Autobiographies in the era of Instagram

A comparison of written and automated autobiographies and its impact on positive and negative emotions

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Abstract

Background. In the past years, autobiographies were found to play an important role for individuals in order to enable the act of reminiscence. Previous studies show the power of autobiographies in affecting individual's current emotions. Social Media platforms offer a new kind of memory collection since more and more people share their experiences online. However, the cataloguing of one's memories online as a form of an autobiography has been neglected. Therefore, this paper compares an automated autobiography of Instagram called 'Top 9' with a traditional written autobiography and its direct impact on individuals' emotions.

Method. The study illustrates a quasi-experiment with an automated autobiography as the experimental condition and a written autobiography as the control condition. The automated autobiography has been established using the app 'TOP 9' of Instagram from the year 2018. The written autobiography was established using a written collection of memories from the year 2018. Participants emotions were determined using the positive and negative affect scale (PANAS) which measures positive and negative affect. The study took place in a single session for each participant. 33 Participants have been recruited based on selective sampling, 17 in the written and 16 in the automated autobiography group.

Results. The study revealed that the automated autobiography can yield a higher score on individuals' positive emotions and a lower score on negative emotions. The written autobiography showed a higher score on positive as well as negative emotions. However, when comparing both conditions, it revealed that the autobiographical condition did not differ in respect to the effect on positive emotions. As opposed to the negative emotions, where the negative emotions of participants from the automated autobiography declined, whereas the negative emotions for participants of the written autobiography increased.

Discussion / Conclusion. The study indicated that the automated autobiography showed a change of individuals positive as well as negative emotion after reviewing the past experiences. However, in order to further investigate the tool of automated autobiographies in supporting reminiscence, it is recommended to take the content of the autobiographies into account to determine its detailed comparison with traditional written autobiographies.

Keywords: automated autobiographies, written autobiographies, emotions, reminiscence

Introduction

One of the most recurrent research topics in the last 80 years is the association between memory and emotion. Several studies presented evidence for the fact that *reminiscence* can yield a significant impact on emotions (Gillihan, Kessler & Farah, 2005). Reminiscence plays an important role for individuals to make meaning of one's past memories. Due to the high spread of social media use, platforms like Instagram enable a new digital form of reminiscence (Thomas & Briggs, 2016). Instagram is one of the most growing global social networks sites. People share various personal experiences online and thus create a new way of collecting memories. In fact, per day 80 million photos are shared on Instagram (Sheldon & Bryant, 2016). Despite the social media rise, it has been neglected whether a platform like Instagram can take on a form of a personal autobiography and yield the same association between memory and emotion as traditional autobiographies. In order to adapt to the fast spread of social media use, this study investigates Instagram as a form of an automated autobiography and its impact on emotion. Therefore, written and automated autobiographies are introduced. Followed by a part about the relation between memory and emotion and a theoretical background of individuals online self-presentation.

Written Autobiographies

Generally, when individuals feel the need to tell about themselves and share their experiences, it represents a new stage of their life (Aleandri & Russo, 2015). This act of sharing and recalling central memories is also called the act of *reminiscence*. Reminiscence can offer several benefits for an individual. In fact, it can give people the opportunity to re-experience past events, review them and deal with unresolved conflicts (Aleandri & Russo, 2015). Further, it supports an individual to reflect upon these memories and learn from past experiences (Aleandri & Russo, 2015). This, offers the opportunity to reflect on a meta-cognitive level, on own strength and weaknesses. By carefully reflecting on memories, the individual takes the past experience from the outside world, steps back and brings it to the mind. Based on the retrieved memory, an individual can make a connection to other experiences (Daudelin, 1996). According to Erikson's stage theory, an important aspect in an individual's life is making up the balance of one's own life. He argues that it is important to review past conflicts and deal with uncertainties. This can for example be a past dream that has not been realized. Previous research states that individuals who have a higher positive identity, meaning a higher meaning in life, have a higher level of

well-being. As a consequence, reminiscence can play an important role for individuals to find reconciliation with their past life (Bohlmeijer, Roemer, Cuijpers, Smit, 2006).

The tool of written autobiographies can be used to enable the act of reminiscence (Thomas & Briggs, 2016). In general, autobiographies are written by individuals about their central memories. They consist of subjective mental representations of the self in the past. However, autobiographical memories are not stored as static representations in the brain but are constructed by an individual itself. These constructions are often determined in relation to current needs and goals (Demiray & Janssen, 2015). Therefore, people can select their past selves and events, shift their subjective view on it, and recall a specific moment whenever they want (Willson & Ross, 2003).

The use of autobiographies is a flexible, adaptable and effective method that can be useful in various contexts like education or therapeutic setting. In this context, it supports the impact on self-reflection and mood (Aleadri & Russo, 2015). Currently, it is used in therapies for people who suffer from depression or dementia. In therapies', prompts like images, photographs, or music are used to enable reminiscence in therapies (Thomas & Briggs, 2016). Next to that, autobiographies are used as a scientific method in human scientific research. Researchers can focus on the individual's memories and its surroundings which enables deep analyses. It is useful, in order to determine the individual's life story as well as its social context. Therefore, it is beneficial in order to investigate its influence on individual's emotions (Aleadri & Russo, 2015).

Automated Autobiographies

Nowadays, social media has added a new dimension of creating an autobiography. Platforms like Facebook and Instagram are more and more widely used and enable people to present their self by sharing experiences and memories with the society (Djafarova, & Rushworth, 2017). Both platforms demonstrate a tool where people can create a profile, communicate with other people, share their memories and view other people's memories. At the same time, it is possible to view other people's profiles and shared memories (Thomas & Briggs, 2016). Prior research indicates that self-presentation demonstrates a key concept when classifying social media use (Kaplan & Haenlein, 2010). Until recently, the cataloguing of content on social media to review one's self-presentation and to further reflect on the shared memories has been neglected. Consequently, reflecting on the information that individuals share on social media only takes place

in limited ways. In order to use social media as a source for the act of reminiscence, tools have been implemented that enable individuals to reflect on their digital self's. Those, so called automated autobiographies, automatically create an autobiography based on an individual's social media posts (Thomas & Briggs, 2016). However, the content of those autobiographies is limited to the memory's individuals share on social media. An example represents 'Top 9' from Instagram. The 'Top 9' app can be used to automatically collect the 9 posts with the most "likes" from a specific year on Instagram. Individuals receive a collage about their most popular posts on Instagram and can reflect upon their shared posts ('TOP 9').

Memory and Emotion

Prior research investigates the link between autobiographical memories and emotional state. Generally, the impact is assumed to be reciprocal. On the one side, an individual's current emotion can have an impact on the kind of memories being recalled. On the other side, recalling certain memories can affect one's emotion (Westerhof & Bohlmeijer, 2015). As introduced before, reminiscence enables individuals to re-experience moments but at the same time deal with unresolved conflicts. Therefore, the possibility to retrieve positive as well as negative memories is possible, depending on current self-beliefs, self-views and levels of well-being that individuals experience (Westerhof & Bohlmeijer, 2015).

However, the second assumption is also important to consider. Memories can regulate an individual's emotions and their satisfaction with different aspects of their life. Thus, it is a common mood-regulation strategy. In this case, an autobiography that captures the most central memories of an individual can function as a strategy to support the emotion regulation (Gillihan, Kessler & Farah, 2005). Specifically, recalling a personal memory can have a direct link to a person's mood and life satisfaction. Prior evidence shows that positive memories enhances the well-being of an individual, indicating improvements in mood and feeling of belongingness (Wilson & Ross, 2003). For instance, people who suffer from dementia or depression have already been successfully introduced to the method of autobiographies, resulting in higher well-being. Additionally, studies on nostalgia indicated that the recollection of positive memories can be an effective way against negative moods (Luo, Liu, Cai, Wildschut & Sedikides, 2006). However, at the same time recalling negative memories can evoke negative feelings about past events and lead to a sense of failure (Thomas & Briggs, 2016).

Digital Self

In order to investigate social media as a form of an autobiography and its impact on emotions, it is important to consider how people present themselves on social media and what memories they share. This is essential in order to determine whether the memories being shared on social media can support the act of reminiscence and yield an influence on emotions. Previous studies illustrate that the kind of memory that is being shared on social media often represents an idealized version of an individual (Thomas & Briggs, 2016). Goffman (2002), indicated that Individuals present their 'digital self', by posting episodic memories within a society that tries to adapt to the world outside. Consequently, the 'digital self' is established on a base of online exchange reactions (Hogan, 2019). In this case, many researchers apply Goffman's dramaturgies approach (Goffman, 2002). The approach indicates that individuals have a 'front stage', which is used to present our idealized self to the society (Thomas, Briggs, Kerrigan & Hart, 2018). It refers to the identity of how we want others to perceive us and how those people perceive us. Generally, Goffman argues that people have the desire to control the impression they make on other people by presenting an identity that is altered and shaped rather than their true identity (Goffman, 2002). By posting an experience on social media people can receive 'likes' or positive feedback in comments. This positive feedback can serve as a confirmation of one's self and enhance people' good and valuable self (Jan, Soomro & Ahmad, 2017). Next to that, Goffman (2002), introduces the theory of Impression Management. That means that people engage in creating an idealized image of themselves and thus promote self-enhancement. On social media people try to present an identity that 'fits in' society. In this case, they can control the impression they make on other people (Kaplan & Haenlein, 2010). Consequently, establishing an autobiography based on social media happens automatically from previous shared memories. Previous research questions the authenticity of digital self's. (Ellison, 2007). Therefore, it is important to determine whether the automated digital retrieval of memories can impact one's emotions in the same way as the traditional written autobiographies, leading to a range of different emotions. The way of using social media as a source of reminiscence and the impact on emotions has been neglected.

Current Study

The current study draws on the investigation of written autobiographies and automated autobiographies and its impact on one's emotions. Traditionally, written autobiographies capture

an individual's most important life-events, positive as well as negative in order to reflect upon them. Prior research indicates that one's emotional state can influence the positive or negative retrieval of memories. At the same time, it can have an impact on one's emotional state after the retrieval, leading to positive or negative emotions (Westerhof & Bohlmeijer, 2015). However, current research neglects the new tools of creating reminiscence based on new forms of reminiscence from social media. Therefore, it is important to determine the impact of using such a new form of an automated autobiography to enable the act of reminiscence. Especially, it is essential to determine whether an automated autobiography can yield an effect on individuals' positive emotions as well as negative emotions, when considering an individual's idealized online self-presentation? Therefore, this study aimed to compare traditional written autobiographies with automated autobiographies created through the app TOP 9 regarding its *direct influence* on emotions.

Research Question 1. What direct impact does an automated autobiography have on one's positive / negative emotions?

H1: After reviewing the automated autobiography, the participants will have a significant higher score on positive emotions, and a significant lower score on negative emotion than before.

Research Question 2. What direct impact does a written autobiography have on one's positive / negative emotions?

H2: After reviewing the written autobiography, the participants will have a significantly higher score on positive emotions, and a significant higher score on negative emotion than before.

Research Question 3. To what extent does the type of autobiography differ in its effect on positive/negative emotions from individuals?

H3: The automated autobiography condition is expected to improve significantly more on positive emotions and less on negative emotions compared to the written autobiography.

Methods

Design

This experimental study compared automated autobiographies to written autobiographies, regarding its effect on individual's emotion. Generally, experimental research is one type of empirical research. It is preferable when the goal of the research is to produce reliable causable knowledge (Haas & Kraft, 1984**).** The aim of the experimental study was to investigate whether an autobiography based on social media can yield a direct change of emotion. The study employs two parallel conditions, one experimental condition and one control group. The experimental condition referred to the automated autobiography, whereas the control group demonstrated the written autobiography (see Conditions). Therefore, the experiment used a 2x2 between and within subject design. The goal was to investigate a within subject effect for each condition, as well as a between subject design to investigate the differences between the conditions. The independent variable indicated the autobiography condition and the dependent variable, the positive and negative affect. Both groups have received the same questionnaires to assess the emotional affect. The research was approved by the Ethics Committee of the faculty of Behavioural, Management and Social Sciences faculty from the University of Twente (Registration number: 190264). Prior to the experiment, all participants signed an informed consent.

Conditions

The study employed the following two conditions.

1) Automated autobiography Top 9: Participants had to download the app "Top 9 "which automatically creates an automated autobiography of 7 to 9 posts from the year 2018.

2) Narrative autobiography: Participants listed their 7 to 9 most central memories from the year 2018.

The target population of the automated autobiography group aimed for individuals who use Instagram and share memories. The specific criteria for the automated autobiography group were to have an Instagram account with at least 7 posts in the year 2018, a smartphone and an internet connection. The other target population for the group of written autobiographies aimed for individuals who are not active on Instagram. The specific criteria for the written autobiography group were to either not have an Instagram account or not sharing memories on Instagram. Next to that, participants had to be between 18 and 35 years old in both conditions. Consequently,

randomization was impossible since the groups aimed at a different target population, so that the study represents a quasi-experiment (Haas & Kraft, 1984).

Participants

The participants were recruited using selective sampling. This means that people were approached in the surroundings that fulfilled the criteria for participation. Participants were recruited with a request to participate via mail, Sona-System or a direct, personal approach. Sona System is a test-subject system developed by the BMS faculty of the University of Twente. It enables students to get first experiences as a test subject. At the same time, it gives researches the opportunity to collect data (University of Twente, 2019). In case of dropouts, the data from the participant were excluded.

In total, 36 participants were approached. In the automated autobiography group, 18 individuals were approached. Two Participants were recruited via Sona-System, the rest by personal approach. Two individuals dropped out because of missing demographics. From the remaining participants, 16 individuals (3 males and 13 women) participated in the automated autobiography condition. This group entailed a range from 20 to 27 years old (M = 22.8 years). In the written autobiography group, 18 participants were approached, all recruited by a personal approach. One person dropped out due to missing demographics. Thus, 17 participants (8 males and 9 women) took part in written autobiography condition. The group ranged from the 34 years old to 20 years old (M = 23.70 years). Thus, the final sample includes 33 participants.

Material

PANAS. For the experimental as well as the control group, the PANAS scale has been used. The PANAS is a self-report measurement of affect that consists of two 10-item scales to measure both positive and negative affect. ’Positive affect’ indicates positive emotions and the positive way of interacting with life-changes and interactions. ’Negative affect’ relates to the feeling of negativity in relationships and surroundings. The total score is calculated by finding the sum of the 10 positive items, and then the 10 negative items. Scores can range from the lowest of 10 to the highest of 50 for both sets of items. For the total positive score, a higher score indicates more of a positive affect and a lower score reveals a less positive affect. For the total negative score, a lower score indicates less of a negative affect and a higher score a more negative affect. The PANAS

scale shows a high reliability. The subscales consist of an alpha reliability of .88 for positive affect and .87 for negative affect (Humbold & Leal, Monteiro, 2017). The reliabilities for this current study have been calculated resulting in a score of .82 for positive affect and .84 for negative affect.

TOP 9. For the experimental group of automated autobiography, the app '*Top 9*' was used. The app represents a tool which creates an autobiography containing the individuals Top 9 Instagram pictures that were published on ones Instagram account in 2018. Participants can review their pictures, that yield the most 'likes' in the year 2018 ("TOP 9). Therefore, participants needed to bring a smart-phone and have the possibility to download the app in either the IOS or Android store.

For the control group, a pen and paper were provided for the participants to write down at least 7 and maximum 9 most central positive and negative memories from last year.

Procedure

Data were collected from two groups of participants. An individual could not participate in both conditions. Participants were seated in either a room in the university or in a quiet room outside the university in a natural environment one by one, together with the researcher. The whole procedure for each person took place at the same day, so the direct effect of automated and written autobiographies on emotions were investigated in one session per person. In the automated autobiography group, the data were collected with two other researchers. In the written autobiography group, only one researcher collected data. The online platform Qualtrics had been used as the main data collection tool. By using Qualtrics, every researcher can set up surveys and publish them in order to collect results (Barnhoorn, Haasnoot, Bocanegra, van Steenbergen, 2014). The participants received a laptop from one of the researchers with a pre-established questionnaire. Prior to the start of the procedure, they received the informed consent, had an opportunity to read it and ask questions, and submitted their signed consent online (Appendix 1). Afterwards, the participants of all groups received a pre-test of the PANAS scale to fill out via Qualtrics. After they filled in the PANAS scale, Participants from the experimental group were instructed to download the app '*Top 9*' on their cell phone and follow the instructions in order to receive the automated autobiography via mail. Afterwards, the participants had the opportunity to review their collage of 2018 for about 5 minutes. Participants from the control group received a pen and a paper in order to write about their 7 to 9 most central memories of 2018. They were instructed to take 10 to 20

minutes for that. Afterwards, participants had time to review their list. Further, the participants received the online post-questionnaire of the PANAS scale to fill out via Qualtrics.

Analysis Concept

The data were analysed using the statistic program IBM SPSS Statistics (Version 24). The data of the PANAS questionnaire were divided into two subscales, positive affect (PA) and negative affect (NA) subscales for the pre- as well as for the post-test. Thus, four variables were established, Pre-test PA, Pre-test NA, Post-test PA, Post-test NA, once in the experimental data set and once in the control group data set.

Firstly, the data have been tested on Normality. In all four cases, the data was normally distributed using the Kolmogrov-Smirnov Test (p-value <0.5). Secondly, the data has been tested on outliers and revealed two outliers, that lie apart from the distribution. One outlier in the automated autobiography condition and one in the written autobiography condition. When removing the outliers, the data statistically remained the same as when including the outliers. Therefore, the outliers remained in the study.

After testing the previous assumptions, the statistical tests have been applied. Firstly, the characteristics of the participant's age and gender were analysed in both groups. Further, the characteristics of the sample were investigated. Therefore, the sum score of each subscale has been calculated for each participant, as well as the means of the positives and negative affect for the automated as well as written autobiography.

All research questions were answered using four paired sample t-test and two 2x2 mixed measurement Anova tests. For every test a significant level of $p < .05$ was chosen.

The first two research questions investigated for both types of autobiography conditions whether they had a direct change on individuals' levels of positive/negative emotions from the baseline measurement. Hence, a within-group difference was tested using paired sample t-test. A paired sample t-test is used to determine whether the mean difference between two sets of observations is zero. First, differences for the positive emotions from the baseline measurement were investigated for both groups using two t-tests. Secondly, differences for the negative emotions from the baseline measurement were investigated for both autobiography groups using two t-tests.

The third research question investigated the difference between the groups for the outcome on positive as well as negative effect. The first mixed Anova was used for the positive emotions

and the second mixed Anova was used for the negative emotions. In both mixed Anova, one factor referred to the within-subject factor *time*, which had two categories: pre-test and post-test. The other factor was the between-group factor *autobiography condition*, which had two categories: automated autobiography and written autobiography. It was used to determine if there is an interaction between autobiography group and time on positive/negative affect.

For the paired sample t-test Cohens D had been calculated to assess the effect size. A low effect score represents d = 0.2, a medium effect size d = 0.5 and a large affect score refers to d= 0.8. For the mixed Anova the effect size was calculated based on eta-squared. The effect size is small ($\eta^2 = 0.01$), medium ($\eta^2 = 0.06$), and large ($\eta^2 = 0.14$). The effect size quantified the size of difference between the groups (Lakens, 2013).

Results

Positive Affect

First, baseline differences were tested between the automated and written autobiography group for the positive affect. There was no significant difference between the baseline measurements of the two conditions ($p > .05$).

Automated autobiography. For the automated autobiography group, a statistically significant difference between pre-test (M =35.86, SD =5.749) and post-test (M = 37.86, SD =5.864), $t (15) = 3.703$, $p = .002$ were found (Table 1). This refers to a statistically significant difference from zero. The mean equals -2.00 (SD = 2.160). Consequently, the participants scored on average 2.0 points higher in the post-test on positive affect than in the pre-test. The plot shows that the automated autobiography group higher on positive affect in the predicted direction (Figure 1). Cohens D shows a small effect size ($d = 0.36$).

Written autobiography. For the written autobiography group, a statistically significant difference between pre-test (M = 33.06, SD = 4.160) and post-test (M = 36.77, SD =3.032); $t (16) = 4.222$, $p < .001$ (Table 1) has been found. The mean equals -3.71 (SD = 3.62). This means, that participants in the post-test scored on average 3.71 points higher on positive affect in the post-test than in the pre-test. The plot reveals that the written autobiographical scores higher on positive affect in the predicted direction (Figure 1.). Cohens D illustrates a large effect size ($d = 1.05$).

Comparison autobiographies. The results of the mixed Anova showed that there was no significant interaction between the time and autobiography condition on positives affect, $F (1, 31) = 2.660$, $p >.05$. Therefore, the change in positive emotions is not the results out of an interaction between autobiography and time (Figure 1). This effect size is a large effect size ($\eta^2 = .079$). However, there was a significant effect of the simple main effect time, $F (1, 31) = 29.760$, $p < .05$. The positive score significantly increased from pre-test to post-test (Table 1). Consequently, the change between pre-and post-test can be attributed to the within-factor effect of time. The effect size is large ($\eta^2 = .49$). Next to that, no significant main effect of autobiography condition was found. $F (1, 31) = 1.520$, $p > .05$. This effect showed that if we ignore the time change, the autobiography condition was not significantly different from each other. The effect size is large ($\eta^2 = .47$)

To sum up, there was a significant change between pre- and post-test of participants positive emotion in both groups. Besides, no interaction effect has been found. Therefore, the simple main

effect was investigated and showed no main effect of autobiographical condition. However, a significant simple main effect of time was found.

Table 1. *Descriptive PA*

	Total Sample [n = 33]	Automated Autobiography [n =16]	Written Autobiography [n = 17]
Mean			
Pre-test	34.42	35.86	33.06
Post-test	37.30	37.86	36.76
SD			
Pre-test	5.118	5.749	4.160
Post-test	4.586	5.864	3.032
Maximum			
Pre-test	50	50	40
Post-test	40	40	44
Minimum			
Pre-test	26	28	26
Post-test	31	31	44

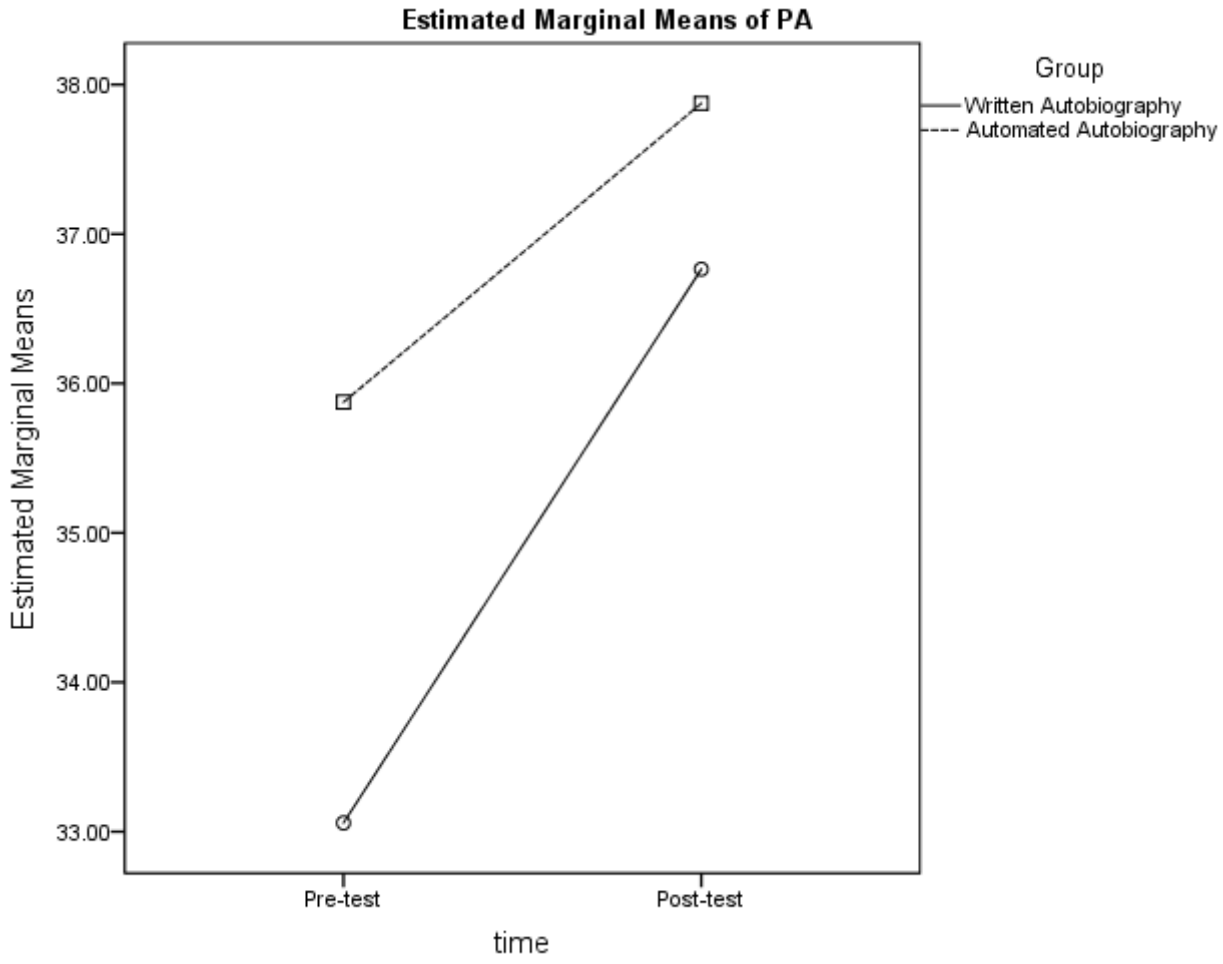

Figure 1. Profile plot positive affect. The plot shows a graphical illustration for examining the data of the written and automated autobiography condition.

Negative Effect

First, baseline differences were tested between the automated and written autobiography group for the negative affect. There was no significant difference between the baseline measurements of the two conditions ($p > .05$).

Automated autobiography. For the automated autobiography group, there was a statistically significant difference between the pre-test (M = 18.75; SD = 7.335) and post-test (M =17.06; SD = 6.245); t (15) = 2.412, p = .029 (Table 2). The mean score was 1.69 (SD 2.798). Therefore, the participants scored on average 1.69 points lower on the post-test than on the pre-test on the negative affect. The plot shows that the automated autobiography group reveals a higher pre-test score and a lower post-test score in the predicted direction (Figure 2). Cohens D indicates a small effect size (d =0.26).

Written autobiography. For the written autobiography, there was a statistically significant different between pre-test (M = 15.82, SD = 3.746) and post-test (M = 21.18, SD = 7.161); t (16) = 3.666 (DF 16), p = 002 (Table 2). The mean equals -5.35 (SD 6.020). This means, that participants scored on average 5.35 points higher on negative affect in the post-test than in the pre-test. The plot indicates a rise in negative affect in the predicted direction (Figure 2.). Cohens D indicates a large effect size (d = 0.97).

Comparison autobiographies. The results of the mixed Anova indicated a significant interaction effect of time and autobiography condition, F (1, 31) = 18.163, p <.001. This shows that the change in negative emotions is the result out of an interaction between the type of autobiography and time. The plot shows that the two groups have an interaction point between the pre and post-test (Figure 2). In the automated autobiography group, the condition was associated with a lower negative affect, whereas in the written autobiography group, the condition was associated with an increased negative affect (Table 2). The effect size is large ($\eta^2 = 0.369$).

To sum up, the results revealed a significant change between pre-test and post-test of participants negative emotions in both autobiography groups. Next to that, an interaction effect of time and autobiographical condition was found.

Table 2. *Descriptive NA*

	Total Sample [n = 33]	Automated Autobiography [n =16]	Written Autobiography [n = 17]
Mean			
Pre-test	17.24	18.75	15.82
Post-test	19.18	17.06	21.18
SD			
Pre-test	5.869	7.335	3.746
Post-test	6.948	6.245	7.161
Maximum			
Pre-test	40	40	24
Post-test	35	33	35
Minimum			
Pre-test	10	12	10
Post-test	10	10	10

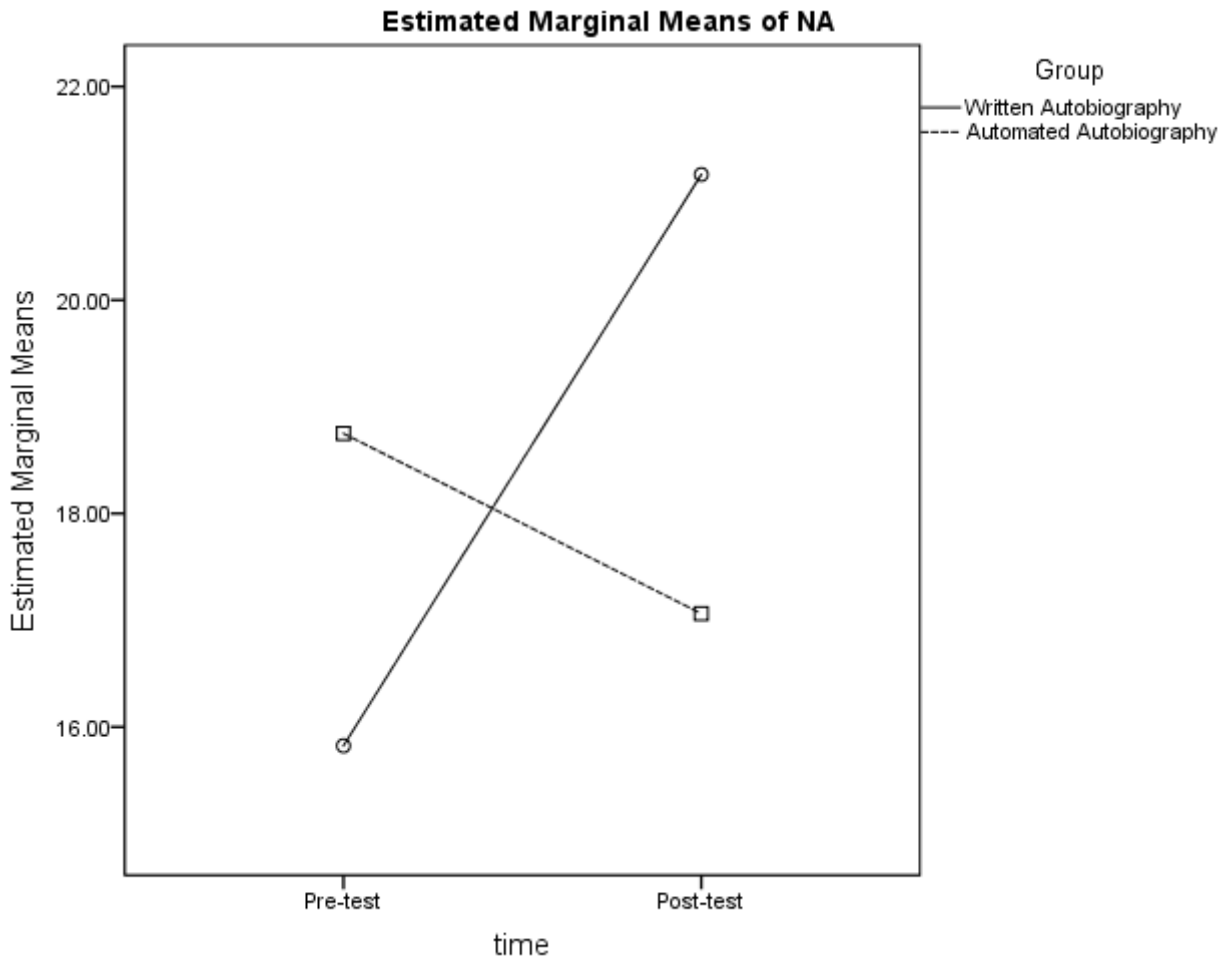

Figure 2. Profile plot negative affect. The plot shows a graphical illustration for examining the data of the written and automated autobiography condition.

Discussion

This research covered whether Instagram's online autobiography can yield a direct effect on emotions in the same way as traditional written autobiographies. It displays that new forms of digital autobiography can indeed yield a rise of positive emotions, as well as a decline in negative emotions. Therefore, the first hypothesis can be met. The outcomes for the written autobiography group showed a rise in positive as well as negative emotions. The second hypothesis can also be met.

The third research question compared both groups and revealed an interaction of autobiographical condition and time for the negative affect. Taking the interaction into account, it decreased significantly more in the automated whereas it increased in the written autobiography condition. Second, the change in positive emotions did not differ for the autobiographical conditions and did not reveal an interaction. Therefore, the third hypothesis can only be met for the outcome on negative emotions but not for positive emotions. This outcome needs to be regarded in a critical view. It indicates that the new digital form of an autobiography differs from that of traditional written autobiography regarding the outcome for negative emotions over time.

Theoretical Reflection

Reminiscence gives individuals the opportunity to make meaning of their past experiences. The tool of autobiographies enables individuals to re-experience and review their experience. (Thomas & Briggs, 2016). One main function of reminiscence, according to Erickson's stage theory, is to reconcile with one's past memories (Bohlmeijer, Roemer, Cuijpers, Smit, 2007). Therefore, it can lead to positive as well as negative emotions (Thomas & Briggs, 2016). When considering the results, specifically the decline in negative emotions, it remains questionable whether an automated autobiography enables reminiscence in the same way as a written autobiography. However, it indicated that it enhances individual's positive emotions and therefore enhance one's positive emotions. Nevertheless, it is important to determine whether digital forms of Instagram offer the needed input to enable the act of reminiscence. In this context, previous research highlights the presentation of an individual's self as questionable in representing one's true identity. Some studies argued that: 'the digital can never be real' (Ellison, 2007). Furthermore, studies highlight the lack of sharing negative experiences online that might lead to negative emotional states. Participants reported deleting pictures of their ex-partner in order to avoid

unwanted or upsetting material to review later (Thomas & Briggs, 2016). This might support the fact that some past conflicts are being neglected on social media and do not offer material of past memories to reflect upon on. However, this study only investigates the effect of automated autobiographies, not considering the content. In order to understand whether the autobiographies in this research entailed an input that can support the act of reminiscence, the content needs to be taken into consideration.

Possible explanation regarding the decline in negative emotions of the automated autobiography can be applied to the 'Impression Management' Theory of Goffman (2002). He argues that individuals generally have the desire to control the impression they make on others in front of an audience. He refers to this desire as the "front stage" that people present of themselves. A self-presentation that indicates an individualized and shaped identity about the self (Goffman, 2002). This can be applied to the results. In the written autobiographical condition, people were missing an audience since the memories that were retrieved were not shared with anyone, nor collected by the researcher. Consequently, the people might have not experienced the desire to impress an audience and present Goffman's so called 'front stage' (Kaplan & Haenlein, 2010). Thus, positive as well as negative results might have been recalled, leading to a rise in positive as well as negative emotions. However, the automated autobiography group received an automated autobiography that has already been exposed to an online audience of Instagram. According to the theory of Goffman, the 'front stage' has been activated, so that people might have used their online memories to impress other people and present their ideal 'digital self'. This could indicate that only positive memories were being shared that were used to present a good and valuable self. According to the theory of Goffman (2002), the idealized self-presentation might explain the rise in positive emotions and decline in negative emotions. As consequence, the interaction effect of the autobiography condition for the negative effect might be explained using Goffman's theory.

Strength and Limitations

The current study offers some assets. In order to explore the effect of autobiographies on emotions, a standardized previous established questionnaire was used. This highlights the credibility of the research. The PANAS reveals one of the most widely used affect scales and shows high internal validity and reliability (Humbold, Leal & Monteiro, 2017).

A further major asset of the study represents the topic of research. Nowadays, people spend a considerable amount of time on online platforms and share memories from their private life. Therefore, it is essential to determine what impact those new forms of memory collection can have on individuals. Since autobiographies are a widely used method in education and therapeutic settings, it is important to adapt to the changes that more and more people create an online autobiography (Thomas & Briggs, 2016). This enables to incorporate the online autobiographies of individuals in the educational and therapeutic settings. In order to assess the value of automated autobiographies, the social media platform Instagram had been selected. It is one of the most commonly used and fasted growing social media platforms for memory collection (Sheldon, Bryan, 2016). Therefore, it is important to determine social medias function to enable reminiscence by using a platform that is commonly used by the society.

Despite the strength, the study must be regarded with caution due to some shortcomings. The first shortcoming refers to the method of participant selection. Some participants were known to the researchers due to personal relationships. Consequently, participants could have answered the questionnaires based on social desirability. This means that the participants might have given information that tend to be desirable instead of giving responses that indicate their true emotional state (Randall & Fernandes, 1991). Consequently, the effect of the autobiographies in both conditions might be attributed to their social desirability.

Another shortcoming of the study displays the data collection. Regarding the location, some experiments occurred within the university, whereas others took place outside or in a home environment. Within affect studies, a broad range of influence must be regarded. Emotions can arise in response to the surroundings and other people's behaviour. This means, several stimuli can affect our emotional responses (Brown, 2013). In this research, the individual had several influences that could have induced the change in emotion. Possible explanation can be the weather outside or negative experiences about the University of Twente. Besides, the automated autobiography data has been collected by different researchers, resulting in differences in the professional approach toward the participant or possible personal relationships.

A further limitation refers to the data collection of the automated autobiography group. It was shared with two other researchers, who included questionnaire about self-esteem and body self-esteem before giving answer to the PANAS in Qualtrics. Therefore, answers to those questionnaires might have interfered with participants answers on the PANAS affect scale. Due to

that, certain questions from the other researchers focus about self-esteem might have induced emotions on the answer to the PANAs scale. Opposed to participants in the written autobiography, who only received the PANAS scale. Previous studies indicate that emotions can arise out of multiple different resources. Whether the change in emotion can only be attributed to the autobiography represents a limitation. This represents a limitation of quantitative research, since the researcher cannot investigate in depth information of participants thoughts about the autobiographies (Walker, 2017). However, a manipulation check is useful to determine whether the effect is due to the manipulation in the experiment or due to other points.

Next to that, participants spend a different amount of time reviewing their autobiographies. Observation during the experiment point out that some people in the automated group viewed their autobiographies more extensively than other. In the written autobiography group, some participants took the full available time to write their autobiography whereas other took less time. Consequently, the time people took to reviewing was not measured and represents a limitation in the research. In addition to that, the degree of reflection might have differed between the participants. This might cause different emotional intensity levels in the PANAS scale and impact the average means. As introduced in the beginning of the paper, reflecting on the memories can elicit emotions in individuals. In the process of reminiscence, memories must be retrieved from the outside brought to the mind to successfully reflect on it (Daudelin, 1996). However, the current study shows that some participants might have engaged in different stages of reflection levels than others, processing certain memories more extensively and longer than others. This could have been caused due to an influence of different self-reflection levels or different amounts of reviewing the autobiography. As a recommendation, the study could examine the effect of self-reflection levels and examine the time people spend reviewing their autobiographies.

Recommendations

In the following, recommendations for future research are stated. First, it is recommended to apply a different research method as a follow-up study. In this case, qualitative research offers several benefits. Within this research method, it is possible to emphasize the role of in-depth analysis about how individuals experience the world around them (Walker, 2017). Especially in relation to this current study about memory and emotion, it might be interesting to use follow-up interviews to enhance the level of self-reflection. As introduced in the beginning, autobiographies

can offer the opportunity for in-depth research so that it is best used within the field of qualitative research (Aleadri & Russo, 2015). It could be applied to investigate the content that people shared in their automated as well as written autobiographies to get a further insight.

Secondly, in order to assess the power of automated autobiographies, it might be recommended to take different online platforms into account. In this context, Facebook represents a different famous platform for memory collection within the society. About 93% of Facebook activity indicates the sharing of pictures with the online society. Therefore, it can be used as a potential assessment of autobiographies (Sheldon, Bryan, 2016). One could compare autobiographies of Instagram and Facebook in order to determine its power to enable the act of reminiscence.

At last, previous studies have pointed out the importance of using digital reminiscence from social media in therapeutic settings. When using autobiographies, it is important to review on all past experience, positive and negative, to make meaning of those memories. Therefore, positive as well as negative emotions can arise. The study showed that a digital autobiography differed in its outcome on negative emotion compared to written autobiographies. Thus, one can question whether the content on social media can be perceived as a sufficient form in supporting the act of reminiscence or only displays a collection of memories that do not enable the reflection process of past experiences. Consequently, it is important to further investigate the reminiscence opportunities of automated autobiographies, in order to incorporate them in therapeutic settings (Briggs & Thomas, 2016).

Conclusion

The current study showed that automated autobiographies of Instagram in comparison with written autobiographies did not significantly differ in effect on individual's positive emotions. Both resulted in a higher positive score after reviewing the autobiography. This indicates that online autobiographies possess the power to influence one's emotional positive state and enhance individual's well-being. However, it did differ in respect to negative emotions, resulting in a lower impact on negative emotions in the automated autobiography condition compared to the written autobiography condition. The decline in negative emotions of the automated autobiography raises the question, whether the form of digital autobiographies differs in its power of supporting personal reminiscence. Therefore, the outcome promotes future research opportunities that focuses on the

content of the digital autobiographies. In order to enable the act of reminiscence, it needs to be researched whether the content on Instagram can take on a form of a personal autobiography and entail sufficient memories to reflect upon on.

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Appendix

Informed Consent

I hereby declare that I have been informed in a manner which is clear to me about the nature and method of this research. I agree of my own free will to participate in this research. I reserve the right to withdraw this consent without the need to give any reason and I am aware that I may withdraw from the research at any time. I know that all the data will be made completely anonymous and that my data will not be disclosed to third parties.

If I request further information about the research, now or in the future, the contact person is Leonie, l.museler@student.utwente.nl

Do you agree with the informed consent?

Yes
No