

# Self-defining memories in older adults: Distribution across lifespan and characteristics of the reminiscence bump

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## ABSTRACT

Many studies have investigated the temporal distribution of autobiographical memories, but none has focused on Self-Defining Memories (SDMs), i.e. memories that are particularly important for personal identity, in a large non-clinical sample. No study has examined the temporal distribution of Self-Defining Memories (SDMs), i.e. memories that are particularly important for personal identity, in a large non-clinical sample of older adults. Moreover, we examined for the first time the characteristics of SDMs located in RB. Two hundred and eighty elderly adults aged from 65 to 90 years old reported three SDMs. Participants were non-institutionalized retirees screened for global cognitive function. Participants were asked to recall three SDMs. They also completed the Mini-Mental State Examination. The period from 0 to 9 years corresponds to a very limited recall of SDMs. A RB appears between for the 10–24 years period. Recalled memories are enhanced after the age of 50. The temporal distribution of recalled SDMs differed according to thematic content and emotion. The percentage of positive SDMs was the highest in RB compared with other life periods. Specificity, meaning-making, tension, redemption and contamination did not differ for bump SDMs versus non-bump SDMs. In addition, differences between men and women were observed. Our results confirm the existence of the classical temporal distribution of autobiographical memories for SDMs. Recalling positive bump SDMs might improve well-being in older adults.

## 1. Introduction

Many studies focused on the temporal distribution of autobiographical memories across the life span and observed three components (Rubin, 1986). The first is childhood amnesia, i.e. limited recollection of personal events from early childhood (Pillemer & White, 1989; Rubin, 2000). The second is recency effect, i.e. tendency to recall events occurring in the last years (Rubin & Wenzel, 1996). Lastly, the Reminiscence Bump (RB) corresponds to a large number of autobiographical memories from the period ~10–30 years of age. This is a robust phenomenon which is observed in normal subjects over 40 (Fitzgerald & Lawrence, 1984; Rubin & Schulkind, 1997; Rubin, Rahhal & Poon, 1998), in centenarians (Fromholt et al., 2003), in patients with schizophrenia (Cuervo-Lombard et al., 2007; Raffard et al., 2009, 2010) and in patients with Alzheimer's disease (Fromholt & Larsen, 1992). Munawar and colleagues (Munawar, Kuhn & Haque, 2018) analyzed 68 articles focusing on the RB published between 1988 and 2017 and showed that the overall location of the bump varies depending on the method used to

induce memories. When the experimenters ask participants to retrieve their most important memories, the bump is located between 10 and 30 years old. When they used the cue-word method, the bump starts earlier, at age 5 to until age 30. Finally, for studies using narrative methods, the location of the bump lies between 6 and 39 years. No differences were observed in the RB with respect to either participant age or education level [e.g. 14]. Finally, the retrieval curve of autobiographical memories seems universal. Conway, Wang, Hanyu & Haque (2005) found no intercultural difference between the shape of the distribution for word-cued autobiographical memories.

The RB is linked to the maturation of the self (Fitzgerald, 1996). It would result from a preferential encoding of experiences related to two crucial phases of self-development (periods of adolescence and young adulthood) (Holmes & Conway, 1999). It reflects the period of identity and intimate relationship formation. Recollections about these periods are specific and highly accessible to memory because they are associated with the ongoing goals developed by the self (Conway & Holmes, 2004). Several hypotheses attempt to explain the RB (Wolf & Zimprich, 2020):

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the frequency of repetition and the semantic representation of these memories (Cermak, 1984), the event richness of this period of life (Robinson, 1992) with in particular a large number of first experiences (first intimate relationships, first trips, marriage, birth of the first child, first professional position, and World War II for subjects aged 70–79 years old), a particular "optimum" encoding (because of the novelty and the particular stability of these first memories (Rubin et al., 1998)) or a deep encoding (the first experiences requiring the most efforts to be encoded, (Conway & Rubin, 1993)) or specific recovery mechanism since this period of life provides particularly effective recovery cues or benchmarks. Thus, culturally shared life scripts may structure the retrieval processes of autobiographical memories (Berntsen & Rubin, 2002).

Concerning the emotional valence of memories, for people over 40, the happiest memories are situated in the RB between 20 and 30 years (Conway, 2005; Rubin & Berntsen, 2003; Rubin & Schulkind, 1997; Rubin et al., 1998; Thomsen & Berntsen, 2008; Wolf & Zimprich, 2020). A clear bump was observed for the positive most important memories but not for negative or neutral ones (Coleman, Janssen & Belli, 2023; Dasoki, Morselli & Spini, 2016; Erdoğan, Baran, Avlar, Taş & Tekcan, 2008; Rubin & Berntsen, 2003; Zaragoza Scherman, Salgado, Shao & Berntsen, 2015). Indeed, cultural life scripts contain higher proportions of positive life events and may thus favor the retrieval of emotionally positive autobiographical memories (Berntsen & Rubin, 2002).

Regarding gender differences, Janssen, Chessa & Murre (2005) reported the RB with a peak at ages 15–18 for men and 13–14 for women using cue-words methods. Elnick, Margrett, Fitzgerald & Labouvie-Vief (1999) highlighted a gender effect for characteristics of bump memories.

As assumed by Munawar and colleagues (Munawar et al., 2018), the exploration of SDMs, i.e. recollections of highly significant memories that are vivid, emotionally intense, repetitively recalled, and focused on central goals, enduring concerns or unresolved conflicts (Singer & Salovey, 1993) is an important approach for understanding the association between identity and the RB. Only three studies investigated the self-relevance of autobiographical events in the RB using SDMs (Raffard et al., 2009, 2010; Rochat et al., 2021). Raffard et al. (2009, 2010) observed that patients with schizophrenia showed a RB at ages 15–19, whereas the distribution of SDMs peaks for control subjects at ages 20–24. Moreover, (Rochat et al., 2021) observed a peak of recalled SDMs between 15 and 19 years old with no difference between patients with severe traumatic brain injury and matched controls.

In the present study, we sought to replicate previous findings of SDMs' temporal distribution and extend them by examining for the first time, the characteristics of SDMs (emotional valence, thematic content, specificity, meaning-making, tension, redemption and contamination) in a large non-clinical sample of older adults. As prior research suggests that an explanation of the RB is the grounding of an individual's self; and that this part of the retrieval curve is involved in identity formation and highly self-relevant experiences, we hypothesized that SDMs' temporal distribution was similar to those observed for general autobiographical memories. As suggested by Liao, Bluck & Glück (2021) as a fruitful line of future research, we examined characteristics of bump memories, as they could be related to positive aging. Regarding emotional valence, we also expected a RB, as reported previously for positive events. Finally, gender differences were analyzed.

## 2. Method

### 2.1. Participants

Two hundred and eighty older adults (64.6% female) aged from 65 to 90 years old ( $M = 74.2$ ;  $SD = 7.4$ ) were recruited through announcements at community organizations, such as the local senior centers, clubs and associations. Participants were non-institutionalized retirees and managed their own household. They averaged 11.6 years of education ( $SD = 3.4$ ) and were screened for global cognitive function using the

Mini-Mental State Examination (M.M.S.E.) (Folstein, Folstein & McHugh, 1975). Their MMSE score ( $M = 28.1$ ;  $SD = 1.9$ ) showed normal cognitive functioning. Participants with a history of substance abuse (according to DSM-5 criteria), psychiatric or neurological disorders were not included in the study. All participants were native French speakers with corrected or normal vision. Written informed consent was obtained. Our sample included 181 participants already recruited in a previous study (Fritsch, Voltzenlogel, & Cuervo-Lombard, 2024). This research was conducted in accordance with the Helsinki Declaration and was approved by the local ethics committee (IRB 00011835-2019-03-19-143).

### 2.2. Measures

Participants were asked to write down three SDMs according to the standard SDMs instructions developed by Singer and colleagues (Blagov & Singer, 2004; Singer & Moffitt, 1991). The task was presented through an oral definition of an SDM event and its specific attributes. First, the temporal distance between the event and present time should be at least 1 year. Second, an SDM should be important for the subject and vividly represented. Third, it should be related to an event that helps oneself and others to explain who one is as an individual with its own characteristics. Fourth, the event should be related to an important and enduring theme, issue, conflict, or concern from one's life and linked to other events sharing the same theme. Fifth, it could be either a positive or a negative event; the only important aspect is that it generates strong feelings. Finally, it should be an event that participants have thought of many times. While listening to this description, participants had a sheet of paper in front of them summing up the main points. Thereafter, participants had to rate their emotions associated with each SDM at the time of recall on two 7-point Likert scales (from 0 = not at all to 6 = extremely intense), one for positive emotions and the other for negative emotions. Finally, they had to estimate the delay between the event and the present time, in order to obtain a measure of the time frame (months between the described event and the retrieval day) for each SDM.

### 2.3. Scoring

Around 20% of the 840 SDMs were scored by 2 raters. Interrater reliability was estimated using Cohen's kappa (Cohen, 1960). In the few cases where the two ratings differed, the final rating was discussed and agreed by the two raters. Agreement between the raters was good for content ( $\kappa = 0.88$ ), integrative meaning ( $\kappa = 0.86$ ), contamination ( $\kappa = 0.84$ ) and redemption ( $\kappa = 0.88$ ). It was very good for specificity ( $\kappa = 0.98$ ) and tension ( $\kappa = 0.96$ ).

#### - Emotional valence

The emotional valence (i.e., positive, neutral, or negative) of each event at the time of retrieval was obtained by calculating the numeral difference between the scores on the two 7-point Likert emotion scales (one for positive emotions and the other for negative emotions).

#### - Content of SDMs

The content of an SDM was assessed using the classification proposed by Thorne and McLean (Thorne, McLean & Lawrence, 2004). Seven categories were distinguished: life-threatening events, recreation, relationships, achievement/mastery, guilt/shame, drug/alcohol abuse, and an "event not classifiable". Recreation or exploration events refer to narratives describing recreational activities such as leisure activities, hobbies, travel, sport, festivities, etc. Relationship events focus on interpersonal events (relations with peers, love, wedding, divorce, interpersonal conflict, etc.). Achievement events include references to one's own or others' effortful attempts at mastery or accomplishment regardless of the outcome (success or failure). Guilt or shame events are

events that involve a moral choice or one's doing right or wrong. Drug, alcohol or tobacco events include events that refer to the use of drugs, alcohol or tobacco for recreational or other purposes. Finally, NCE are narratives that do not fit into the six categories above or that involve more than one category.

#### - Specificity

A memory was coded as specific (1) if it described an event that happened at a particular place and time and lasted less than a day. Non-specific SDMs (0) included categoric (summaries or similar repeated events) and extended (an event that lasts longer than a day) memories.

#### - Integration or meaning-making

As described by Singer & Blagov (2000), narrative integrative meanings of SDMs were coded in light of the assessment of what the event taught the participant about himself or herself, someone else, or life in general. An event was considered to be integrated (1) if the individual stepped back from the event narration and added a statement about the significance or meaning of the event for him or her. In contrast, if the narrative event contained only the event description (without a meaning), it was considered as non-integrative (0).

#### - Tension

SDMs were also coded for the presence (1) or absence (0) of tension (Thorne et al., 2004). Tension was defined as an explicit reference to discomfort, disagreement, or unease during the narration of the event.

#### - Redemption and contamination

Contamination and redemption sequences were defined following the Foley Center for the Study of Lives' manual (Foley Center for the Study of Lives 1998; Foley Center for the Study of Lives 1999) and (McAdams, Reynolds, Lewis, Patten & Bowman, 2001). They were coded as present (score = 1) or absent (score = 0). A redemptive event had to contain an explicit and clear transformation in the story from a really negative-affect state to a really positive-affect one. On the contrary, a contaminative event had to contain an explicit transformation in the memory narrative from a demonstrably positive affective state to a demonstrably negative affective state.

## 2.4. Statistical analysis

Analyses were performed using SPSS®. To examine temporal distributions of SDMs, recalled events were defined as the statistical unit. We used 5-year intervals following Cuervo-Lombard et al. (2007). Nevertheless, we set a cut-off at the median value of age distribution of the sample. Thus, the SDMs' temporal distribution was illustrated from birth to 69 years of age, comprising 767 SDMs (of a total of 840 SDMs collected). Furthermore, comparisons were made between SDMs from within the bump period versus all other SDMs, since our purpose was to examine whether the characteristics of "bump memories" differed from all other memories, i.e. SDMs from outside the bump period. Chi-square tests were used to compare frequencies for nominal variables.

## 3. Results

### 3.1. Distribution of SDMs across lifespan

Using 5-year intervals, the temporal distribution of the 767 recalled SDMs generated by our sample is presented in Fig. 1. Based on Fig. 1, we defined the RB to fall between the ages from 10 to 24 years, because the corresponding three age intervals showed the largest percentages. We observed a more marked peak for the 20–24-year period. The average age of participants is 17.2 years (SD = 4.3) at the time of the RB' events. Moreover, the 0–9-year period illustrated a limited recollection of SDMs and the recalled memories are enhanced after the age of 50.

Moreover, considering the emotional valence of the 767 SDMs recollected, 70.0% are positive, 23.2% negative and 6.8% neutral. The temporal distribution of SDMs according to positive and negative valence is presented in Fig. 2. The RB peaked in the 10 to 29 years of age for positive SDMs and in the 5 to 19-year period for negative SDMs.

The temporal distribution of the recollected SDMs was different regarding thematic contents (Fig. 3). There was a significant difference for life threatening events ( $\chi^2(13) = 24.48, p = .027$ ) and achievement ( $\chi^2(13) = 27.02, p = .012$ ).

### 3.2. Characteristics of SDMs in the RB (10–24-year period) vs all other life periods (non-bump memories)

#### - Thematic contents of SDMs

Comparison between thematic content of SDMs from the bump and non-bump period were presented in Table 1. SDMs illustrating life-

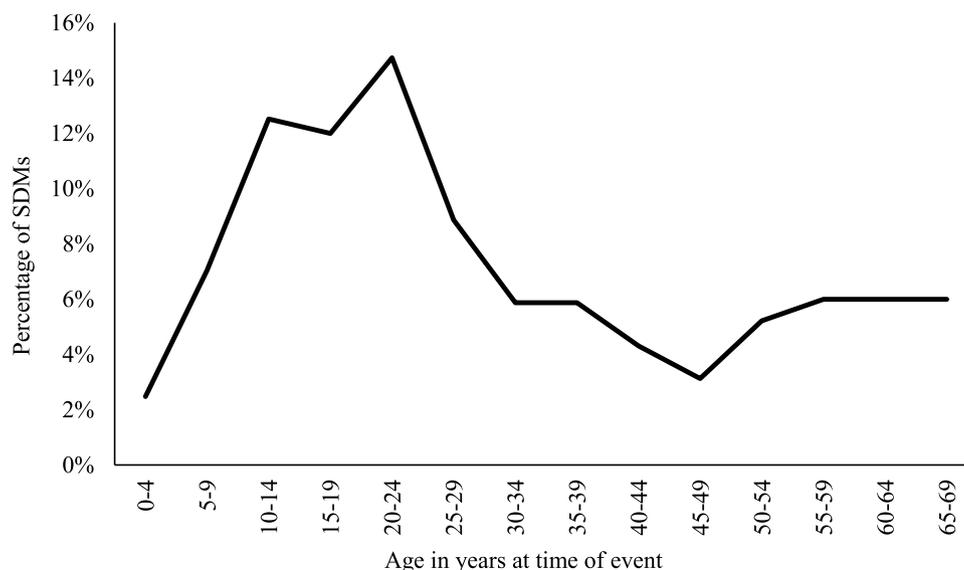


Fig. 1. Temporal distribution of Self Defining Memories (SDMs,  $n = 767$ ).

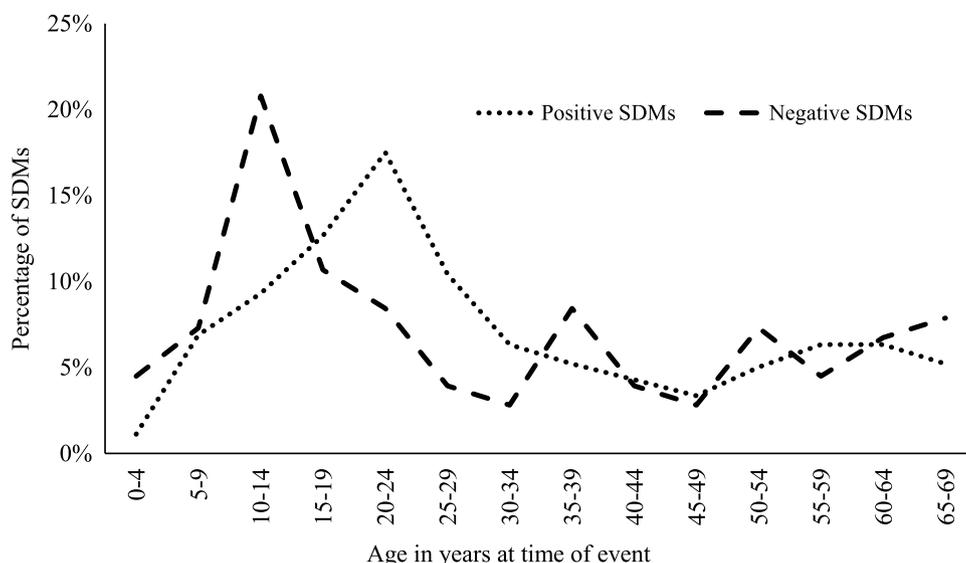


Fig. 2. Temporal distribution of positive (n = 537) and negative Self Defining Memories (SDMs, n = 178).

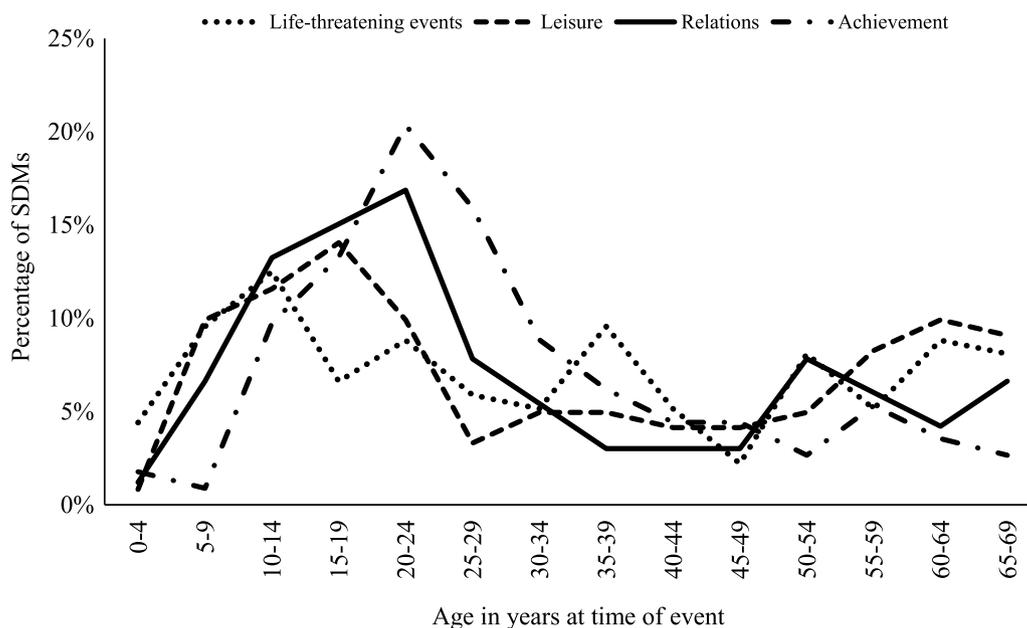


Fig. 3. Temporal distribution of Self Defining Memories (SDMs) according to thematic content.

threatening events were present at different periods of life but were the lowest in the bump period (12.6% of the memories in the 10–24-year period contained this thematic vs 21.0% in other periods,  $\chi^2(1) = 8.86, p = 0.003$ ). Other contents did not differ among periods of life ( $ps > 0.05$ ).

- *Specificity, meaning making, tension, redemption and contamination*

We found no significant differences for these dimensions for bump SDMs versus non-bump SDMs (see Table 1).

- *Emotional valence*

The percentage of positive, negative and neutral SDMs was equivalent in the 10–24-year period compared to the non-bump period (see Table 1).

3.3. Gender differences

The temporal distributions of SDMs for older adults men and women are presented in Fig. 4. Concerning women, the RB was in the 10–24-year period, whereas for the distribution for men, the bump was at the 20–24-year period. There was a significant difference between men and women concerning the number of SDMs referring to the 15–19-year period (8.4% of the total SDMs for men and 14.0% for women;  $\chi^2(1) = 5.36, p = .021$ ) and the 35–39-year period (men: 8.4%, women: 4.5%;  $\chi^2(1) = 4.84, p = .028$ ). Regarding the other periods, no difference achieved statistical difference (all  $ps > 0.05$ ).

Considering the emotional valence, men recalled 74.2% of positive SDMs, whereas women recalled only 67.7% of positive SDMs ( $\chi^2(1) = 3.55, p = .06$ ). The gender difference observed for negative SDMs failed to reach significance (men = 19.3%, women = 25.4%;  $\chi^2(1) = 3.72, p = .054$ ). Percentage of neutral SDMs did not differ between men (6.6%) and women (6.9%;  $\chi^2(1) = 0.04, p = .85$ ). The temporal distributions for

**Table 1**  
Comparison of the characteristics of Self Defining Memories in the bump (10–24-year period) vs all other life periods (non-bump memories).

	Bump (n = 300)	Non-bump (n = 466)	$\chi^2$	p
Thematic content%				
Life-threatening events	12.6	21.0	8.74	.003
Leisure events	14.3	16.5	0.66	.42
Relationships events	25.0	19.5	3.22	.07
Achievement events	16.0	13.9	0.61	.43
Guilt or shame events	2.0	2.6	0.26	.61
Drug, Alcohol or tobacco use events	0.3	0.6	0.34	.56
Non-classifiable events	29.7	25.8	1.41	.24
Specificity%	50.3	45.5	1.72	.19
Meaning making%	30.3	26.6	1.25	.26
Tension%	17.7	16.3	0.24	.62
Redemption%	5.3	8.4	2.52	.11
Contamination%	6.0	5.2	0.25	.61
Emotional valence%				
SDMs with positive affect	70.3	69.7	0.03	.86
SDMs with neutral affect	6.0	7.3	0.49	.49
SDMs with negative affect	23.7	23.0	0.05	.82

\* p < .05.

positive and negative SDMs according to gender are also illustrated in Fig. 4. We observed a similar bump for positive SDMs in the 20–24-year period (18.6% and 16.8% of the SDMs of men and women belonged to that period) and a bump of negative SDMs in the 10–14-year period (18.9% for men vs 21.6% for women). Across lifespan, the only significant difference was observed for the 40–44-year period, with women reporting more negative SDMs than men (3.9% vs 0% respectively;  $\chi^2(1) = 6.55, p = .011$ ). No significant difference was observed for other life periods for the percentage of positive and negative SDMs between women and men ( $ps > 0.05$ ).

Considering thematic contents, across lifespan, women recalled more SDMs with relations content than men (24.1% vs 17.0%;  $\chi^2(1) = 5.68, p = .017$ ) and less achievement memories (12.2% vs 17.3%;  $\chi^2(1) = 4.10, p = .043$ ). In the RB period (10–24 year), there was no difference in the thematic contents of memories regarding gender. However, women recollected more leisure SDMs than men (19.1% vs 3.6%;  $\chi^2(1) = 3.85, p = .050$ ) and fewer achievement SDMs (7.4% vs 21.4%;  $\chi^2(1) = 3.87, p = .049$ ) in the 10–14-year period. Women also recalled a higher percentage of life-threatening SDMs in the 20–24-year period (15.9% vs 2.3%;  $\chi^2(1) = 5.29, p = .021$ ). Finally, relationship SDMs did not significantly differ between women and men in the 15–19-year period (30.4% vs 17.4% respectively) and in the 20–24-year period (31.8% vs 20.3% respectively).

Concerning specificity, meaning making and redemption/

contamination, no significant difference was observed between men and women across lifespan. However, women recollected more SDMs containing tension than men (21.1% vs 9.1%;  $\chi^2(1) = 18.30, p < .001$ ). Considering the RB (10–24-year period), no difference was observed between men and women for specificity, meaning-making, redemption/contamination and tension. Nevertheless, women recalled more SDMs containing tension than men for the 10–14-year period (28.1% vs 10.9% respectively;  $\chi^2(1) = 6.27, p = .012$ ) and 20–24-year period (22.2% vs 12.3% respectively;  $\chi^2(1) = 5.27, p = .022$ ).

#### 4. Discussion

We examined the temporal distribution of SDMs collected in a large non-clinical sample of older adults and highlighted the three classical phenomena (childhood amnesia, recency effect and RB). Firstly, the period from 0 to 9 years corresponds to a very limited recall of SDMs. As this life period is not crucial for self-construction, it is not surprising that participants recalled only a few events from this period. Moreover, childhood amnesia could be linked to the complex developmental mechanisms that allow the emergence, both progressive and late, of autobiographical memory (Perret, 2011): the acquisition of language, the production of narratives, the representation of self, understanding the concept of time and the theory of mind. Secondly, recalled memories are enhanced after the age of 50. Retention function is indeed a robust phenomenon because that is found regardless of the age of participants (Rubin & Schulkind, 1997). Thirdly, SDMs peak between ages 10 and 24 with a more marked bump for the 20–24-year period. This result is coherent with Conway (Conway, 2005), who suggested that many memories from the RB period are memories of “self-defining” experiences. Thus, our data provide further support to the theoretical assumption that the phenomenon of the RB is due to the development of Self. Furthermore, our results are in accordance with those of Raffard and colleagues (Raffard et al., 2009, 2010) who observed a bump for SDMs in the same period for their non-clinical group. However, Rochat et al. (2021) highlighted an earlier peak in their healthy participants, but their sample was small (N = 16) and heterogeneous in age (19–72 years).

Considering emotional valence, we observed a positivity effect classically reported in older adults (e.g. Reed & Carstensen, 2012). Positive experiences are frequently rehearsed to strengthen the self (Wolf, Pociunaite, Hoehne & Zimprich, 2021) and related to advantageous psychosocial outcomes such as life satisfaction in older adults (Nusser, Zimprich & Wolf, 2022). Rochat et al. (2021) also showed that retrieval of SDMs is more often associated with positive than negative affect. Furthermore, we highlighted that RB peaked in the 10–29 years period for positive SDMs and in the 5–19-year period for negative SDMs. Thus, both positive and negative SDMs are crucial to the formation of

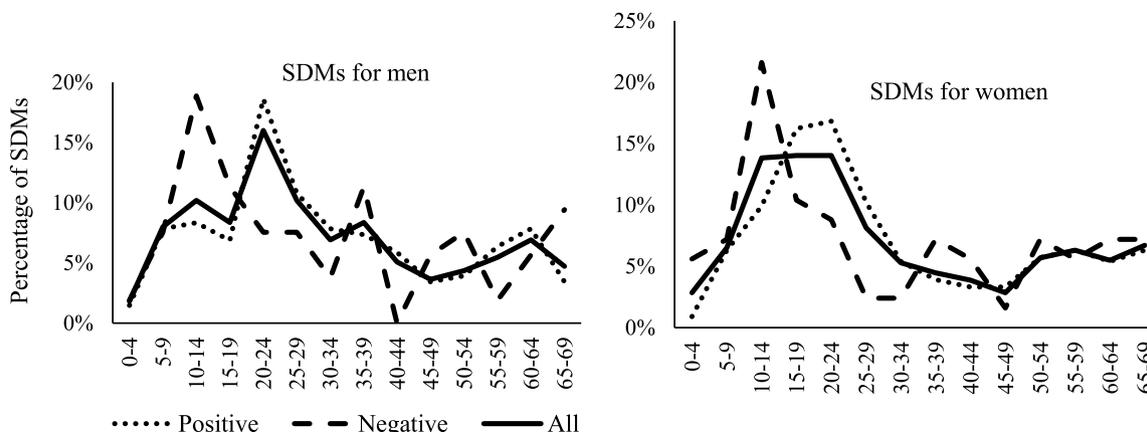


Fig. 4. Temporal distribution of positive, negative and all Self Defining Memories for men (n = 275) and women (n = 492).

the individual's identity, as within his personal life trajectory, an individual had to integrate positive as well as negative events. Curci, Battista, Lanciano, d'Ovidio & Conway (2024) also observed that the RB emerged for both positive and negative important memories. However, in their study, the shape of the distributions for the negative events appear rather smoother than for the positive memories, as a consequence of the high predominance of negative recollections upon positive events. These authors suggested that the Self is nourished by positive and negative experiences taken from the individual's private context of life as well as from the social and historical context in which the person lives. Previous studies (Cuervo-Lombard et al., 2007; Holmes & Conway, 1999) demonstrated that the RB comprises two components: an early component (approximately 10–20-year period) that concerns memories relating to social identity formation, and a later component (approximately 20–30-year period) that concerns memories relating to the last stage of personal identity development. The latter component corresponds to a period during which individuals' goals and desires interact with significant others and form close personal relationships, which plays a crucial role in the final formation of a coherent and stable self. We suggested that the negative events might be more related to public events experienced during adolescence, whereas positive memories were more linked with personal relationships in young adulthood. Our results seemed to be inconsistent with previous studies (Berntsen & Rubin, 2002; Collins, Pillemer, Ivcevic & Gooze, 2007; Leist, Ferring & Filipp, 2010) supporting the cultural script theory of autobiographical memories. These authors found that the RB is more prominent in response to requests for important and/or emotionally positive events, but tends to be absent in response to a request for memories of negative events. Zaragoza Scherman et al. (2015) showed that memories of the positive life events primarily came from adolescence and early adulthood, forming a RB, whereas the memories of the negative life events came from the entire life span, with an increase in frequency later in life. To their part, Erdoğan et al. (2008) reported a very small bump for the negative events, but located in the second decade of life.

We also examined the temporal distribution of memories as a function of contents. "Relationship" and "Achievement" are the most frequent thematic content reported in the RB period, which is consistent with the establishment of life plans (meeting wife/husband, getting married, birth of children, professional choices...) Thus, a majority of SDMs reflect participants' adopting normative adult social roles such as spouse, parent, and worker. "Relationship" and "Achievement" are also the most frequent themes reported by young participants (Lardi, D'Argembeau, Chanal, Ghisletta & Van der Linden, 2010) and older adults (Singer, Rexhaj & Baddeley, 2007). This result is not surprising inasmuch as forming or maintaining close personal relationships plays a crucial role in the formation of a coherent and stable self. Moreover, Elnick et al. (1999) found that significantly more memories concerning family/relationships events were generated than events depicting other content domains such as work/school, residence, social activities, or health and that a bump was seen only for family /relationships events.

Considering comparison between characteristics of SDMs from within the bump period vs SDMs from outside the bump period, we highlighted only one significant difference. The thematic "life threatening event" was less present in the bump period than in the non-bump period. SDMs from these two periods did not differ in emotional valence. This result is in accordance with that of Koppel and Berntsen (2016), but differs from that of Wolf and Zimprich (2020) who found that the RB is associated with more positive memories compared to life periods before and after the RB. Specificity, meaning-making, tension, redemption and contamination did not differ for bump SDMs versus non-bump SDMs, as SDMs are selective records of the most important events of our lives. Moreover, studies examining important or freely recalled memories reported no difference in the characteristics of memories from within versus outside the bump period (Conway & Holmes, 2004; Thomsen & Berntsen, 2008). Thus, measures of characteristics associated with individual memories (vividness or emotionality for example) typically

show a uniform distribution across life (Rubin & Schulkind, 1997). However, Koppel and Berntsen (2016) reported differences between bump and non-bump memories for two variables not measured in our study (conversation, i.e. how much you have talked about this event since it took place, and thinking, i.e. how much you have thought about this event since it took).

Concerning gender differences, the RB was in the 10–24-year period for women, whereas it was in the 20–24-year period for men. The earlier age of the bump in women may be attributed to earlier hormonal changes in adolescence (Janssen et al., 2005). Moreover, (McLean, Breen & Fournier, 2010) suggested that men had a different trajectory in narrative identity construal. Considering emotional valence of SDMs, the bump for positive SDMs and the bump for negative SDMs did not differ according to gender. However, women tend to recall less positive SDMs and more negative ones than men. They also recollected significantly more SDMs containing tension than men. To their part, (Staugaard & Berntsen, 2021) highlighted that women did not remember negative events more frequently than men do. Considering thematic contents, across lifespan, women recalled more SDMs with relations content than men and less achievement memories. This result is consistent with gender effects in career and family orientation described by Parker and Aldwin (1994). Thus, women are thought to express concerns with family and relationship issues more often than men, while men are thought to be more interested in work or career development. However, in the RB period, we observed no difference in the thematic contents of memories regarding gender. Our results were consistent with those of Elnick et al. (1999) who found that women reported more events from the family/relationships domain across the lifespan, without significant difference for the bump period. These authors suggested that events involving intimate relationships were equally important to men and to women in establishing their adult identities during the bump period. Finally, in accordance with previous studies, we found no gender differences for specificity (El Haj & Allain, 2020) and meaning-making (El Haj & Allain, 2020; McLean & Pratt, 2006; Pasupathi & Mansour, 2006).

## 5. Limitations

Although this study has been conducted on a large sample, several limitations need to be acknowledged. Firstly, our sample might not be representative of the French population for some demographic data such as sex ratio or sociocultural level and consequently our results could not be extrapolated to the entire population. Secondly, that the methodology used was based on retrospective self-reports of memories without collateral reports to corroborate the self-defining memories. Finally, we collected only three SDMs by participant to take into account age-related increase of fatigability. However, even if Singer and colleagues (Singer et al., 2007) and (Masumoto, Sato, Harada, Yamamoto & Shiozaki, 2022) asked their participants to retrieve five SDM, previous studies on older people or pathological condition collected between one (Falzarano, Minahan & Siedlecki, 2019) and three SDM (Castellon, Sudres & Voltzenlogel, 2020; Cuervo-Lombard, Raucher-Chéné, der Linden & Voltzenlogel, 2021).

## 6. Conclusion

Our results confirm the existence of the classical temporal distribution of autobiographical memories for SDMs and are consistent with the identity-formation theory. Moreover, the temporal distribution of SDMs differed only according to thematic content and emotional valence. We observed a RB for both positive and negative SDMs showing that positive as well as negative life experiences contributed to shaping the Self. Finally, differences between men and women were also highlighted.

Future work could extend our results by including older adults suffering from anxiety or depression or from neurocognitive disorders. Further research could focus on the potential adaptive value of recalling

positive events from the bump period to improve well-being in older adults with or without normal aging.

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## CRediT authorship contribution statement

**Christine-Vanessa Cuervo-Lombard:** Writing – original draft, Supervision, Project administration, Methodology, Investigation, Conceptualization. **Alain Fritsch:** Writing – review & editing, Visualization, Methodology, Investigation, Formal analysis. **Virginie Voltzenlogel:** Writing – original draft, Supervision, Project administration, Methodology, Investigation, Conceptualization.

## Declaration of competing interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

## Data availability

Data will be made available on request.

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