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What Characterizes Life Story Memories? A Diary Study of Freshmen's First Term

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Abstract

We investigated whether memories are selected for the life story based on event characteristics. Sixty-one students completed weekly diaries over their first term at university. They described, dated and rated two events each week. Three months after the end of the term they completed an unexpected memory test. They recalled three memories from the diary period that were important to their life story. Three randomly selected events scoring low on importance to the life story functioned as control memories. Life story memories were rated higher on goal relevance, emotional intensity, importance and rehearsal in the diary and maintained their higher ratings at the test session, while ratings for control memories dropped off. Life story memories' content was less consistent over time but they were more accurately dated than control memories. The results suggest that event characteristics play an important role for the selection of life story memories.

Keywords: Autobiographical memory, life story, goals, emotion, event characteristics, accuracy, diary study

What Characterizes Life Story Memories? A Diary Study of Freshmen's First Term

The way memory is organized and how organization affects memory has been widely discussed (e.g. Bartlett, 1932; Conway, 2005; Reiser, Black & Abelson, 1985; Schank, 1999; Tulving, 1962) and narrative organization has been proposed to be a central type of organization in memory (Bluck & Habermas, 2000; Conway, Singer & Tagini, 2004; Robinson, 1992; Schank & Abelson, 1995). More specifically the life story has been suggested to organize autobiographical memory and form the basis of identity and self-understanding (Bluck & Habermas, 2000; Bruner, 1990; Conway et al., 2004; Fitzgerald, 1988; McAdams, 1993; 1996; Neisser, 1994; Polkinghorne, 1988; Robinson, 1992). The life story is an internalized story about one's life, based on autobiographical memory, and characterized by temporal, causal and thematic coherence (Bluck & Habermas, 2000; Habermas & Bluck, 2000; McAdams, 2001).

Some memories are more central to the life story than other memories (Berntsen & Rubin, 2004; Bluck & Habermas, 2000; Conway, 2005; Robinson & Taylor, 1998). Such life story memories have been used to study the relationship between the life story and other variables, such as well-being (e.g. McAdams, Reynolds, Lewis, Patten, & Bowman, 2001; Rubin, Berntsen, & Hutson, 2009; Thomsen & Berntsen, 2009), personality (e.g. McAdams et al., 2004; McGregor, McAdams & Little, 2006; Raggatt, 2006) and development (e.g. Bohn, 2010; McLean & Pals, 2008). This approach assumes that life story memories have been selected by some mechanism that ensures a privileged relationship between the variables in question and life story memories.

Although there is general agreement that not all memories are equally important in the life story, there is no general agreement on the mechanisms at play when memories are selected to become a part of the life story. Some approaches would seem to favour social processes as a selection mechanism, i.e. memories that are shared with others are likely to be included in the life story (e.g. Pasupathi, 2001). Other approaches emphasize cultural influences as a selection mechanism, suggesting that culturally transmitted knowledge about important life events directs the selection of life story memories (Bohn, 2010; Bohn & Berntsen, 2008; Berntsen & Rubin, 2002; 2004; Habermas & Bluck, 2000; Habermas, 2007; Rubin & Berntsen, 2003; Thomsen & Berntsen, 2008).

The life story is ultimately a very personal knowledge structure which is closely intertwined with self and identity (Conway, 2005; Fitzgerald, 1988; McAdams, 1996). Thus, the life story can be expected to include memories that are very significant to self and identity and such significance may be experienced at the time of the event. Following this idea, the present study investigates whether life story memories score higher on certain event characteristics (e.g. goal relevance and emotional intensity) than other memories and whether life story memories are more elaborate, consistent over time and accurately dated than other memories.

In order to answer these questions we asked 61 first term students to keep a weekly diary of events during their first term (i.e. from late August to January). They described, dated and rated these events on a number of event characteristics (e.g. goal relevance and emotional intensity). Three months after the end of the term they participated in an unexpected memory test session and were asked to tell the part of their life story extending from late August to

January. Following this, they were asked to recall three memories from their diary that were especially important to this part of their life story (life story memories). They were then cued with event headings for six memories randomly chosen from their diary entries and three of these memories, rated lowest on importance to their life story, were selected as control memories. Both life story and control memories were then described, dated and rated on the event characteristics (in counterbalanced order). The comparison between life story memories and control memories with respect to both the diary data and the test data allowed us to examine the questions posed above. However, first we elaborate on the relationship between the life story and specific memories and discuss event characteristics that may be central for the selection of life story memories. Second we discuss the potential effects that being a part of the life story may have on memories with respect to content consistency over time and dating accuracy.

What Memories Are Selected to Become a Part of the Life Story?

Several authors have suggested that the life story is based on autobiographical memory (Bluck & Habermas, 2000; Conway et al., 2004; McAdams, 2001). Thus, memories are selected, interpreted and interconnected to form the life story (McAdams, 2001; Pillemer, 2001; Singer & Bluck, 2001). We suggest that event characteristics are an important mechanism for selecting life story memories. The life story is based on memories highly relevant to personal goals (Conway, 2005; McAdams, 1996) and such goals are likely to be activated during the event. These goals may cause appraisals of goal relevance, importance and emotion (Oatley & Johnson-Laird, 1987; Power & Dalgleish, 2008; Scherer, 1999), factors associated with long-term memories (e.g. Brown & Kulik, 1977; Cahill, Prins, Weber

& McGaugh, 1994; Gold, 1992; LaBar & Cabeza, 2006; Pillemer, 1998). These factors also characterize self-defining memories that symbolize enduring concerns and themes in the individual's life, and are central to the life story (e.g. Singer & Salovey, 1993). However, no studies have examined whether life story memories score higher on these events characteristics than other memories. In the present study we therefore examined if event characteristics play a role for the selection of life story memories.

There are several event characteristics that could be relevant for the selection of life story memories. Below we address these event characteristics and explain why they would work as selection mechanisms specifically in relation to life stories. As a part of this, we also review research on event characteristics generally associated with memory availability over time, because memories selected to be a part of the life story would naturally be memories that are available over time.

First, narratives are about agents pursuing goals over time (Bruner, 1990; Polkinghorne, 1988; McAdams, 1993). Thus, events that are central to goal pursuit would be more likely to be selected to become a part of the life story. In the present study, we measured this aspect through three variables: Goal relevance, emotional intensity and importance. Goal relevance has been suggested to be a central mechanism in the encoding of memories (Barsalou, 1988; Conway & Pleydell-Pearce, 2000; Robinson, 1992; Schank, 1999), and studies have found that memory content and characteristics are associated with goals or motives (e.g. Johannesen & Berntsen, 2009; 2010; McAdams, 1982; McGregor et al., 2006; Singer, 1990; Singer & Salovey, 1993; Woike, 1995). The only diary study to examine this

found mixed results for the effect of goal directedness on availability over time (no effect in Study 1 and a positive effect in Study 2; Brewer, 1988).

Emotions have been argued to occur in response to goal relevant events (Oatley & Johnson-Laird, 1987; Power & Dalgleish, 2008; Scherer, 1999) and thus emotions often reflect that the event is central to goal pursuit (Conway et al., 2004). Likewise a reasonable assumption is that important events are central to goal pursuit, because appraisal of importance is a part of the response to goal relevant events (e.g. Scherer, 1999). Emotional intensity and importance have generally been associated with better memory over time (e.g. LaBar, 2007; Pillemer, 2001) in for example flashbulb memory studies (e.g. Bohannon, 1988; Conway et al., 1994; Pillemer, 1984) and diary studies (Brewer, 1988; Catal & Fitzgerald, 2004; Conway, Collins, Gathercole & Anderson, 1996; Thompson, Skowronski, Larsen & Betz, 1996; Wagenaar, 1986).

Goal relevant, emotional and important memories would be more likely to be rehearsed (e.g. Catal & Fitzgerald, 2004; Conway et al., 1996, Thompson et al, 1996). Rehearsal may work as autobiographical and narrative reasoning in relation to the life story, that is, individuals may interpret and connect their memories through rehearsal (Neisser et al, 1996; Singer & Bluck, 2001). Thus, rehearsal would serve to connect memories with each other in cause-effect relationships, leading to the formation of the links between memories that would serve as causal and thematic coherence in the life story (Bluck & Habermas, 2000; Brown & Schopflocher, 1998; Singer & Bluck, 2001). This process may be supported by reminders (Schank & Abelson, 1995). Thus, when individuals rehearse important events they may be reminded of other thematically related events, and the concurrent rehearsal of

memories may serve to connect memories to each other in cause-effect relationships. Hence rehearsal would be an important process in selecting memories for the life story. Flashbulb and diary studies have also found that rehearsal (both internal and external) is associated with better memory over time (Catal & Fitzgerald, 2004; Linton, 1978 (e.g. repeated testing effect); Thompson et al., 1996).

Second, it has been suggested that events which violate the canonical attract more narration (Bruner, 1990). This is because such events call for interpretation and explanation to a higher degree than events which are canonical (Bruner, 1990). Thus, events that are unusual and/or unplanned may be more likely to become selected for the life story, because the individual needs to explain and interpret these events; a process that may occur through rehearsal of the events. Unusualness has been found to predict better memory over time in diary studies (Brewer, 1988; Catal & Fitzgerald, 2004; Skowronski, Betz, Thompson & Shannon, 1991; Wagenaar, 1986), presumably because unusualness prevents memories from becoming a part of generic structures and thus unavailable for later recall (Linton, 1982).

Third, the life story has been suggested to be positively biased, either because it is a central part of identity and people strive to maintain a positive identity and self-understanding (Glück & Bluck, 2007; Taylor & Brown, 1988) or because the life story is affected by culturally transmitted norms, e.g. the cultural life script, that emphasize positive events (Berntsen & Rubin, 2002, 2004; Rubin & Berntsen, 2003). Also, much research suggests that autobiographical memory is positively biased (e.g. Walker, Skowronski & Thompson, 2003). Since the life story is based on autobiographical memory, this positivity bias would extend to the life story. Thus, it is possible that positive events are more likely to be selected to be part

of the life story. Studies have also found that positive emotional valence is associated with memory availability over time (Skowronski et al., 1991; Thompson et al., 1996; Wagenaar, 1986, but see Wagenaar, 1992 for a re-analysis suggesting that self-focused negative memories may be particularly well-remembered), although emotional positivity has been less consistently associated with memory availability than emotional intensity (Thompson et al., 1996).

In addition to the event characteristics and rehearsal processes mentioned above, we also examined if memories from the beginning of extended periods are more likely to be selected for inclusion into the life story. Extended autobiographical memory, e.g. life time periods (Conway & Pleydell-Pearce, 2000; Conway & Rubin, 1993), extendures (Linton, 1986), extended-event timelines (Barsalou, 1988) and mini-narratives (Robinson, 1992) may be used as chapters in the life story (Bluck & Habermas, 2000; McAdams, 2001; Thomsen, 2009). These chapters have been suggested to influence the selection of life story memories such that memories from the beginning of chapters are more likely to be included in the life story (McAdams, 1993; Thomsen & Berntsen, 2008). Studies have indeed confirmed that memories from the beginning of extended periods are more often recalled than memories from later parts of the period (Kurbat, Shevell & Rips, 1998; Pillemer, Rhinehart & White, 1986; Pillemer, Goldsmith, Panter & White, 1988; Rathbone, Moulin & Conway, 2008; Robinson, 1986; Thomsen & Berntsen, 2005; Thomsen, Pillemer & Ivcevic, 2011). This may be because such events are experienced as goal relevant, emotional, unusual, important and are often rehearsed (e.g. Pillemer et al., 1986).

Based on this reasoning, memories that are relevant to goal pursuit, emotionally intense, important, well-rehearsed, unusual and positive as well as memories from the beginning of extended periods would be more likely to be selected to become a part of the life story. Studies have shown that ratings of event characteristics may increase or decrease over time (e.g. Talerico & Rubin, 2003; Teckan, Ece, Gülgöz & Er, 2003; Wright, 1993). This variability may reflect that later events support new interpretations of the meaning of the event (Linton, 1982; Neisser et al., 1996). Following this line of thinking it has been suggested that emotion may not only affect memory at encoding but also during consolidation and retrieval (e.g. Christianson, 1992; LaBar & Cabeza, 2006) and similar claims could be made for other event characteristics such as goal relevance and importance. Presumably memories where the ensuing re-appraisals confirm the goal relevance, emotional intensity, importance, unusualness and positivity of the memory would be more likely to be selected to be a part of the life story. This is because the mechanisms selecting memories for the life story are not static, they are dynamic and geared to select and de-select memories based on their shifting meaning over time. Thus, memories that are selected for inclusion into the life story would be expected to be those memories that are perceived as highly goal relevant, emotional and important both at the time of experience and when the life story is thought about or told to others. In the present context, life story memories are thus expected to be rated higher on the event characteristics in both the diary and test session.

Elaboration, Content Consistency and Dating Accuracy of Life Story Memories

One of the factors influencing memory recall is the underlying organization that the memory is a part of (Bartlett, 1932; Schank, 1999). The life story may be an especially potent

form of organization affecting memories because of its close association with self and identity (Bluck & Habermas, 2000; Bruner, 1990; Conway et al., 2004; Fitzgerald, 1988; McAdams, 1993; 1996; Polkinghorne, 1988). Hence, motivational influences, e.g. towards stable (e.g. Schwann, 1997) and/or positive self-perceptions (Ross & Wilson, 2003; Taylor & Brown, 1988), may be more likely to affect the reconstruction of life story memories.

Being a part of the life story could affect memories in several ways. Here we focus on three dimensions: Elaboration, consistency of content and dating accuracy. Elaboration refers to the amount of information in the memory (at both the diary entry and the test session) and accuracy refers to how consistent the memory content is over time (e.g. is all the information in the first description present in the second description?). The more consistent the second memory description is with this first memory description, the more the second memory description can be thought to be an accurate reflection of the original event (Neisser & Harsch, 1992). Although life story researchers tend to focus on the reconstructive nature of the life story and rarely examine issues relating to consistency over time (but see McAdams et al., 2006; Thorne & Klohnen, 1993), accuracy and consistency of the self-concept is a concern in other areas of personality psychology (e.g. Schwann, 1997; Taylor & Brown, 1988). Thus, we suggest that consistency and accuracy of the life story may also be an important area of research. This is because the life story, as a part of self, guides action (e.g. Pillemer, 1998). If actions are not guided by a relatively consistent and accurate life story, they will lack accurate reference to earlier events, appearing out of context or in other ways inappropriate. Thus if actions towards for example a colleague are not guided by a relatively accurate extended narratives of previous encounters, then actions toward this colleague may

well disrupt the relationship and perhaps cause reduced well-being. Below, we first address how life story memories may differ from other memories on elaboration and next how they may differ from other memories on consistency of content and dating accuracy.

Regarding elaboration, life story memories could be more elaborated than control memories because the narrative process of embellishment (Schank & Abelson, 1995) would tend to enrich life story memories to a higher degree than other memories. If life story memories are more goal relevant, emotionally intense and important than other memories this would also facilitate elaboration (e.g. Christianson, 1992). In the present study, we examined elaboration by 1) counting words for both life story and control memory descriptions in both the diary and test session and 2) counting information categories for both life story and control memory descriptions in the diary.

Consistency can be reduced by at least two processes: Distortion or omission. Regarding distortion, one possibility is that life story memories would be less consistent than other memories because narrative processes generally distort experience (Bruner, 1994; Schank & Abelson, 1995). Also, self-serving biases (e.g. Ross & Buehler, 1994; Walker et al., 2003) may distort life story memories to a higher degree than other memories, because life story memories are more closely connected to the self (Pasupathi, Mansour & Brubaker, 2007). With regard to omission, life story memories may become less consistent over time through the narrative process of condensing (Schank & Abelsen, 1995). If social processes, like memory sharing, play a role in the selection of life story memories (McLean et al., 2007), such processes may also lead to both distortion and omissions. Hence, life story memories

would be expected to be less consistent over time than other memories, either because they are distorted or because they are simplified.

Some theorists have argued that narratives are extensions rather than distortions of experience (Carr, 1997; Polkinghorne, 2004). Thus, narrative processes would not necessarily distort memories. Rather, because life story memories are expected to be more goal relevant, important and emotional, this may lead to higher consistency. Studies have shown either positive or non-significant relationships between event characteristics or rehearsal and consistency (positive relationship: Er, 2003; Hornstein, Brown & Mulligan, 2003; Neisser et al., 1996 (direct vs. indirect experience); Pillemer, 1984; Schmolck et al., 2000 and non-significant relationship: Hirst et al., 2009; Kvavilashvili, Mirani, Schlagman, Foley & Kornbrot, 2009; Nachson & Zelig, 2003; Talerico & Rubin, 2003). But no studies have examined if life story memories are more or less consistent compared to other memories. We examined content consistency by comparing the memory description in the diary with the memory description in the test session for both life story and control memories. Because previous studies on event characteristics and content consistency show positive or non-significant relationships (i.e. not negative relationships) and because life story memories were expected to be rated high on event characteristics, we predicted that life story memories would be more consistent than control memories.

Another approach to examining the accuracy of memories is to look at dating accuracy (i.e. to test if participants can accurately date events in their life after some time has passed). There is general agreement that dates are rarely encoded as specific information in the memory, rather dates are reconstructed based on other knowledge, such as generic

knowledge of temporally anchored routines (e.g. “the semester starts in September”), and personal landmark events, where dates are known (e.g. “the day I received my Ph.D. degree”) (Brewer, 1988; Friedman, 2004; Thompson et al., 1996; Shum, 1998). Personal landmarks are likely to be a part of the life story and hence life story memories will have connections to these landmarks or even be landmarks themselves (Shum, 1998). Such organizational embedding could make this dating strategy more accurate for life story memories compared to other memories. Dating accuracy has also been related to the clarity and amount of memory content (Friedman, 2004; Skowronski et al., 1991; Thompson et al., 1996), presumably because a rich and clear memory content supports the reconstruction processes needed to date the memory accurately. In addition, studies show that strongly encoded and well-rehearsed memories are more accurately dated (Catal & Fitzgerald, 2004; Skowronski et al., 1991; Thompson et al., 1996). Thus, if life story memories differ from other memories on event characteristics, elaboration and consistency, this may also affect the dating reconstruction process. Following this line of thinking life story memories would be more accurately dated than other memories either because 1) they are landmarks or connected to landmarks or 2) because their elaborate content can be used to support dating reconstruction processes.

The Present Study

To recapitulate, the purposes of the present study were to examine: 1) whether event and rehearsal variables, measured both at the time of the event and at the test session influence the selection of life story memories; 2) whether life story memories differ from other memories on elaboration, consistency of content and accuracy of dating. We hypothesized that goal relevant, important, emotionally intense, rehearsed, unusual and

positive memories as well as memories from the beginning of extended periods (here the first term at university) would be more likely to be included into the life story. Regarding the second question we followed the general idea that since life story memories are expected to be goal relevant, emotional and important this would be associated with memory advantages across all three measures. Thus, we predicted that life story memories would be more elaborate, have higher content consistency and be dated more accurately than other memories.

Method

Overview of Study Design and Procedure

During their first term at university (a five month period), 61 participants completed a weekly diary, where they described, dated and rated two events (see Figure 1 for an overview of the method). We chose the first term at university because this is a delimited period of time that can be assumed to form a chapter in the participants' life story. At the same time the first term is an important and emotional period, which is associated with a number of different goals and concerns, like doing well at studying and initiating new relationships. This ensures that the period will contain at least some memories of importance to the ongoing life story. Approximately 2-3 months after the completion of the diary period participants completed an unexpected memory test session. In this session participants were first asked to tell about the segment of their life story referring to their first term at university in order to activate this part of their life story. They were then asked to recall three events from the diary period, which were important to this segment of their life story (life story memories). The participants were then presented with six randomly selected event headings from the diary period. Both life story and randomly selected events were rated for importance

to the segment of the life story. The three *least* important randomly selected events were selected for further description and rating (control memories). Next participants described, dated and rated the three life story and the three randomly selected events in counter-balanced order. Because most participants also had at least one memory among the randomly selected memories from the diary that they could not remember (forgotten memories), this allows for comparisons between life story, control and forgotten memories on event and rehearsal variables for the initial diary ratings. After the data collection was completed, the recalled memories from the test session were matched to the corresponding memories from the diary by two independent coders. The same two coders then rated memory content categories and content consistency.

Participants and Recruitment

The participants were 35 women and 26 men, with an average age of 22.10 ($SD = 4.70$). They consisted of freshmen from different study areas. Originally 89 participants were included in the diary study. Participants were lost to analyses for the following reasons: Dropped out of the study (14), excluded due to seven or more missing diary events (10), participant time constraints (3) and experimenter error (1). The 61 participants did not differ from the original 89 participants on age ($t(82) = 0.35, p > 0.10$) or gender ($\chi^2(1) = 0.01, p > 0.10$) (gender and age data on five of the original 89 participants were lost due to experimenter error). Also five participants were either unable to recall life story or control memories that could afterwards be matched with diary events and were therefore not included in the analyses comparing life story to control memories. Twelve participants did not have

any forgotten memories and were therefore not included in the analyses comparing forgotten memories with life story and control memories.

The participants were recruited from a larger group of individuals who had been accepted at the University of Aarhus and had participated in a study on personality (see Olesen, Thomsen, Schnieber & Tønnesvang, 2010; Thomsen, Tønnesvang, Schnieber & Olesen, 2011). As a part of the previous study, participants were asked if they would be interested in participating in a diary study and 811 freshmen indicated an interest. Of these 89 were selected for inclusion in the diary study. Selection criteria were based on an equal gender distribution and speed of response (because the participants had to have time to receive information on the diary study before the start of the term).

Procedure and Materials

Initial session. The participants were telephoned and invited to an individual introduction session with a student assistant. The introduction sessions took place in the three weeks preceding start at university and the study was presented as examining how students experience their first term at university. The assistant explained that the participant would be required to complete weekly electronic diaries describing and rating two events from the previous week. They were instructed to select the two events that first entered their thoughts, when they thought back upon the previous week. It was explained that the events could be both important and less important, both positive and negative, emotionally intense or more neutral. It was also explained that for some weeks it would be easy to select two events and for other weeks it might seem that there was nothing worth describing, but they should nonetheless select two events for every week in the diary period. The participants then

completed a practice version of the weekly diary and any questions from the participants were answered. The participants were informed that the assistant would be their personal contact person during the diary period and the reminder and the book gift procedure was explained (see below). Participants were ensured full confidentiality and it was explained that they could withdraw from the study at any time.

The diary. The diary period started the last week in August and ended the last week in January. Each Monday in this period, the participant was sent an email with links to two electronic questionnaires, one for each of the two events of the previous week. For each event the participant was given the following instructions: “Before you answer the questionnaire, please spend approximately 5 minutes to think back on the past week – i.e. from Monday through Sunday last week. After the five minutes please select the two specific events that come to mind first. With specific events, we mean events lasting no more than one day - the event can last anywhere from several minutes to a day. It is not a special type of events that we are interested in. It is entirely up to you what you choose - it can be important and less important, positive and negative, emotionally intense and more neutral, unusual or more typical. Some weeks it might be easy to think of two events, other weeks it may seem as if there is nothing worth reporting. Even in these weeks we will ask you to select two events, even if you may basically not think it is something worth talking about”. The questionnaire then contained two blank spaces: One for a self-selected heading for the event (used as cues in the recall of control memories) and one for description of the event. The blank space for the description of the event had no text limitations and was headed by the following instruction: “Description of event 1 (or 2): Please include where the event took place, what happened,

who was present, your actions, what you thought and felt as well as any other details that you remember". Although the instruction for selecting events was vague in order not to direct participants' recall toward special types of events, inspection of the diary content implies that participants followed the instructions. They were then asked to provide date and month for the event and finally the participants rated the event on questions 1-7 in Table 1.

If the participant had not responded to the questionnaire by Tuesday, she/he was first reminded on email by her/his personal student assistant. If the questionnaire had still not been answered Thursday, the participant was reminded by telephone by her/his personal student assistant (when participants could not be reached by telephone a second reminder email was sent out). Friday the electronic questionnaires were closed. Thus all event descriptions and ratings were completed a maximum of 12 days after the occurrence of the event. There was one exception to this procedure: During the Christmas week, the electronic questionnaires were extended for three days to ensure responses and the reminder procedure was cancelled. Each month the participants received a book gift of their own choice (approximate value \$55).

The test session. At the test the participant was given the following instruction: "In this interview, I will ask you to tell a segment of your life story, the story about events in your life from the period of late August last year to the end of January this year. Try to tell the story in approximately 15 minutes. You can include anything you like and all areas of your life. I will not ask any questions during your story, just tell the story any way you like. There is no right or wrong way to do this. You decide what to include, how to tell it and how you compose your story. For now, you will have 5 minutes to think about, how you would like to

tell about this segment of your life story. Here is a piece of paper, where you may write keywords as you think about how to tell the story. Do you have any questions?”. The interviewer then left the room for 5 minutes. After the five minutes had passed the participant was given the first sentences of the above instruction again and informed that if she/he was still in the process of telling the story after 15 minutes they would be given a sign, so that they knew they should finish their story. The student assistant then listened to the life story segment without interrupting the participant. If participants finished telling the story before 15 minutes had passed they were given up to two neutral prompts.

After completing the first part of the test session, the participant was given the following instruction: “Now I am interested in the relationship between what you just told and the events you recorded during the diary period. Please recall one event that you recorded during the diary period, which is especially important to the story you just told. Think back upon the events you recorded and spend some time considering which event is especially important to the story you just told.” The participant was then asked to note the heading of the event and to rate the event on questions 8-10 in Table 1, which were included to check that participants recalled memories that were important to their life story. This instruction was repeated twice in order to elicit three life story memories for all participants. However, some participants were unable to recall three life story memories or recalled life story memories that did not match diary descriptions. Hence the number of life story memories per participant is lower than three in the analyses.

Following the recall of three life story memories, the participant was given the following instruction: “Here is the heading of a randomly selected event from the diary period

(participants generated headings for events during the diary period). Please mark if you remember this event". The participant then answered questions 8-10 in Table 1 if they remembered the event. The instruction was repeated five more times (with different randomly selected events) in order to elicit at least three remembered control memories for all participants. However, some participants were unable to recall three control memories or recalled control memories that did not match diary descriptions. Hence the number of control memories per participant is lower than three in the analyses. The cued recall procedure yielded two types of comparison memories: Memories of events that were considered of little importance to the life story (control memories) and events that could not be remembered (forgotten memories).

After the completion of this task, the interviewer chose the three randomly selected events from the diary that were rated lowest on importance to the segment of the life story. Randomly selected events that matched the life story events were excluded.

The participants were then asked to describe, date and rate the three life story and three control memories in two electronic questionnaires. The forgotten memories were not rated in this part of the procedure because it seemed illogical to ask participants to rate something they could not remember. The order of description, dating and rating was counterbalanced so that a randomly selected half of the participants described, dated and rated the life story memories first and the control memories afterwards or vice versa.

The participants received the following instructions: "You have now received the three sheets where you noted the heading of three events that were especially important to the segment of your life story/the three sheets with headings from randomly selected events from

your diary. Please describe these events and answer the questions. It's very important that you describe the events as you remember them today – it is not your earlier description of the event that you should try to remember. The same applies to the questions you will be asked to answer for each event: Please choose the answer that you think is right today – do not try to remember what you answered when you submitted the event originally". The questionnaire then contained a blank space with no text limitations for the description of the event, which was headed by the following instruction: "Description of event 1 (or 2 or 3): Please include where the event took place, what happened, who was present, your actions, what you thought and felt as well as any other details that you remember". They were then asked to provide date and month for the event (a sentence saying: "Please give your best estimate" was added) and finally the participants rated the event on questions 1-7 in Table 1.

We assumed that by having participants tell the segment of their life story in the beginning of the test session, they would activate knowledge central to their life story for their first term, thus making it more likely that the life story memories would be important for this part of their life story. Although this segment of their life story is presumably not a complete version, it likely captures many important aspects; an assumption we tested by having participants answer two general questions. The questions were as follows: 1) "If you were asked again to tell the section of your life story, i.e. the story about your experiences in the period of your life stretching from late August last year to the end of January this year, would you tell the same things or something completely different? Or would your story be the same to some extent, but encompass some changes, additions or deletions?" Rated on a 7-point scale anchored with 1 = Be completely different, 4 = have some additions, changes and/or

deletions and 7 = be exactly the same; 2) “To what degree do you think that what you told says something about who you are?” Rated on a 7-point scale with 1 = not at all and 7 = to an extremely high degree. For the first question the mean was 5.02 ($SD = 1.27$) and for the second question the mean was 5.02 ($SD = 1.00$). Both questions thus indicate that the participants told the section of their life story in a way that would be fairly stable over time and encompass important life story memories.

Finally participants were debriefed and received a self-selected book gift (approximate value \$55).

Coding of Elaboration and Content Consistency

Life story and control memories recalled in the test session had to be matched to the corresponding events from the diary. This was necessary in order to examine if life story memories were rated higher on event characteristics in the diary and to examine elaboration and consistency (by comparing the original diary description to the description in the test session). The procedure for matching memories from the test session to events described in the diary was as follows: The fourth and the first author read through the events from the diary and selected the events that matched the memories from the test session most closely. The raters were not blind to the status of the memories, but since there were no specific hypotheses regarding match for life story and control memories, the status of the memory as such is unlikely to have influenced the matching procedure. For each participant a document was created containing the memories recalled at the test session and the matching memories from the diary. The fourth and the first author then rated each of the memories for match. A match reflected that the test session description and the diary description referred to the same

event and the same time slice of the event (contact first author for a more detailed description of the coding criteria). The rating was done independently and agreement was 91% (Cohen's kappa = 0.77). Disagreements were resolved by discussion.

Following this coding 125 life story memories were matched to a diary event (approximately 2 per participant) and 151 control memories were matched to a diary event (approximately 2.5 per participant). Only these memories are included in the following analyses and hence the number of life story and control memories differs in the analyses.

In order to code for content elaboration and consistency each diary event was coded for 1) presence of information category (only in the diary description) and 2) consistency for each information category between the diary and the test session. The information categories were: Location/scene (e.g. "the Department for Language Studies"), other people present (e.g. "my fellow students and the tutors"), activity (e.g. "greeting each other, eating and drinking together, staying out till late, getting stuck on a fence I tried to climb on my way home"), own affect (e.g. "very nervous and sweating"), other's affect (e.g. "my boyfriend laughed at me when I came home late"), antecedents and consequences (inspired by Brown & Kulik, 1977; contact first author for a more detailed description of the coding criteria). The last two categories refer to information of days/periods before the actual event (e.g., from a different event, "my mom and dad were divorced last year, and since then my brother and I have had difficulties with family celebrations") or after the actual event (e.g. "at that time it seemed important but as it turned out later, the relationship didn't last, so it wasn't really that important").

For coding of consistency we used the coding system developed by Neisser and Harsch (1992; contact first author for a more detailed description of the coding criteria). When information was the same across the two descriptions the information category was given a score of 2 (e.g. at diary mentioning boyfriend Peter and most of his friends and at test session mentioning boyfriend Peter and all his friends); when information was somewhat similar, but lacking details the information category was given a score of 1 (e.g. at diary mentioning 300 other new students and some tutors and at test session only mentioning fellow students); and when information was dissimilar or lacking in the test session description, the information category was given a score of 0 (e.g. at diary mentioning fellow students and boyfriend and at test not mentioning these people as part of the event). When the information category was not present in the diary description, it was scored as irrelevant. All memories were coded by the first author and the fourth author. The raters were not blind to the status of the memories, but the fourth author was blind to the specific hypothesis concerning consistency of life story and control memories. Interrater agreement was satisfactory (Cohen's $\kappa = 0.77$). For the analyses, averages of the two codings were used.

Results

Before testing the central hypotheses of the study it was examined if the counterbalancing, i.e. rating life story or control memories first during the test session, had any systematic effect on the results. A series of independent t-tests showed no systematic differences between the two conditions on the dependent variables used in the analyses below (3 tests of 53 were significant).

We then tested if participants followed the instructions when asked to recall life story memories in the first part of the test session. We base these analyses on questions 8-10 in Table 1. Life story memories were considered significantly more important to the section of the life story (life story memories $M = 5.13$ ($SD = 1.10$) and control memories $M = 2.88$ ($SD = 1.27$), $t(55) = 10.98$, $p < 0.05$); were significantly more often thought about while telling the section of the life story (life story memories $M = 0.83$ ($SD = 0.33$) and control memories $M = 0.20$ ($SD = 0.30$, $t(55) = 11.66$, $p < 0.05$) and were significantly more likely to be mentioned while telling the section of the life story (life story memories $M = 0.63$ ($SD = 0.41$) and control memories $M = 0.12$ ($SD = 0.25$), $t(55) = 9.21$, $p < 0.05$). These analyses indicate that participants were able to follow the instructions, when asked to recall life story memories.

Below we first examine whether life story, control and forgotten memories differ on event characteristics and whether life story memories are more likely to be from the beginning of the term. Second we report analyses examining whether life story memories score higher on elaboration, content consistency and dating accuracy. The analyses are based on averages computed within the three types of memories: Life story, control and forgotten memories. These averages control for the fact that participants recalled different numbers of each class of memories (i.e. some participants recalled fewer than three life story or control memories that could be matched to diary events and number of forgotten memories differed across participants).

Comparison of Life Story, Control and Forgotten Memories on Event Characteristics, Rehearsal and Location at Beginning of Period

We examined whether life story memories were rated higher on event and rehearsal variables than the control memories in the diary and at the test session. A series of two-way repeated ANOVAs were conducted to test this with time of recall (diary and test session) and type of memory (life story and control memory) as the two independent variables and the event and rehearsal variables as the dependent variables. There were significant main effects of memory type for goal relevance, importance, intensity, rehearsal and unusualness ($F_s(1, 55)$ from 5.63-78.09, $p_s < 0.05$). The effects for valence and planning were not significant ($F_s(1, 55) = 0.01$ and 0.61 , $p_s > 0.10$). As can be seen from Figure 2, life story memories were rated higher on goal relevance, importance, intensity, rehearsal and unusualness, but were not rated as more positive or more unplanned across the diary and test session. In addition, there was a main effect of time of recall on rehearsal ($F(1, 55) = 112.20$, $p < 0.05$), where rehearsal ratings dropped over time. The main effects for time of recall were not significant for goal relevance, importance, intensity, valence, planning and unusualness ($F_s(1, 55) = 0.02$ -2.68, $p_s > 0.10$). Interestingly, these main effects were qualified by interactions for goal relevance, importance and rehearsal ($F_s(1, 55) = 4.07$ -13.96, $p_s < 0.05$) and there was also a trend towards an interaction for intensity, valence and unusualness ($F_s(1, 55) = 2.90$ -3.68, $p_s < 0.09$). Planning showed no significant interaction ($F(1,55) = 0.27$, $p > 0.10$). Inspection of the means indicate that life story memories maintained or slightly increased their levels of goal relevance, importance, intensity, valence and unusualness over time, whereas this dropped off for the control memories. Regarding rehearsal, this dropped off over time for both life story and control memories, but more so for control memories.

In order to examine specifically which event and rehearsal variables distinguished life story and control memories *at the time of the event* (rather than across the diary and test session as examined in the analyses above), we followed up on the above analyses by conducting a series of post hoc t-tests for correlated means with life story versus control memories as the independent variable and the diary measures of the event and rehearsal variables as the dependent variables. The tests showed that life story memories were rated significantly higher on goal relevance, importance, intensity and rehearsal ($ts(55) = 3.85-6.03$, $ps < 0.05$) than control memories, but were not more positive, unplanned or unusual ($ts(55) = 0.11-1.25$, $ps > 0.10$). Similar analyses using the test session measures of the event and rehearsal variables as dependent variables showed a similar pattern except that life story memories now also scored higher on unusualness ($ts(55) = 3.16-9.56$, $ps < 0.05$), but were still not more positive or less planned ($ts(55) = 0.23$ and 0.27 , $ps > 0.10$).

Next, we compared life story and control memories to forgotten memories. Forgotten memories were those memories that were cued during the test session, but which the participants could not recall. Because these memories were not rated at the test session, they can only be compared with life story and control memories with regard to diary ratings. We compared forgotten memories with life story and then control memories for each of the variables using t-tests for correlated means (because the analyses reported above have already tested differences between life story and control memories). The means can be seen in Figure 2. Forgotten memories were rated significantly lower than life story memories on goal relevance, importance, intensity, rehearsal and unusualness ($ts(44) = 2.85-6.05$, $ps < 0.05$). There were no significant differences between forgotten and life story memories for valence

and planning ($t(44) = 1.25$ and 0.57 , $p > 0.10$). Forgotten memories were rated significantly lower than control memories on rehearsal and unusualness ($ts(47) = 2.57$ and 2.14 , $ps < 0.05$). There were no significant differences between forgotten and control memories on goal relevance, importance, intensity, valence and planning ($ts(47) = 0.04$ - 1.58 , $ps > 0.10$).

In order to examine whether life story memories were more likely to be from the beginning of the term, the percentage of each type of memories was plotted for each week of the diary period, using the dates given in the diary entry (see Figure 3). The observed distribution for life story memories differed significantly from an even distribution, ($\chi^2(21) = 43.08$, $p < .05$), whereas this was not the case for control memories ($\chi^2(21) = 28.93$, $p > 0.10$). However, the distribution of forgotten memories also differed from an even distribution ($\chi^2(21) = 31.38$, $p < 0.05$). The clearest difference between life story, control and forgotten memories is that life story memories were much more often from the first week of the term. These memories are mostly about the social events taking place as an introduction to university and meeting the other students. In addition, life story memories appear to be overrepresented around week 21. Inspection of the content of these memories suggests that exams are often involved.

To sum up, memories rated high on goal relevance, emotional intensity, importance and rehearsal were more likely to be selected for the life story. Life story memories also remained high on these variables over time. Memories that were forgotten were less unusual and less rehearsed than life story and control memories. Also, memories from the beginning of the term were more likely to become a central part of the individual's life story.

Comparison of Life Story and Control Memories on Elaboration, Content Consistency and Dating Accuracy

We then examined if life story memories were more elaborated, consistent in content over time and accurately dated than control memories. First, number of words was assessed using a common word count function. We then compared number of words for life story and control memories at both the diary entry and the test session using a two-way repeated ANOVA. There was a significant effect of type of memory ($F(1,53) = 8.40, p < 0.05$), a trend towards an effect of time of test ($F(1,53) = 3.46, p < 0.07$), but no interaction ($F(1,53) = 1.66, p > 0.10$). Inspection of the means indicate that life story memories were described with more words both at diary entry and test session and that number of words tended to drop over time for both types of memories (see Table 2).

Second, we tested if life story memories were more elaborate than control memories using presence of information categories in the diary. A t-test for correlated means showed that there were no significant differences ($t(55) = 0.13, p > 0.10$, see Table 2).

Third, we tested if life story memories were more consistent than control memories. A t-test for correlated means showed that life story memories were *less* consistent than control memories ($t(55) = 2.41, p < 0.05$, see Table 2). This was contrary to predictions and is generally at odds with research showing that highly important and emotional memories are more consistent over time (e.g. Pillemer, 1984; Schmolck et al., 2000). Note that the consistency scores generally reflect a consistency level of 1 or more for each information category suggesting that although details are lost over time, the memories are generally consistent for gist information.

Fourth, we compared dating accuracy for life story and control memories. Dating discrepancy was coded as 0 if the date given at the test session was exactly the same as the date given at the diary entry. Discrepancies were coded for number of days discrepant in either direction. A t-test for correlated means showed that life story memories were dated more accurately than control memories (see Table 2, $t(55) = 3.66$, $p < 0.05$). A closer inspection showed that life story memories had 38 of 125, i.e. 30.40% exact datings, whereas control memories had 27/151, i.e. 17.88% exact datings. The difference approached significance (McNemar $\chi^2(1, N = 108) = 0.04$, $p = 0.06$). Thus, life story memories were on average more accurately dated than control memories.

Discussion

Life story memories were more goal relevant, more emotionally intense and important and more rehearsed than control memories both at the time of diary entry and at the test session. But they were not more unusual (diary entry) or positive (both diary entry and test session). Forgotten memories scored lower on all variables, except positivity and planning when compared to life story memories, and lower on unusualness and rehearsal when compared to control memories. Life story memories were also more likely than control memories to be from the first days at university. In addition, life story memories were more elaborated than control memories when using number of words but not when using number of information categories. Life story memories were less consistent than control memories on content but were more accurately dated.

What Memories Are Selected to Become a Part of the Life Story?

The results confirm that event characteristics play a role in the selection of life story memories and that the event characteristics of primary relevance were those related to goals, i.e. goal relevance, emotional intensity, importance and rehearsal. This is in agreement with the emphasis on goals and intentionality in narrative theories (Bruner, 1990; Polkinghorne, 1988; McAdams, 1993) and the central role of goals in theories on the organization of autobiographical memory (Barsalou, 1988; Conway & Pleydell-Pearce, 2000; Robinson, 1992). In this line of thinking, narratives are structured by goals and memories of particular significance to goal pursuit receive more intense narrative processing (elaborative rehearsal) and become landmarks in the narrative organization of autobiographical memory. Life story memories maintained their high ratings on the goal related variables at the test session, whereas control memories dropped off, indicating that memories remaining high on goal relevance over time are more likely to be selected for the life story. Possibly this reflects that the content of these memories is relevant to long-lasting and highly prioritized goals and that they become self-defining (Moffitt & Singer, 1994; Sutin & Robins, 2008). This is consistent with the idea that long-term memories function as records of past goal pursuit, helping the individual retain a sense of past selves (Conway, 2005). Over time such memories may become self-defining to the degree that they become connected to similar events, serving as symbols of recurring themes in the individual's life (Singer, 1990). Although the life story memories in the present study referred to fairly recent events and thus may not yet be considered self-defining, the findings suggest that memories likely to become self-defining memories possess the characteristics suggested by Singer and colleagues, namely, goal relevance, emotion and rehearsal (e.g. Moffitt & Singer, 1994; Singer, 1990; Singer & Salovey, 1993). However, it should also be noted that the participants sometimes recalled life

story memories in the test session that they had not included in their diary (i.e. the memories that were excluded from analyses, see Method section). We do not know whether participants originally interpreted these memories as unimportant and then changed this interpretation due to later events or whether it reflects the difficulty of selecting memories that were both important to the life story and recorded in the diary.

The finding that life story memories were more often from the beginning of the period is in agreement with earlier studies finding that memories from the beginning of sequences are more available (e.g. Pillemer et al, 1986; 1988). Such memories have also been suggested to be especially salient in the narrative organization of autobiographical memory, because they help establish cause-effect relationships between related series of memories (Robinson, 1992; Thomsen et al., 2011). In the present context these memories reflected events from starting university, that are loaded with significance in relation to both achievement (“do well at university”) and affiliation (“make new friends”) goals and thus more likely to become enduring memories (Conway et al., 2004).

However, not all event characteristics distinguished between life story and control memories. First, life story memories were not more likely to be unusual or unplanned compared to control memories. Unusual or distinctive events have been argued to receive more narrative processing (Bruner, 1990) and unusualness has also been associated with memory availability over time (Brewer, 1988; Catal & Fitzgerald, 2004; Skowronski et al., 1991; Wagenaar, 1986). The combined findings from comparing life story, control and forgotten memories, suggest that unusualness may be critical in distinguishing between memories that are retained and memories that are forgotten. However, once memories are selected for long term retention by their relatively high unusualness other factors, namely goal

relevance, emotional intensity and importance, determine whether memories are selected for life story inclusion. The memories selected for long term retention, but not life story inclusion, may then follow one of two potential routes. First, they may slowly be forgotten because of their low goal relevance and lack of organizational embedding. Second they may remain available as single memories containing information in a non-generic form (Pillemer, 1998).

Surprisingly, life story memories were not more positive than control or forgotten memories. We had hypothesized that the motivation to maintain a positive identity and self-understanding would increase the selection of positive memories as more important to the life story (Glück & Bluck, 2007; Taylor & Brown, 1988). However, as Figure 2 shows the memories were on average above the midpoint on the scale indicating that there were more positive than negative memories. Thus, our participants generally had more positive memories but did not further emphasize positive memories when selecting memories for their life stories. Hence, it appears that goal relevance, emotional intensity and importance were the dominating selection mechanisms for life story memories. Because goal relevant memories may be both positive (when goals are achieved) and negative (when goals are thwarted), both positive and negative memories are important to incorporate in the life story as they contain salient information about past goal pursuit. Also it has been argued that narrating negative memories is more crucial for well-being than narrating positive memories (McLean et al., 2007). In this understanding selecting negative memories for the life story and connecting these to other life story memories through autobiographical reasoning would benefit well-being. It is still possible that the life story is positively biased. However, the mechanisms involved may be more subtle than de-selecting negative memories that contain important self-

relevant information about failed goal pursuit. These processes could include decreased emotional reliving of negative life story memories, possibly through recall at a more general level (e.g. Blagov & Singer, 2004; Rasmussen & Berntsen, 2009), biased recall of the content of the event (e.g. minor shifts of responsibility for the negative outcomes) and/or changing interpretations emphasizing positive aspects of negative events (e.g., redemption through learning lessons, McAdams, 2006).

Although the present study emphasizes event characteristics as a selection mechanism for life story memories, these findings are not at odds with theories emphasizing cultural (e.g. Berntsen & Rubin, 2002; 2004; Habermas & Bluck, 2000) and social factors (e.g. Pasupathi, 2001). Rather the current findings supplement these perspectives in several ways. Regarding theories emphasizing cultural processes, these have focused on culturally transmitted norms for important events that should be included in the life story (e.g. the cultural life script, Berntsen & Rubin, 2002). Such norms have been internalized by the individual and may not only influence the recall of memories in retrospect (e.g. Bohn, 2010; Rubin et al., 2009; Thomsen & Berntsen, 2008), but also the experience of events at the time of the experience, that is event characteristics (Berntsen & Rubin, 2004). Thus, events that are a part of such norms (e.g. starting university and starting romantic relationships) are endowed with meaning partly through the cultural life script and thus may contribute to the individuals' experience of goal relevance, emotional intensity and importance at the time of the event. Several of the life story memories in the present sample actually included events that are explicitly a part of such cultural norms (e.g. starting university). However, cultural norms have been suggested to be rough sketches of the typical (and idealized) life course helping the individual build a skeletal account of her/his life story (Habermas & Bluck, 2000; Rubin &

Berntsen, 2003). The individual life course contains many events that are not part of such cultural norms and the present findings suggest that goal relevance, emotional intensity and importance may be the critical factor in selecting such individually relevant memories for inclusion into the life story.

Regarding theories emphasizing social factors, often conceived as conversations about memories (Pasupathi, 2001), the present findings should also be viewed as supplementing rather than disagreeing with this perspective. The present findings clearly showed that rehearsal was one of the factors distinguishing life story from control memories, and such rehearsal may also include conversations with others. We did not include a separate measure of overt rehearsal, but it is likely that many of the events reported by our participants were shared with other people. Studies have shown that emotional memories are often shared with other people (see McLean et al., 2007 for an overview) and our participants may have shared their life story memories more often than their control memories. We would simply argue that strong goal relevance, emotional intensity and importance generally make memories more likely to be shared (McLean et al., 2007) and that these event characteristics often work in concert with social sharing as selection mechanisms for inclusion of memories into the life story.

Elaboration, Content Consistency and Dating Accuracy of Life Story Memories

The finding that life story memories were described in more words at both diary and test session suggests that life story memories are more elaborate than other memories. However, life story memories did not include more information categories suggesting that although they were more elaborate this did not extend to the inclusion of qualitatively other

types of information but rather more detailed information within the information categories, e.g. more detailed description of activity.

The memories were generally consistent over time for gist information. However, it should be mentioned that we scored the memories for match thereby excluding some memories from scoring of consistency. This may lead to overestimation of consistency because grossly inaccurate memories could not be matched to diary events and hence not scored for consistency. On the other hand, some of the memories that could not be matched to diary events may have been fairly accurate memories of events that really took place but were simply not recorded in the diary. This may be especially likely for the life story memories because the instruction to free recall memories that were both important to the life story and recorded in the diary may have been difficult for some participants.

Life story memories were less consistent than control memories. Although the literature on consistency is mixed, no studies have, to the best of our knowledge, found that more emotionally intense and/or important memories are *less* consistent than more neutral control memories. When differences are found, they are always in the favor of emotional and important memories (Er, 2003; Hornstein et al., 2003; Neisser et al., 1996 (direct vs. indirect experience); Pillemer, 1984; Schmolck et al., 2000). However, because previous studies have examined personal memories for important public events, that are clearly influenced by other factors than the more private personal memories investigated in the present study (e.g., media exposure, Hirst et al., 2009), this may explain why the results from previous studies were not replicated in the present study. The difference in consistency may reflect that life story memories are more prone to omission or distortion than other memories because of the

motivational influences that push the content of memories to maintain a positive and/or stable identity and self-understanding. The principle of coherence, i.e. shaping memories to confirm existing self-views to maintain a stable self-system (Conway et al., 2004) may thus influence life story memories that are highly self-relevant more than other memories that are perceived as less self-relevant. Another factor could be inherent characteristics of narrative processing that distort experience (e.g. leveling and sharpening, Schank & Abelson, 1995). Life story memories were more rehearsed than control memories and if this rehearsal focused on specific aspects of the self and narrative shaping (e.g. “why did I do that and what were the consequences?”), such rehearsal may over time decrease consistency for other details, while enhancing life story relevance. If rehearsal encompassed social sharing, this could also diminish consistency, because such sharing may focus on elaborating some aspects of the events and ignoring others; a process that would result in reduced consistency over time.

However, several notes of caution are necessary. First the lower degree of consistency in life story memories was not assessed for motivational relevance. That is, the present analyses do not distinguish between inconsistencies that are relevant or irrelevant to the self-system. Neither do we know if the inconsistencies reflect omissions or distortions and the degree to which these are due to narrative processes, e.g. levelling and sharpening. Second, the recall procedure was different for life story and control memories. Life story memories were freely recalled with no cues, whereas control memories were recalled using a cue, which may well have contained information helping the recall of control memories, thus making the content more consistent over time. Third, only one of the two raters of content consistency was blind to the hypothesis. Hence the present results cannot be strongly interpreted to support the view that life story memories are less consistent and possibly less

accurate than other memories because of motivational influences or inherent characteristics of narrative processing.

Life story memories were dated more accurately than control memories. This indicates that life story memories are either 1) characterized by content and/or 2) organizational embedding that support the reconstructive process leading to relatively accurate dating or 3) that life story memories are more often encoded with date information and thus functions as temporal landmarks in memory. Regarding the first suggestion, the content of life story memories was more elaborate (i.e. contained more words), indicating that the content of life story memories could have supported dating reconstruction to a higher degree than the content of control memories (e.g., Friedman, 2004; Skowronski et al., 1991; Thompson et al., 1996). But at the same time life story memories were less consistent over time, which may compromise this strategy. Regarding the second possibility, life story memories have been connected to many other important memories and these connections may support dating reconstruction because they place life story memories in a more fine-grained web of temporally related information. Regarding the third possibility that life story memories are more often encoded with date information, the higher number of exact dating for life story memories would seem to support this notion. In any case, the more accurate dating of life story memories would seem to support temporal coherence in the life story, ensuring that events are organized in the order of approximate occurrence. Such temporal coherence is also a prerequisite for causal coherence, i.e. it is important to know which events occurred first to establish plausible causal explanations.

Advantages and Limitations of the Present Study

The primary advantage of the present study is that it sampled a large group of students from diverse study programs, who did not know in advance that they were participating in a memory study.

However, there are also some limitations to the present study. First, the study was concerned with event characteristics as a selection mechanism. But because memories were rated between 1-12 days after the event, the event characteristics may not be accurately rated. However, this was equally the case for life story and control memories and thus may not explain the differences between the two. Although sharing of memories may be argued to have been involved in the selection of life story memories which would then be rated higher on event characteristics it is not clear why this should affect the event characteristics concerned with goal relevance and not for example positivity (since people tend to emphasize positive events for conversational uses, e.g. Rasmussen & Berntsen, 2009). Also, 1-12 days is well within the time period most other studies of the importance of event characteristics utilize (e.g. flashbulb memory studies).

Second, life story and control memories were recalled using different procedures, i.e. free versus cued recall, and free recall is generally assumed to be more difficult (e.g. Tulving, 1979). As discussed above this difference may have favored control memories regarding consistency. However, two other observations speak against this as a general explanation of the present results. First, the differences between life story and control memories at the diary entry could logically not be the result of the recall process utilized at the test session. Second, given that free recall is assumed to be more difficult, this should be reflected in poorer performance for life story memories, which is inconsistent with the

findings that life story memories were described in more words and were more accurately dated.

Third, it may be argued that the differences between life story memories and control memories at the test session may be a result of the instructions “stacking the deck” towards these differences, i.e. the differences were induced by the recall instruction and the selection of control memories as those least important to the life story. However, the findings for the diary ratings are not subject to this criticism and analyses for the test session and the diary ratings yielded very similar results. Still future studies could avoid this problem by providing participants with the memories from the diary and ask them to rate life story relevance, rather than directing their recall through instructions.

Fourth, the participants may have been selective in what they reported in their diaries. However, the participants generally disclosed highly personal information; indeed there were passionate kisses, bitter tears and heated arguments in many descriptions.

Conclusion and Perspectives

The present study showed that event characteristics, specifically goal relevance, emotional intensity, importance and rehearsal, contribute to the selection of life story memories and that life story memories are more elaborate and accurately dated than other memories.

The present study thus pinpoints mechanisms whereby personality, in the form of goals, may affect the life story. Thus, the findings support the approach taken when researchers use life story memories to study the relationship between the life story, well-being and personality. Based on this perspective, individual differences in goals, e.g. avoidance-approach, may influence the construction of the life story through the types of events selected

(Moffitt & Singer, 1994). Studies based on this perspective would further illuminate the relationship among personality, well-being and the life story.

In addition, the study supplements theories that focus on cultural and social processes in the selection of life story memories. The interaction between event characteristics, social and cultural processes in the construction of the life story is also a promising avenue for future research.

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Table 1

Event, Rehearsal and Life Story Variables Assessed at Diary and Test Session

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1. How important was the event to you? Rated on 7-point scales anchored with 1 = not at all and 7 = very important.
 2. Was the event planned or was it totally unexpected? Sometimes an event is planned, but then turn out in an unexpected way. In that case, please rate the event from 2-6, depending on how unexpected the outcome was. Rated on 7-point scales anchored with 1 = totally unexpected, 4 = planned, but with partly unexpected outcome and 7 = totally according to plan.
 3. Independent of whether events are planned or not, they may be more or less unusual, depending on how often you have experienced this type of event. How unusual was the event to you? Anchored with 1 = not unusual at all and 7 = very unusual.
 4. How much have you thought about the event, since it happened (except for thinking about it now)? Anchored with 1 = not at all and 7 = very often.
 5. Some events are very important to our long-term goals, while others are less important to our goals. Events that are important to our goals may both aid and block our goals. To what degree and in which way was the event important to your goals, when it happened? Anchored with 1 = blocked my goals to a high degree, 4 = not relevant to my goals and 7 = aided my goals to a high degree. (Recoded so that 1 and 7 indicated high goal relevance, 2 and 6 indicated medium goal relevance, 3 and 5 indicated low goal relevance and 4 indicated no

goal relevance; yielding a scale from 0-3 with increasing numbers indicating increased goal relevance).

6. How emotionally intense was the event to you? Anchored with 1 = not intense at all and 7 = very intense.

7. How would you describe the event emotionally? Anchored with 1 = extremely negative, 4 = neutral or mixed and 7 = extremely positive.

8. How important do you think this event is to the part of your life story, which you just told? Anchored with 1 = not important at all and 7 = very important.

9. Have you thought about the event, while you told the part of your life story? With response options yes (= 1) and no (= 0).

10. If yes, did you mention the event in the part of your life story? With response options yes (= 1) and no (= 0).

Table 2

*Differences Between Life Story and Control Memories on Elaboration, Content Consistency
and Dating Accuracy*

	Life story memories	Control memories
Dependent variable	<i>M (SD)</i>	<i>M (SD)</i>
Number of words (diary)	137.16 (86.82)	113.69 (79.94)
Number of words (test)	120.27 (59.43)	101.77 (57.75)
Number of information categories	4.22 (0.92)	4.21 (0.75)
Content consistency	4.91 (1.97)	5.49 (1.47)
Dating accuracy (discrepancy days)	9.51 (9.62)	18.20 (15.94)

Figure 1: Overview of method.

Figure 2: Differences between life story, control and forgotten memories at diary and test session (with standard errors). Black bars represent life story memories, grey bars represent control memories and white bars represent forgotten memories. For the life story and control memories the left bars represent diary ratings and the right bars represent test session ratings. Note that importance, intensity, rehearsal, valence, planning and unusualness vary between 1-7, whereas goal relevance varies between 0-3.

Figure 3: Percentage of life story, control and forgotten memories across the first term. Black bars represent life story memories, grey bars represent control memories and white bars represent forgotten memories.