustments were made, and then a power

analysis was done using the software G*Power (power = .8, medium effect size=.3), suggesting that a minimum of 60 participants were needed for the study to reach a proper effect size. Next, the data collection started. First, the participants read the information sheet (see Appendix A) and gave their consent to participate. This was followed by the demographic survey, then the written AMT, and finally the surveys ART, MTUAS, and SMD (in that order). Lastly, the participants read the debriefing information (see Appendix F).

When data from 40 participants had been collected, 10 were randomly selected for an inter-rater-reliability analysis. The data from these participants were rated on AMT, in terms of memory specificity and memory detail, by two independent raters. Cronbach's alpha for specificity was $\alpha = 0.80$, and $\alpha = 0.69$ for memory detail. Because of the lower score on the memory detail, a comparison was made between rater A and rater B to see what the differences were, to establish common ground. A corrected score was created for each data point, accounting for the differences between raters, formulating a new protocol for coding (see Appendix VI). Subsequently, 10 additional data points were coded by both raters, to see if the new protocol was better, which resulted in a Cronbach's alpha of $\alpha = 0.91$ for memory detail. Rater A then proceeded to rate the remaining data points, based on the new protocol.

Once all data had been collected, six participants had to be excluded. Three were removed for not fitting the age demographic, and three were removed because they explicitly wrote that they had mental health conditions in the written text on the memory task. This resulted in a total sample size of 101 participants.

Analysis

First, descriptive statistics of the main variables was computed in order to see the general characteristics of the results. Second, in order to answer the research questions, a series of partial Spearman's correlations were performed. The relationship between social

media usage and autobiographical memory was investigated after controlling for the effects of the control variables.

Ethical Considerations

The present study was conducted in line with ethical guidelines established by the Swedish Research Council, and thus in accordance with the *Ethical Reviewal Act* (SFS, 2003:460). Informed consent was obtained from all participants, and they were informed that they could withdraw at any time if they no longer wanted to participate. After the study, the participants were able to send an email to the researcher if they had any questions, or if they wanted to know the results of the study.

All data is stored in a confidential manner, and no data can be traced back to the individual participant. Even though the cue words used in the memory test are neutral, they could be associated with negative memories. However, the participants could likely come across these words at any time in their everyday life. This combined with that the participants were aware that they could withdraw from the study at any moment, justifies the usage of these words based on the minimal risk principle (Shaughnessy, Zechmeister, & Zechmeister, 2015), given that the study poses no more potential risks than an everyday situation.

Results

Descriptive Statistics

The characteristics of the participants are described in Table 1. The majority of the participants ($N = 101$) were female (65.3%). Most participants were students (72.3%), and a large group of the participants had a Bachelor's degree (48.5%). The participants experienced Covid-19 to have affected their lives to different degrees, although most to a small (29.7%) or moderate (39.6%) degree. 38.6% of the participants were native English speakers, while the remaining were fluent but not native.

Table 1.

Participant characteristics of the sample of the present study

	Frequency	Percentage
Age		
18-22	44	43.6%
23-26	36	35.6%
27-30	21	20,8%
Gender		
Male	35	34.7%
Female	66	65.3%
Other	0	0%
Education		
High School	35	34.7%
Bachelor's degree	49	48.5%
Master's degree	14	13.9%
PhD or further	2	2.0%
Other	1	1.0%
Occupation		
Student	73	72.3%
Non-student	28	27.7%
Covid		
Very small degree	6	5.9%
Small degree	30	29.7%
Moderate degree	40	39.6%
Large degree	16	15.8%
Very large degree	9	8.9%
English Level		
Native speaker	39	38.6%
Non-native	62	61.4%

The descriptive statistics of the main variables are presented in Table 2. In terms of memory detail, the participants reported on average between 9 to 11 details per memory. However, for the cue-word *plant*, the maximum number of details was higher compared to other cue words. All autobiographical memory dimensions were similar in terms of participant mean and range. For MTUAS, the participants used social media at various frequencies, ranging from never using social media, to using social media more than once an hour. The subscales of SMD are quite similar in terms of participant mean value, apart from the subscale *escape*, which has a participant mean of 1.61.

Table 2.

Descriptive statistics of the main variables

	<i>M</i>	<i>Sd</i>	Min	Max
Memory Specificity				
Specific	2.44	1.42	0	5
Extended Overgeneral	.78	.88	0	4
Categorical	1.62	1.29	0	5
Omission	.16	.39	0	2
Memory Detail				
Plant	11.0	5.08	3	45
City	9.85	4.66	0	23
Hammer	9.51	4.17	0	21
Ship	9.67	4.46	0	21
Table	10.20	3.83	2	23
Number of Words per Memory				
Plant	49.30	21.0	8	112
City	48.20	22.4	0	124
Hammer	43.50	21.8	3	99
Ship	45.90	22.2	0	106
Table	46.80	20.0	6	96
Autobiographical Memory Dimensions				
Full scale	4.58	.98	2.33	6.9
Vividness	4.49	1.41	1.33	7
Narrative Coherence	3.91	1.27	1.33	6.67
Reliving	4.50	1.36	1	7
Rehearsal	4.62	1.24	1.67	7
Scene	4.61	1.31	1	7
Visual Imagery	5.09	1.26	1	7
Lifestory relevance	4.86	1.34	2	7
MTUAS				
Full scale	4.67	1.47	1	8.33
SMD				
Full scale	5.89	4.91	0.0	24.0
Preoccupation	.94	.87	0	3
Tolerance	.79	.93	0	3
Withdrawal	.46	.83	0	3
Persistence	.74	1.06	0	3
Escape	1.6	1.31	0	3
Problems	.78	.87	0	3
Deception	.17	.58	0	3
Displacement	.33	.69	0	3
Conflict	.07	.29	0	2.0

Note. The decimals in the *Min* and *Max* columns for Dimensions of Autobiographical Memory are because three items were used for every dimension, and based on that each participant got a score for each dimension. SMD refers to *Social Media Disorder Scale*, which measures problematic social media usage, and MTUAS refers to the subscale *General Social Media Usage* from the *Media and Technology Usage and Attitudes Scale*, which measures social media usage frequency.

Control Variables

A correlation matrix was created for all of the memory variables together with the control variables age, gender, education, occupation, English level and experience of Covid-19 (see Appendix I). This showed significant effects of English level, education, occupation and gender. In terms of English level, it was found that native speakers tended to report a higher number of words per memory ($r = .33, p < .001$) as well as a higher number of details per memory ($r = .32, p = .001$) compared to non-natives. For education, it was found that the higher the education, the higher the number of details per memory ($r = .20, p = .005$), and that the higher the education, the higher the score on the *scene* dimension of ART ($r = .28, p = .04$). Further, it was found that students had a significantly higher number of specific memories compared to non-students ($r = .23, p = .02$), who had significantly more extended overgeneral memories compared to students ($r = -.25, p = .01$). In terms of gender, it was found that females tended to score higher on ART ($r = .22, p = .03$) compared to males. Additionally, it was found that females scored significantly higher on the ART-dimensions *reliving* ($r = .21, p = .04$), *rehearsal* ($r = .21, p = .04$) and *lifestory relevance* ($r = .36, p < .001$) compared to males.

Social Media Usage and Autobiographical Memory Specificity and Detail

In order to investigate RQ1a, a partial Spearman's correlation was conducted between social media usage and different aspects of memory specificity (see Table 3), controlling for age, gender, education, occupation, English level, and effect of Covid-19. The results showed significant correlations between memory specificity and social media usage. First, the higher the problematic social media usage, the lower the number of specific memories were reported ($r = .24, p = .02$). Second, the higher the problematic social media usage, the higher the number of extended overgeneral memories were reported ($r = .20, p = .05$). Looking at the

subscales of SMD, two showed significant correlations. The higher the score on the *tolerance* subscale, the lower the number of specific memories reported ($r = -.23, p = .03$), and the higher the score on the *escape* subscale of SMD, the higher the proportion of extended overgeneral memories were reported ($r = .23, p = .02$).

In order to investigate RQ1b a partial Spearman’s correlation was conducted between social media usage and memory detail (see Table 3), controlling for age, gender, education, occupation, English level, and effect of Covid-19. No significant correlations were found between social media frequency related to memory specificity and memory detail, and no correlation was found between problematic social media usage and memory detail.

Table 3.

Partial Spearman’s correlations between social media usage and autobiographical memory specificity and autobiographical memory detail

	Memory Specificity				Memory Detail	
	Specific	Overgeneral	Categorical	Omission	Detail	Number of words
MTUAS, participant average	-.19	.13	.20	-.04	-.05	-.01
SMD full scale	-.24*	.20*	.13	.13	.003	-.07
Preoccupation	-.16	.09	.11	.04	.001	-.001
Tolerance	-.23*	.10	.16	.15	-.06	-.13
Withdrawal	-.14	.003	.18	.07	.04	-.004
Persistence	-.15	.16	.08	.08	-.01	-.05
Escape	-.19	.23*	.05	.18	-.08	-.13
Problems	-.07	.10	-.03	.02	.09	-.004
Deception	-.10	.19	-.03	.13	-.04	-.14
Displacement	-.03	.09	.01	-.04	.07	.04
Conflict	-.01	-.09	.05	.14	.03	-.06

Note. Controlling for age, gender, education, occupation, English level, and Covid-19. * $p < .05$, ** $p < .01$, *** $p < .001$

Social Media Usage and Dimensions of Autobiographical Memory

In order to investigate research question RQ2, partial Spearman’s correlations were conducted between social media usage and the different dimensions of autobiographical memory (see Table 4), controlling for age, gender, education, occupation, English level, and

effect of Covid-19. No correlation was found between social media usage and the full ART-scale. However, significant correlations were found for the dimensions of *rehearsal* and *narrative coherence*. This suggests that the higher the social media usage frequency ($r = .21$, $p = .05$) and problematic social media usage ($r = .33$, $p = .001$), the higher the score on the rehearsal dimension of ART. Additionally, the SMD-subscales preoccupation ($r = .26$, $p = .01$), withdrawal ($r = .29$, $p = .005$), and escape ($r = .25$, $p = .02$), showed positive significant correlations with the rehearsal dimension of ART. As for the *narrative coherence* dimension of ART, it can be suggested that the higher the preoccupation subscale of SMD, the lower the *narrative coherence* ($r = -.24$, $p = .02$), and that the higher the conflict subscale of SMD, the lower the *narrative coherence* ($r = -.24$, $p = .02$).

Table 4.

Partial Spearman's correlations between social media usage and different dimensions of autobiographical memory

	ART, full, average	Vividness	Narrative Coherence	Reliving	Rehearsal	Scene	Visual Imagery	Life-story relevance
MTUAS, full scale	.04	-.003	.03	-.03	.21*	-.06	-.12	.12
SMD, full scale	.07	-.05	-.04	.14	.33**	-.09	-.003	.10
Preoccupation	-.05	-.13	-.24*	-.009	.26**	-.11	-.10	.06
Tolerance	-.04	-.15	-.11	-.009	.16	-.15	.05	.05
Withdrawal	.05	-.05	-.15	.06	.29**	-.09	.05	.16
Persistence	-.003	-.05	-.11	.07	.14	-.02	-.05	-.005
Escape	.13	.04	.10	.15	.25*	.03	.05	.05
Problems	.03	-.07	.01	.09	.19	-.16	-.08	.14
Deception	-.03	-.05	-.09	.12	.16	-.05	-.08	.05
Displacement	.11	.03	-.05	.17	.19	-.04	.13	.10
Conflict	-.07	-.08	-.24*	-.02	.07	-.17	-.02	.08

Note. Controlling for age, gender, education, occupation, English level, and Covid-19. * $p < .05$, ** $p < .01$, *** p

<.001

Discussion

The present study investigated the effect of social media usage on autobiographical memory, and the results found a correlation between memory specificity and problematic social media usage, both for the problematic social media scale as a whole, but also for the subscales *tolerance* and *escape*. Additionally, some differences were found for the different dimensions of autobiographical memory recollection, suggesting that the dimensions of *narrative coherence* and *rehearsal* were related to problematic social media usage. No significant results were found for social media frequency and autobiographical memory apart from in relation to the ART dimension *rehearsal*, nor any relation between social media usage and autobiographical memory detail.

Social Media Usage and Autobiographical Memory Specificity

A correlation was found between problematic social media usage and memory specificity, suggesting that the higher the problematic social media usage, the lower the number of specific memories, and the higher the number of extended overgeneral memories. This is in line with hypothesis H1a, since it could be interpreted that individuals with higher levels of problematic social media usage have lower memory performance. The validity of the relationship between the variable increases since it goes both ways; it is not only high levels of problematic social media usage that relates to a lower number of specific memories but the opposite as well, that higher problematic social media usage relates to a higher number of extended overgeneral memories. It is of importance to note that memories that are categorized as extended overgeneral on their own do not necessarily indicate a low memory performance. This is illustrated by that some of the participants recalled very detailed and long memories that were categorized as extended overgeneral, while some of the memories that were categorized as specific were very short and concise. Hence, what is important here is that

memories that are categorized as extended overgeneral does not directly imply that the memory is of poor quality. Rather, extended overgeneral memories has been found to correlate with limited cognitive functioning (Bunnell et al., 2020), implying that recalling a large proportion of extended overgeneral memories tends to be associated with limited cognition. Hence, individuals who reported a large proportion of extended overgeneral memories can report detailed memories, but due to the relation to limited cognitive functioning, these individuals are more likely to struggle in other aspects of cognition (Bunnell et al., 2020)

Next, correlations were found between two subscales of SMD and memory specificity. Firstly, the tolerance-subscale of SMD was negatively correlated with the number of specific memories recalled, suggesting that the higher the score on the tolerance aspect of problematic social media usage, the lower the number of specific memories reported, confirming hypothesis H1a. This finding is sensible given that the tolerance subscale refers to wanting an/or needing to use social media more and more often (see Appendix E). Thus, the more you use social media and the more you think about using social media, the more it occupies your attention. When an excessive amount of attention is placed on social media, the more it interferes with other aspects of cognition since it prevents people from paying attention to what is happening around them (Spence et al., 2020; van den Eijnden et al., 2016). This could explain the effects excessive social media usage has on autobiographical memory, more specifically, how it correlates with a lower number of specific memories. Additionally, this finding can be related to multitasking, where every switch between using social media and doing something else creates new event boundaries (Wang & Egner, 2022), thus influencing what you remember. Hence, the more you use social media, the higher the tolerance becomes, and the higher the tolerance becomes, the more you use social media. This in turn would lead to higher levels of memory hindering.

Comparing the present study with previous research on the effect of social media usage on autobiographical memory by Henkel (2014) and Tamir et al. (2018), the contributions of the present study becomes more clear. The studies by both Tamir et al. and Henkel, relate to how using social media during an event, influences the recollection of that particular event. However, the present study investigated how social media usage in everyday life influences the individuals' autobiographical recollective ability overall, by examining general principles of autobiographical memory such as specificity and detail, rather than focusing on what you remember from a certain event. This has not been studied before the present study, and therefore contributes to the field of research to a great extent.

Secondly, a correlation was found between the escape subscale of SMD and memory specificity, suggesting that the higher the score on the escape aspect of SMD, the higher the number of extended overgeneral memories were reported, further confirming hypothesis H1a. The escape subscale regards to what degree you use social media as an escape from the real world and unpleasant thoughts (see Appendix E), and according to this finding, it could be argued that the more you use social media as an escape from other things, it becomes problematic in terms of memory. If you use social media as a way of not thinking about other things that are going on in your life, you are according to Bunnell et al. (2020) avoiding your memories. This often presents itself through reporting a large proportion of extended overgeneral memories (Bunnell et al., 2020), perhaps by distancing yourself from remembering more distinct and specific memories. It could be argued that these individuals hence use less cognitive resources to deal with their memories (Bunnell et al., 2020) and use social media as a coping mechanism to distract themselves from things that are tough as a form of problematic social media usage (van den Eijnden et al., 2016). This contributes to the growing body of literature on this topic since the aspect of problematic social media usage (SMD) has not been used together with autobiographical memory before, which creates many

interesting research possibilities and applications. For instance, this scale can be used on younger populations in order to identify symptoms of problematic social media usage early in their lives, and from there further study its effects on autobiographical memory. This could be used in order to raise awareness about the negative effects of social media on memory, and be the basis for developing preventative measures. However, the finding regarding the subscales of SMD should only be seen as indicative, due to the low Cronbach's alpha for the present sample.

As for social media usage frequency, no correlation was found for its link to autobiographical memory specificity, which contradicts hypothesis H1a. This implies that social media usage does not have to be frequent to be problematic, and vice versa. This contributes to the existing knowledge in that it can be beneficial to include several measures of social media usage in a study, since there are several subconstructs (e.g., estimated time, problematic usage, frequency) and the previous finding highlights that using different subconstructs can be different, such as that the measure of frequency is more reliable than the measure of estimated time (Rosen et al., 2013). Most studies tend to only use one construct to measure social media usage (e.g. Martini et al., 2020; Sharifian & Zahodne, 2020; Tamir et al., 2018), and then interesting nuances are left out, such as differences between estimated time and aspects of problematic usage. Since no correlation was found in the present study for social media frequency and autobiographical memory, it could be argued that there is no difference in terms of frequency, or that there is no difference for the particular sample. If there in fact is no difference, it could be that the different constructs of social media usage are different enough from each other in order to produce such distinct results, and then further research would be necessary in order to reach a more detailed understanding of what these differences are. This finding together with the results show that problematic social media usage relates to autobiographical memory specificity, suggesting that problematic social

media usage, but not social media usage frequency, can influence memory specificity to a large extent.

Social Media Usage and Autobiographical Memory Detail

No significant correlation was found regarding autobiographical memory detail, to neither social media frequency nor problematic social media usage, contradicting hypothesis H1b. It was hypothesized that there would be a difference in memory detail depending on social media usage due to the previous research regarding other aspects of autobiographical memory (Henkel, 2014; Tamir et al., 2018), seeing as memory detail has not yet been studied in relation to social media usage. It could be argued that this result was found due to the choice of method in the present study, so that it to a degree limited the present study's ability to uncover the relation between social media usage and memory detail. If another way of measuring memory detail was used, the results might have been different. However, when testing the impact of social media usage on the number of words per memory, still no significant results were found, supporting that there in fact is no difference, considering the high correlation between memory detail and number of words per memory (see Appendix I). According to Roberts et al. (2018), memory details are a separate construct from autobiographical specificity that is based on the associate strengths of the details within the memories. It could be argued that memory details is not as related to executive functioning processes in the same way that autobiographical memory specificity is (Roberts et al., 2018). Hence, social media does not have the same effect on memory detail as it has on memory specificity, which could explain the results found in the present study regarding memory detail.

Social Media Usage and the Dimensions of Autobiographical Memory

When it comes to the dimensions of autobiographical memory related to social media usage, no correlation was found for the ART-scale as a whole, which is not surprising, considering that the scale measures many broad aspects. However, two of the dimensions showed differences in terms of social media usage. First, a significant link was found for the dimension *narrative coherence* based on the SMD subscales *preoccupation* and *conflict*, supporting hypothesis H2. This suggests that the higher the *preoccupation* and *conflict* subscales of SMD, the lower the *narrative coherence* dimension of ART. This could be explained by the constant switching back and forth between social media and the real world creates new event boundaries (Wang & Egner, 2022). The increased number of event boundaries from the continuous switching could lead to continuity issues in remembering events in real life. For instance, if you check social media constantly when attending a friend's dinner party, different parts of the conversation might be coded into separate memories since event boundaries are created every time you open social media (Wang & Egner, 2022). Given that the features of an event might be coded as separate memories due to the constant interruption of social media, the result could be perceiving your memories as less coherent. This is merely speculative, and more research would need to be done to further investigate this. It is important to keep in mind that ART measures how the individual perceives their own memories, not how accurate the memories actually are. Hence, it would be interesting to see the differences between ART and a more objective measure of memory in a future study. Additionally, the finding regarding the subscales of SMD should only be seen as indicative, due to the low Cronbach's alpha for the present sample.

Moreover, a significant relationship was found between the *rehearsal* dimension of ART, and several aspects of social media usage: social media frequency, problematic social media usage, as well as the SMD-subscales *preoccupation*, *withdrawal*, and *escape*, which all

are in line with hypothesis H2. It could be that the social media usage makes the individuals see the externalization of events through social media, and therefore perceive that they rehearse more. It would be interesting to see how these individuals would perceive their rehearsal when not using social media – if it is lower and thus actually indicative of social media usage, or if it is still the same level of rehearsal, just that it is how they perceive it. As for the withdrawal subscale of SMD, it could be argued that those might have a weaker perceived rehearsal without social media, and maybe they then feel like they need the cues that social media provides to recall what they experienced. This positive relationship between social media usage and rehearsal could be seen as contradicting the other hypotheses in the study since it suggests that the more problematic the social media usage, the higher the rehearsal of autobiographical memories. On the other hand, it can be argued that the increased perceived rehearsal is a result of the participants feeling like they need to rehearse more, and therefore notice it more, as a result of social media. It might be the case that individuals become less aware of their own experiences when having a more problematic relationship with social media, and hence feel the need to actively rehearse their memories in order to properly remember them. On the contrary, it could be argued that the individuals who have higher levels of problematic social media usage tend to use social media as a means of externalizing their memories by posting pictures etc. As a result, the reasoning behind this correlation is simply speculative, and therefore it is still in need of being further studied.

No differences were found for the other dimensions of ART in relation to social media, which could mean that there simply is no difference, or it could be due to the particular sample used in the present study. Further studies would be needed in order to verify the findings. Nonetheless, based on findings regarding social media and the dimensions of *narrative coherence* and *rehearsal* of ART, it can be stated that there is a moderate distinction between the different dimensions of autobiographical memory depending on problematic

social media usage. Relating to the claim made by Berntsen et al. (2019) that research on autobiographical memory historically has focused on general mechanisms rather than individual differences, the present study contributes to the field of study by finding differences in terms of the different dimensions of autobiographical memory.

Control Variables

Regarding the control variables, the findings showed significant effects for English level, education, occupation, and gender. Regarding level of English, it was found that native speakers reported memories with significantly more details and number of words compared to non-natives. The difference is not surprising, considering that natives will most likely have a more natural way of phrasing their expressions when writing under time pressure compared to non-natives. Next, in terms of education, it was found that higher levels of education related to higher number of details per memory, as well as a higher score on the *scene* dimension of ART. This can be a result of that academics are used to writing reports and expressing themselves using words, and therefore having an easier time to report memories with more details, as well as reporting more details regarding the environment of the memory. Relating to this, participants who currently were students had a higher number of specific memories compared to non-students. It could be argued that this is because the students have a common way of thinking regarding learning information and encoding, given the specific nature of students' everyday life and habits. In terms of gender, it was found that females scored higher than males on ART, specifically on the subscales *rehearsal*, *relevance*, and *lifestory relevance*. This is most likely due to gender stereotypes and social roles, and that these factors influenced the subjective perception of how important these aspects are when remembering your own experiences. Lastly, no effects of Covid-19 were found. This could be explained by that the present study is based largely on singular events rather than lifetime periods.

However, it would be interesting to see the impact of this variable in a study with a more holistic and qualitative perspective. The above-mentioned patterns justify the use of the inclusion of these control variables in the current study in order to control for their effects. Since partial correlations were used for the main part of the data analysis, the effects of these were controlled for.

Methodological Discussion

One of the biggest limitations of the present study is the impossibility of implying a direction of causality to the findings. Since it is merely correlational, it cannot be established whether social media hinders autobiographical memory, or if individual differences in autobiographical memory influence how much social media individuals use. In order to overcome this limitation, further studies would need to be conducted using a longitudinal design, in order to increase the reliability of the results.

When studying memory, it is important to consider the differences between actually remembering something and being able to recall it and formulate it into words under time pressure. As a part of this, it is also relevant to discuss language skills – not only which language you speak and whether or not it is your native language, but also how good you are at that language. For instance, some people read a lot or have a larger vocabulary and might therefore have an easier time formulating their memories into words. Simply because you cannot formulate your memories into words does not mean that you actually remember less. This becomes a threat to the validity of the results, and because of this, it is suggested that future studies do more comprehensive language tests to further control for its effects.

Considering the sample, convenience sampling is not the most reliable way of recruiting participants, given that the individuals who voluntarily find and sign up to participate in this study might not be representative of the entire population. Because of this,

it would be beneficial for future research to include a larger and broader sample using another sampling method, such as stratified sampling (Shaughnessy, Zechmeister, & Zechmeister, 2015) in order to increase the generalizability of the sample.

Another major limitation of this study is that it was conducted completely online, which decreases the ecological validity. Some measures were taken to overcome this limitation to some extent, such as timers for the questions and clear instructions about participating in a quiet location. Despite this, the results would be more accurate if the study was conducted in a laboratory setting. However, this was one of the best feasible options considering the uncertainty of the Covid-19 situation at the beginning of this project. Additionally, due to the study being survey-based, it raises questions regarding the reliability of self-reported data considering social desirability bias as well as proper self-awareness. This is especially relevant in the context of reporting how one uses social media, seeing as people might not be aware of how active they are on social media.

Relating to the measures used, an important factor is the choice of cue words. Even though these were chosen from another study that controlled for word length and frequency, the results could have been different if other words were chosen. For instance, if a participant really enjoys gardening it was probably easier to come up with a memory for the word *plant* compared to the other cue words. In line with this, the results would probably have been different if the participants got to describe memories from their own life without cue words, or without a time limitation. This would have yielded more qualitative data and would be interesting for further studies.

Even though inter-rate reliability rating was conducted carefully, there is still some degree of experimenter bias in terms of interpreting the results of the AMT due to the coding of the memories. Also, in terms of validity, it is worth mentioning that the subscales of SMD had low Cronbach's alpha for this particular sample, which could be due to the fact that the

scale consists of “yes” or “no” questions, or because of the sample. This suggests that the subscales were not as reliable on their own compared to the scale as a whole.

Future Research

Ideally, the present study would be replicated in a laboratory setting in order to further validate the results and to increase the reliability. Additionally, an intervention study would be both interesting and scientifically valuable. For instance, it could be beneficial to let one group use social media for a month while another group did not, and then compare how much they remembered about their own lives from that month.

It would be interesting to further investigate the age factor. Seeing as the participants in the present study are 18-30 years old, and that social media usage continues to increase, it would be beneficial to see the development of this in an even younger population that has used social media all their lives.

Considering the quantitative nature of the measures used in the present study, a suggestion for future studies would be to explore this in a more long-term perspective using longitudinal studies, in order to see how the influence of social media usage on memory plays out over time.

Conclusion

To summarize, the present study investigated to what extent social media usage in everyday life influences autobiographical memory recollection, by exploring both narrative recollection in terms of specificity and detail, as well as recollective experience in terms of the dimensions of autobiographical memory. The novelty of this research topic together with the results found creates an important contribution to the current field of research. This is especially relevant considering how much social media usage increases. If the effects are

better understood, it can create opportunities for preventative interventions to help those who show tendencies towards hindered autobiographical memory.

In conclusion, problematic social media usage was to a moderate degree correlated with different aspects of autobiographical memory recollection, suggesting that individuals with higher levels of problematic social media usage tended to report a lower number of specific memories. Also, individuals with higher levels of problematic social media usage showed lower levels of coherent memories, as well as higher levels of rehearsal. These together contribute to the field by starting to answer the question regarding how everyday social media usage influences peoples' general autobiographical recollective ability.

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Appendices

Appendix A – Participant Information Sheet

Hello!

This study is conducted as part of a Master's Thesis at the Master's Program in Psychology at Lund University. The main topic of the study is autobiographical memory, i.e. how we remember our own lives.

The study consists of some background questions, a memory task, followed by some survey questions. The study will take approximately 15-20 minutes to complete.

Please make sure that you can participate in the study via your **computer/laptop** (not on your smartphone), in a **quiet place** where you can be **undisturbed** for the duration of the study.

Eligibility conditions:

- In order to participate you need to be **18-30 years old**, and **not have any current mental health conditions** (such as depression).
- Participation is completely voluntary.
- You as a participant are free to withdraw from the study at any time, if you no longer want to participate.
- The survey is completely anonymous.
- All data will be handled in a confidential manner, so that the information you provide cannot be linked back to you.

If you have any questions about the study, please contact us by email:

Moa Nilsson: mo0561ni-s@student.lu.se

Supervisor Yunhwan Kim: yunhwan.kim@psy.lu.se

I have read and understood the information above, and I consent to participate in the study.

Yes

No

Appendix B – Demographics and Control Variables

Age (in years).

Gender

- Male
- Female
- Other

What is the highest level of education you have completed?

- High School
- Bachelor's degree
- Master's degree
- PhD or further education

Other: (please specify) _____

Occupation (check all that apply)

- Student
- Employed part time
- Employed full time
- Unemployed
- Other, please specify: _____

How much would you say that the COVID-19 Pandemic has changed your everyday life?

- To a very small degree. My everyday life is pretty much the same as before the pandemic.
- To a small degree. My everyday life has changed a little bit compared to before the pandemic.
- To a moderate degree. My everyday life has changed in several aspects compared to before the pandemic.

- To a large degree. My everyday life has changed a lot compared to before the pandemic.
- To a very large degree. My everyday life looks completely different now compared to how it did before the pandemic.

How would you rate your English skills?

- Non-fluent
- Mostly fluent
- Fluent, but not native
- Native speaker

Appendix C – ART

Instructions

People vary a lot as to how they remember events from their life. The following questions are about how you remember your own memories for events you have experienced in the past. Please consider each item and indicate on a scale from 1 to 7 how much the description applies to the way you remember events from your past.

Please consider how you remember past events and answered the questions in an honest and sincere way, by choosing a number between 1 (strongly disagree) and 7 (strongly agree).

Scale	Items	Components
1	*My memories of past events have lots of details.	Vivid
2	*My memories of past events come to me as good stories or descriptions.	Coherence
3	*While remembering past events it is as if I am reliving them	Reliving
4	*I often think back to past events in my mind and think or talk about them.	Rehearsal
5	*In my memories of past events, I remember where the actions, objects, and people are located in the events.	Scene
6	*While remembering past events, I can see them in my mind.	Visual
7	*My memories of past events are a central part of my life story.	Life Story
8	My memories of past events are vivid.	Vivid
9	My memories of past events are coherent and connected, not a collection of isolated, disconnected fragments.	Coherence

Scale Items	Components
10 While remembering past events, it is as if I am mentally traveling back to the time they occurred.	Reliving
11 My memories of past events often pop into my mind by themselves - without me consciously trying to remember them.	Rehearsal
12 In my memories of past events, I remember where I am in relation to the individual things in the events.	Scene
13 In my memories of past events, I can see with my mind's eye what took place.	Visual
14 My memories of past events are part of my identity.	Life Story
15 My memories of past events are clear, not fuzzy or clouded.	Vivid
16 My memories of past events come to me complete, not in pieces with missing bits.	Coherence
17 While remembering past events, it is as if I am experiencing the same general atmosphere again.	Reliving
18 After an event has happened, I often willfully and deliberately think back to it in my mind and try to remember it.	Rehearsal
19 In my memories of past events, I remembered the layout of the broader setting in which the events are located.	Scene
20 My memories of past events have clear visual details.	Visual
21 My memories of past events are a reference point for the way I understand myself and the world.	Life Story

Note. Each item is rated on a 7-point scale: Strongly Disagree 1 2 3 4 5 6 7 Strongly Agree. Brief ART is marked by * (items 1–7). Mean score is reported. The copyright for the scales is held by the authors (©2019, Berntsen, Hoyle, & Rubin). Permission is given to use the scale for research purposes.

Appendix D – MTUAS subscale

How often do you do each of the following activities on social networks/social media?

Questions answered using this Likert scale:

1	2	3	4	5	6	7	8	9	10
Never	Once a month	Several times a month	Once a week	Several times a week	Once a day	Several times a day	Once an hour	Several times an hour	All the time

32. Check your social networks/social media

33. Check your social media from your smartphone.
34. Check social media at work or school.
35. Post status updates.
36. Post photos.
37. Browse profiles and photos.
38. Read postings.
39. Comment on postings, status updates, photos, etc.
40. Click "Like" to a posting, photo, etc.

Appendix E - SMD

(Participants answer only yes/no to each question, and then get a score of 0-27 corresponding to the number of 'yes')

This scale measures social media dependency/addiction/problematic social media usage.

Originally used for diagnostic purposes. 27 items. Measured only using yes/no questions, and then each participant would get a score between 0-27, with a separate score for each variable.

* = These items are part of the 9-item short version of SMD

Preoccupation

During the past year, have you ...

- 1... often found it difficult not to look at messages on social media when you were doing something else (e.g. school work)?
- 2 ... regularly found that you can't think of anything else but the moment that you will be able to use social media again?*
- 3 ... often sat waiting until something happens on social media again?

Tolerance

During the past year, have you ...

- 4 ... felt the need to use social media more and more often?
- 5 ... felt the need to check messages on social media more and more often?
- 6 ... regularly felt dissatisfied because you wanted to spend more time on social media?*

Withdrawal

During the past year, have you ...

7... often felt tense or restless if you weren't able to look at your messages on social media?

8... regularly felt angry or frustrated if you weren't able to use social media?

9... often felt bad when you could not use social media?*

Persistence

During the past year, have you ...

10... tried to reduce your use of social media, but failed?

11... tried to spend less time on social media, but failed?*

12... been unable to stop using social media, even though others told you that you really should?

Escape

During the past year, have you ...

13... regularly used social media to take your mind off your problems?

14...often used social media so you didn't have to think about unpleasant things?

15... often used social media to escape from negative feelings?*

Problems

During the past year, have you ...

16... often not paid attention at school, while doing homework or at work because you were using social media?

17... regularly not had enough sleep because you were using social media too late at night?

18... regularly had arguments with others because of your social media use?*

Deception

During the past year, have you ...

19... regularly lied to your parents or friends about the amount of time you spend on social media?*

20... regularly hidden your social media use from others?

21... often used social media secretly?

Displacement

During the past year, have you ...

22... regularly devoted no attention to people around you (e.g. family or friends) because you were using social media?

23... regularly had no interest in hobbies or other activities because you would rather use social media?

24... regularly neglected other activities (e.g. hobbies, sport) because you wanted to use social media?*

Conflict

During the past year, have you ...

25... had serious problems at school or at work because you were spending too much time on social media?

26... had serious conflict with your parent(s) and sibling(s) because of your social media use?*

27... jeopardised or lost an important friendship or relationship because you were spending too much time on social media?

Appendix F – Participant Debriefing Sheet

Thank you for your participation! Your response will be of great use for the study.

The aim of this investigation is to explore the relationship between excessive social media usage and autobiographical memory.

If you have any questions, or wish to know the results of the study, please contact us by email:

Moa Nilsson: mo0561ni-s@student.lu.se

Supervisor Yunhwan Kim: yunhwan.kim@psy.lu.se

Thank you for your participation!

Appendix G – Instructions to Inter-Rater Reliability Analysis

AMT

AMT refers to how specific of a time frame the memory occurred in, i.e., memory specificity.

Specific = A memory of an event that lasts less than 24 hours.

Ex: “Last night me and my friends played board games”

Extended Overgeneral = Memory of an event that last longer than 24 hours.

Ex: “When I lived in Spain I lived in a very small apartment”

Categorical = Memories that occur regularly.

Ex: “When I was younger, I always used to play with dolls”

Omission = No memory provided

Ex: “I don’t know”

Details

Memory detail refers to the number of units of unique information within each memory, such as places, people, actions, items, thoughts, etc.

- Each part of the response that adds unique information is considered one unit of detail.
- A sum of units is made for each memory.

Start with the memory as a text, and then make enter between each detail, so that each detail is on its own line.

Appendix H – Updated Instructions to Inter-Rater Reliability Analysis

Memory detail:

Each part of the response that adds unique information is considered one unit of detail.

Reference to oneself

“I”, or “me” is redundant, since it’s their own memory.

For example:

“made me realize” and not “made me” “realize”

“me and my mom” and not “me” and “my mom” (because “me” is redundant)

Referring to remembering

“I remember” and “I think of” is not included, since it is about memory.

Unfinished

If something is unfinished, it is still counted as a separate detail. Ex:

“eating and celebrating with my fa” would be:

Eating

And celebrating

With my fa

Referring to time periods

“When I was a child” is considered one detail.

“When I was 4 or 5 years old” is also considered one detail.

“When we got there” is also considered one detail.

“Once when I” is also a detail

Phrases

“and it turned out so well” would be considered one detail, because “And it turned out” doesn’t mean anything without the “so well”

“so different at night” would also be considered one detail, because “so different” doesn’t really mean anything without the “at night”.

Appendix I – Correlation Matrix with Control Variables

	Number of Words	Memory Detail	Specific	Overgeneral	Categorical	Omission	ART	Vividness	Coherence	Reliving
Number of Words	-									
Memory Detail	.92***	-								
Specific Memories	.15	.13	-							
Extended Overgeneral Memories	-.05	-.03	-.35***	-						
Categorical Memories	-.05	-.07	-.79***	-.16	-					
Omission of Memories	-.37***	-.30**	-.30**	-.18	.06	-				
ART Full Scale	0.148	.12	-.06	.09	.07	-.06	-			
Vividness	.12	.07	-.02	.12	.03	-.03	.85***	-		
Narrative Coherence	.04	.04	-.10	.15	.03	.05	.71***	.73***	-	
Reliving	.05	.03	-.01	.03	.05	-.09	.71***	.51***	.35***	-
Rehearsal	-.03	-.06	-.11	.06	.13	-.04	.70***	.41***	.32**	.62***
Scene	.25*	.21*	.01	.13	-.02	-.15	.77***	.72***	.53***	.42***
Visual Imagery	.18	.17	.07	.07	-.02	-.01	.79***	.73***	.47***	.56***
Lifestory relevance	.04	.03	-.15	-.15	.15	-.02	.64***	0.38***	.38***	.41***
Age	.08	.13	.01	.07	-.01	-.13	.09	.09	-.07	-.07
Gender	.095	.11	-.05	.02	.04	.06	.26**	.14	.16	.22*
Education	.17	.20*	-.07	.12	.05	-.16	.09	.03	.09	-.03
Occupation	.02	.04	.22*	-.22*	-.09	.01	.03	.09	.09	.11
English	.27**	.29**	.12	-.23*	-.01	-.05	-.09	-.09	-.06	-.11
Covid-19	-.09	-.01	.09	.06	-.12	.09	.07	-.02	.03	.03

	Rehearsal	Scene	Visual	Lifestory	Age	Gender	Education	Occupation	English	Covid-19
Number of Words										
Memory Detail										
Specific Memories										
Extended Overgeneral Memories										
Categorical Memories										
Omission of Memories										
ART Full Scale										
Vividness										
Narrative Coherence										
Reliving										
Rehearsal	-									
Scene	.34***	-								
Visual Imagery	.34***	.73***	-							
Lifestory relevance	.66***	.25*	.30**	-						
Age	.01	.12	.10	.003	-					
Gender	.22*	.05	.05	.38***	.05	-				
Education	.01	.29**	.14	-.04	.54***	.03	-			
Occupation	-.03	-.06	-.04	.03	-.32**	.11	-.27**	-		
English	-.03	-.04	.01	-.08	-.09	-.19	.07	-.009	-	
Covid-19	.09	-.03	.02	.19	-.13	.03	-.06	.11	.12	-

Note. Significant control variables are marked as bold.