

A content analysis of involuntary autobiographical memories: Examining the positivity effect
in old age

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ABSTRACT

Although research on autobiographical memory is growing steadily very little is known about involuntary autobiographical memories that are spontaneously recalled in everyday life. In addition, very few studies have examined the actual content of autobiographical memories and how the content might change as a function of age. The present study carried out a content analysis of involuntary autobiographical memories recorded by young (N = 11) and old (N = 10) volunteers over a period of one week. A total of 224 memories were classified into 17 categories according to the type of content recalled (e.g., births, holidays, school). The results support the socioemotional theory of ageing (Carstensen, Isaacowitz & Charles, 1999) by showing that although young and old adults recalled a similar number of memories with a typically positive content (e.g., holidays, special occasions), older adults recalled very few memories with a typically negative content (e.g., accidents, stressful events). Moreover, even when such negative memories were recalled they were rated by older adults as neutral or even positive. This, so called, *positivity effect in old age* could not be entirely explained by participants' ratings of mood at the time of recall. Theoretical and practical implications of these findings for ageing and autobiographical memory research are discussed.

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Autobiographical memory is defined as memory for personally experienced past events, and is thought to be crucial in constructing and maintaining one's sense of self and identity (Brewer, 1986; Conway, 1990; Conway & Pleydell-Pierce, 2000; Robinson & Swanson, 1990; Rubin, 1986). Research on autobiographical memory has focused on theoretical issues such as the structure and organisation of autobiographical memory (Conway & Pleydell-Pierce, 2000; Conway & Rubin, 1993; Rubin, Wetzler, & Nebes, 1986), the nature of retrieval (reproductive vs. reconstructive) or particular characteristics of memories (e.g., specific vs. general) (Barsalou, 1988; Conway & Bekerian, 1987; Linton, 1986). Most of this research has studied memories that are deliberately or voluntarily retrieved in response to specific cues provided by the experimenter (e.g., Bekerian & Dritschel, 1992; Cohen & Faulkner, 1988; Conway & Bekerian, 1987; Haque & Conway, 2001). However, autobiographical memories can often come to mind spontaneously and without any conscious or deliberate attempt to retrieve them (see e.g., Conway, 1997; Conway & Pleydell-Pearce, 2000; Linton, 1986; Mandler, 1986; 1994; Winograd, 1993). Despite their prevalence in everyday life, these involuntary autobiographical memories have received relatively little attention until recently (e.g. see Berntsen, 1996; 1998; 2001; Kvavilashvili & Mandler, 2004).

Another neglected area in autobiographical memory research is the content of autobiographical memories i.e., what exactly it is that people remember. Surprisingly, most of the studies that have addressed this question have been conducted as part of the research in social and personality psychology. These studies have shown that certain personality characteristics can influence what is recalled by a person. For example, individuals who score high on the personality motive of communion (referring to concerns of intimacy and

relationships) will recall memories about experiences of love, friendship or rejection, whereas individuals scoring high on the motive of agency (referring to concerns of individual achievement and power) will recall agentic experiences such as accomplishing a goal or losing face (Woike, Gershkovich, Piorkowski, & Polo, 1999; see also Conway & Pleydell-Pearce, 2000).

However, these content analyses of autobiographical memories have been conducted by using a set of predefined categories such as agentic versus communal motives, and consequently all the memories have been classified as representing either one or the other (see McAdams, 1982; Woike et al., 1999). Content analyses that aim to categorise autobiographical memories according to the actual content of the remembered event (i.e., what it is that people remember) have been infrequently reported. Robinson (1976), for example, examined the content of young people's memories retrieved to cue-words (e.g., letter, sing, happy) and found three common categories of experience: accidents/injuries, romantic episodes, and first-time experiences. However, the instances of these categories only made up 27% of the total number of the reported memories, the remaining 73% of memories were apparently too diverse to be classified.

A few more recent content analyses have been more successful in this respect as they were able to classify the majority of autobiographical memories recalled by participants in response to specific cue words or instructions (e.g., Cohen & Faulkner, 1988; Conway & Haque, 1999; Fitzgerald, 1988; Holmes & Conway, 1999). It is also encouraging that many of the categories that emerged from these content analyses were quite similar across the studies and referred to intimate relationships, births, deaths, leisure activities and illnesses or accidents. In all of these studies, however, the content analyses were limited in scope and provided very little detail on how the analyses was carried out.

An even smaller number of studies have addressed possible age differences in the content of autobiographical memory. Cohen and Faulkner (1988), for example, examined memories supplied by three age groups (young, middle aged and older adults) and were able to classify 80% of memories into eight categories. Interestingly, age effects were observed whereby older people recalled more memories concerning war, illness and holidays, middle aged people recalled more memories referring to family and trivia, and the young group recalled more memories of education, love and sex (see also Holmes & Conway, 1999). However, little information was provided on how the content analyses were conducted. Moreover, two different instructions were used to elicit autobiographical memories (six most vivid memories and then one from each decade of life) and it is unclear whether both sets of memories were analysed separately or together.

Clearly, there is a lack of in depth analyses of the content of autobiographical memories. The examination of the content of autobiographical memories is, however, important as it may provide interesting insights into the nature and functions of autobiographical memory. For instance, Cohen (1996) has suggested that the function of autobiographical memory may change with age from mainly interpersonal (e.g., to aid social interaction) to more intrapersonal (e.g., to preserve one's self-concept and aid well-being). The idea that autobiographical memory in old age may serve to regulate and maintain a positive self-concept is also in line with the so called socioemotional selectivity theory of ageing which suggests that as time is perceived to be limited in old age social goals become more focused on emotional satisfaction and positive meaning (see Carstensen, et al., 1999). Therefore, it is possible that as people get older they would be more likely to remember positive events from their life (e.g., successes, celebrations, holidays) than negative events (e.g., failures, funerals, accidents).

There is some initial evidence for this so called positivity effect in old age from a couple of longitudinal studies showing that people's evaluations of their past become more positive as they become older (Field, 1981; Kennedy, Mather, & Carstensen, 2004; Levine & Bluck, 1997). For example, in a study conducted by Field (1981) only 35% of participants reported having a 'generally happy childhood' at age 30. However, when they were re-tested 40 years later the majority (85%) rated their childhood as 'generally happy'.

However, it is unclear whether this positive shift in evaluation of past events is also accompanied by enhanced tendency to recall typically positive events in old age. Cross-sectional studies that have directly compared young and old participants' ratings of the emotional valence of their autobiographical memories have so far produced mixed results. Some studies have found that older adults rate their memories overall as more positive or pleasant than younger adults (e.g., Rubin & Schulkind, 1997) whereas others have reported no age effects (e.g., Anderson, Cohen & Taylor, 2000; Conway & Haque, 1999). Since these studies relied on participants' own ratings of emotional valence and did not examine the actual content of the memories they were not able to analyse the degree of correspondence between the type of content and self-rated emotional valence. In addition, the methods used to sample autobiographical memory differ between many of these studies (e.g., the traditional cue-word technique or recall of most vivid memories). Most importantly, none of these studies have examined the content and valence of involuntary autobiographical memories. However, as Berntsen (1998) has pointed out "...no evidence ensures that the content of the frequently studied voluntary memories is equivalent to the content of involuntary memories. To the extent that differences exist, extrapolating findings from voluntary memories to account for (involuntary) memories...will lead to invalid conclusions" (p. 114).

In the present study we conducted a content analysis of involuntary autobiographical memories that were spontaneously experienced by participants in their everyday life. During

the study young and old participants kept a record of their involuntary autobiographical memories for a period of one week. The diary was pre-structured and required a description of the memory content and ratings of the emotional valence of the memory as well as the mood at the time of memory occurrence. The major aim of our study was to analyse the content of involuntary autobiographical memories in order to identify (a) categories of involuntary memories that are predominantly remembered by young and old adults' in the course of their everyday lives, and (b) whether there are any age differences regarding these content categories.

Since the study was largely exploratory we did not have any specific expectations about which particular categories would emerge from the content analysis. However, it was expected that at least some of these content categories could be identified as typically positive (e.g., holidays) or typically negative (e.g., accidents) in nature. Three alternative (though not necessarily mutually exclusive) hypotheses were formulated in relation to the positivity effect in old age. First, if the function of autobiographical memory is to preserve a positive self-concept in old age then it is likely that older adults' involuntary memories will be more frequently classified into typically positive content categories and less frequently classified into typically negative content categories (Hypothesis 1a). A weaker version of this hypothesis is that the positive self-concept can still be maintained if old people recall significantly fewer negative memories but do not differ from young in the frequency of recalling typically positive memories (Hypothesis 1b). The third possibility is that the positivity effect is primarily about the evaluation of the emotional valence of memories. Thus, irrespective of the frequency of memories falling into positive and negative content categories in both age groups, it is possible the evaluations of negative memories are becoming less negative with time (e.g., Levine & Bluck, 1997) and therefore older adults will rate typically negative contents (e.g., deaths and accidents) as less negative compared to

young adults (Hypothesis 2). Similarly, older people may rate typically positive memories as more positive than young adults.

If the positivity effect in old age, as specified in these three hypotheses, does exist then it is also important to explore its underlying mechanisms. One possible explanation is that this effect is due to mood-congruency (Bower, 1981; Eich, 1995). In other words, older adults may experience more positive memories simply because their mood is generally more positive. Although there is very little research on emotional well-being in old age some recent findings indicate that, in comparison to young adults, old people report more positive and less negative affect (e.g., Mroczek & Kolarz, 1998; see also Carstensen, Paupathi, Mayr & Nesselrode, 2000). The *mood-congruency hypothesis* would suggest a strong and positive relation between current mood and emotional valence of memories, especially in the old sample.

METHOD

Participants. Participants were 21 volunteers. Eleven participants were young (eight females and three males) with the mean age of 23.55 years (range 20 - 28 years). Ten participants were old (four female and six men) with the mean age of 74.2 years (range 64 - 80 years). All older participants and one young participant were recruited from an existing subject pool of volunteers. The remaining young participants were recruited from the psychology undergraduates and by word of mouth (i.e., friends of participants, etc).

All participants' first language was English. Older adults were healthy and community residing. They did not report any vision, hearing or physical mobility problems, or any of the following: serious head injury, stroke, mental health and/or memory problems that had been diagnosed by the doctor. Furthermore, all older participants had previously taken part in a study conducted by Kvavilashvili, Kornbrot, Mash, Cockburn and Milne (2004). In that study, all participants scored above the cut off point of 24 on the Mini Mental

State Examination ($M = 27.8$). Additionally, they obtained significantly higher scores than the young group on the vocabulary sub-test (i.e., Spot-the-Word Test) of the Speed and Capacity of Language Processing Test (SCOLP; Baddeley, Emslie, & Nimmo-Smith, 1993).

Materials/Procedure. The materials used were adapted from Berntsen's (1996) diary study. During an initial meeting with a researcher (the first author), participants were provided with a diary in the form of a notebook, which contained 20 questionnaires, one to be completed for each involuntary memory experienced. Twenty questionnaires were provided because, in an earlier pilot study, none of the participants who were supplied with 50 questionnaires recorded more than 20 memories in a one-week period. At this initial session, participants received detailed verbal and written instructions of how to complete the diary. Involuntary autobiographical memories were described as memories from the past that come to mind spontaneously, without any deliberate attempt to retrieve them (i.e., past memories that simply 'pop' into one's mind). It was explained that involuntary memories may vary in detail, some may be specific and refer to a single episode/event (e.g., the day you moved into a new house; when a member of your family was born), others may refer to more general events that occurred repeatedly over an extended period (e.g., travelling on the tube every morning when working in the City; going to the seaside every summer during childhood). Also it was explained that involuntary memories can be many years old or only a few days old.

The questionnaire required participants to record a description of the memory content in their own words, ratings of their mood at the time of memory occurrence and ratings of the emotional valence of the memory (both on a five point rating scale ranging from 1 = very negative, 3=neutral to 5 = very positive). Several other variables were also recorded by participants (e.g., presence of triggers, ongoing activities, specificity of memory, etc.). However, these were collected as part of another study and will not be reported here.

Participants carried the dairies with them at all convenient times for a period of seven days and completed a questionnaire immediately, or as soon as possible, after the occurrence of an autobiographical memory. If participants were unable to complete the questionnaire or felt the content was too personal a space was provided for them to record this in the form of a tick. There were no restrictions on how many memories were recorded each day.

CONTENT ANALYSIS

A total of 231 involuntary autobiographical memories were recorded by participants throughout the one-week period. The young group recorded 128 (Mean = 11.45, SD = 3.69, range = 4-17) and the old group recorded 103 memories (Mean = 10.30, SD = 6.68, range = 2-19). The recorded memory descriptions differed considerably in length and narrative style. The mean number of words per memory description for the young age group, $M = 15.78$ ($SD = 5.46$), was somewhat lower than for the old age group, $M = 20.14$ ($SD = 11.15$), but these means were statistically not different ($t(19) = -1.16, p = .26$).

A thematic content analysis (Smith, 2000) was conducted in three main stages by two independent coders (the first and the third author). Initially, the coders read through all the records to ensure that the content of the memory description was 'autobiographical'. Next, the coders read through the memory descriptions in order to develop a list of content categories that represented the major themes of the memory descriptions recorded by participants. In the final stage, the coders went through all memory descriptions again and assigned them into the most relevant content categories that emerged from the previous coding procedure. The inter-coder reliability was calculated at this final stage only.

Stage 1: Seven memories were clearly not autobiographical and were discarded by the coders. These memories were examples of either remembering future intentions (i.e., prospective memory), the tip-of-the-tongue phenomenon, or daydreams/current thoughts

(e.g., “*I was thinking that she (my dog) will be nipping out on a walk about this time with my dad*”).

Stage 2: At this stage, the coders first read through the records independently and assigned a label to each memory description summarising its main topic or theme. These labels were then grouped into a number of superordinate categories representing major themes. The number of such categories independently generated by the coders was 23 and 22 for coder 1 and 2, respectively, with the majority of category labels (17 pairs) similar or identical across the coders (see Appendix 1).

In order to produce a final list of categories, the coders then discussed those categories where they had come up with different labels. It was decided to accept the categories ‘Places’ and ‘Objects’ but to drop three categories (‘Unacceptable behaviour’, ‘First time experiences’ and ‘Learning experiences’) as they contained very few memories that could be easily placed into other categories. It was also decided to use ‘School’ as a separate category and to combine ‘University’ and ‘Work’ because the age when one may work or attend university may overlap as well as the level of individual responsibility is more comparable.

The number of thematic categories retained at this point was 23. However, some categories were similar in content and appeared to be subcategories of a super-ordinate content category. Consequently, the categories ‘Sports/exercise activities’ and ‘Leisure/hobbies’ were combined into ‘Leisure/sports activities (including games/hobbies)’; ‘Birthdays/parties’ and ‘Weddings/engagements’ were pooled together as ‘Special occasions’. Additionally, ‘Persons’ and ‘Pets’ were combined as often pets are considered family members and as such both categories are similar in that the rememberer is recalling an event which primarily concerns another living individual with whom he/she had or is still having a relationship. ‘Accidents’ and ‘Illness/injuries’ were pooled together as both

categories refer to physical stress. ‘Objects’ and ‘Places’ were also pooled together as both depict visual images without any additional contextual detail. As a result, the overall number of thematic categories was reduced to 17 and the final list can be seen in Table 1. Examples of memory descriptions categorized into each of these 17 categories are presented in Appendix 2.

Stage 3: The coders independently read through the memory descriptions again and assigned each memory to only one of the 17 content categories. This was decided on the basis of how well a category accounted for the major topic or theme in the memory description. The percentage of agreement was calculated as a measure of inter-coder reliability. For the young group the overall percentage of agreement was 80% (ranging between 52% and 100% for individual categories) and for the old group it was 86% (ranging between 67% and 100% for individual categories).

There were altogether 66 (29%) memory descriptions where the two coders disagreed as to which content category was most appropriate. The majority of discrepancies arose when memory descriptions were complex and contained two or more themes and, as a result, could be classified into two or more categories. To overcome this each memory was classified so that to some extent the category label captured all the important aspects. For example, the record *“I recalled getting into trouble at break time, cheating in tests, disgusting memories of lunch room food!”* is a memory concerning three different activities but was classed into the super-ordinate category of ‘School’. Alternatively, there were a few cases when the memory description was particularly long and the memory was categorised according to the first theme and ignoring the others. For example the record *‘I recalled my grandchildren being born, will be 34 and 21 in four days. Remembering births reminded me of the family tree. Triggering my memories of being in Spain and flashes through my life – school, school friends, family, Air force, managers...’* this memory begins by a general recollection of

births, however, the memory develops into recollections of other people throughout the rememberer's life. In such cases the first theme (e.g., births) was used to code the memory. Using these strategies all discrepancies between coders were successfully resolved and all memories were classified into only one category.

RESULTS

The results will be presented in three parts. First, the findings from the overall content analysis will be described and examined for both age groups. This will be followed by the analyses assessing the positivity effect in old age (hypotheses 1a, 1b, and 2). The final section will address the mood congruency hypothesis by examining the relationship between the ratings of mood and emotional valence of memories in young and old participants, respectively.

Content analysis

Table 1 shows the frequencies and percentages of involuntary autobiographical memories classified into the 17 content categories described above. The modal category for both age groups was 'Persons'. This category included memories that were primarily about other people. In other words, they depicted experiences of other people as observed by the rememberer without his or her active involvement in the event. Examples of 'Persons' memories can be seen in Appendix 2. The second and third most frequently observed categories for the young group were 'Accidents/illness' (13%) and 'Stressful events' (12%). However, these categories were very infrequently observed in the older group (1% and 2% respectively) whose second most frequently observed category was 'Leisure/sports activities' (12%). The third most frequent category in the old group was that of 'Objects/places' (10%). Memories falling into this category did not feature the rememberer or any other person; they were simply about an object (e.g. '*first pair of high heeled shoes*') or a place (e.g. '*a beach in Sri Lanka*' or '*my office in Baker St.*'). Finally, there were three categories that did not

include any memories from one of the age groups. Thus, ‘Conversations’ was reported only in the young group whereas ‘War/Army’ and ‘Travelling/journeys’ were only reported in the old group.

INSERT TABLE 1

To statistically evaluate these observed differences in the frequencies of specific content categories between the two age groups we applied a loglinear analysis to Table 1 and tested several models. Because the category ‘War/army’ had obviously no relevance for young participants it was not included in this analysis. The model of independence stating that the relative frequencies of the 16 content categories were the same for young and old participants was rejected $LR(15) = 52.02, p < .001$. A subsequent residual analysis to identify those categories that were not adequately fitted by the independence model revealed four large (i.e. > 2) adjusted residuals for the categories ‘Accidents/illness’, ‘Stressful events’, ‘Conversations’ and ‘Travelling/journeys’. The corresponding four group by category interaction parameters were added to the independence model resulting in a model of partial independence which fitted the data well $LR(11) = 11.12, p = .43$ with no adjusted residual being greater than ± 1.75 (Agresti, 1990). This model thus confirmed that the only differences in the percentages of the content categories between young and old participants involved memories to do with ‘Accidents/illness’, ‘Stressful events’, ‘Conversations’ and ‘Travelling/journeys’.

Positivity Effect in old age

Hypotheses 1a and 1b were examined, first, by assessing any age effects in the frequency of memories classified into typically positive and negative content categories and, second, by analyzing participants’ own ratings of emotional valence of their memories.

Finally, Hypothesis 2 was examined to see if older adults evaluate typically negative and positive content categories differently from young people.

Out of 17 categories that emerged from the content analysis, at least 4 could be regarded as being typically positive in nature such as 'Holidays', 'Going out', 'Romantic involvement' and 'Special occasions'. However, the log linear analysis did not result in any age effects for these categories (see above). On the other hand, out of 17 categories at least three are typically negative in nature such as 'Deaths/funerals', 'Accidents/illness' and 'Stressful events'. Although there was no age effect in recalling memories about 'Deaths/funerals' there were marked differences between age groups in recalling 'Accidents/illness' and 'Stressful events'. While 25% of memories recorded by the young group fell into these two categories, only 3% of memories recorded by the older group were classified as such.

These observations were further supported by an additional log-linear analysis in which we examined effects of age on the frequency of reporting typically positive memories (pooled across the categories 'Holidays', 'Going out', 'Romantic involvement' and 'Special occasions'), typically negative memories (pooled across the categories 'Accidents/illness', 'Stressful events' and 'Deaths/funerals') and all other memories (pooled across the remaining categories excluding 'War/Army'). The model of independence was rejected $LR(2) = 16.73$, $p < .001$, and the best fitting model $LR(1) = .85$, $p = .36$ confirmed that age differences in the percentages of recalled memories existed for typically negative content categories (29% vs. 8% for young and old group, respectively) and all other content categories (50% - young vs. 70% - old), but not for typically positive content categories (21% - young vs. 22% - old).

Overall, the results of the content analysis seem to provide support for Hypothesis 1b: while there are no age effects in people's tendency to record memories of a positive nature, older adults are less likely to record memories of a negative nature such as

‘Accidents/Illnesses’ and ‘Stressful events’. These findings were further supported by the analyses of participants’ own ratings of emotional valence. Each recorded memory was rated by participants for emotional valence on a five-point scale (ranging from 1 = very negative to 5 = very positive). The percentage of memories falling into each of these five categories as a function of age is presented in Table 2.

INSERT TABLE 2

To statistically evaluate possible age effects in the of ratings of emotional valence we applied a loglinear analysis to the data presented in Table 2. The model of independence stating that the relative frequencies of the five valence categories were the same for young and older participants was rejected $LR(4) = 43.02, p < .001$. A subsequent residual analysis to identify those categories that were not adequately fitted by the independence model revealed two large (i.e., > 2) adjusted residuals for the categories ‘Very negative’ and ‘Neutral’. The corresponding two interaction parameters were added to the independence model resulting in a model of partial independence which fitted the data well $LR(2) = 3.01, p = .22$. This model thus confirmed a positivity effect which is due to older adults’ rating their memories overall as significantly less negative and more neutral than the young group. Although the analysis revealed a significant difference in the percentages of ‘Very negative’ memories there was a similar trend in the percentages of ‘Negative’ memories (only 3% in the older group compared to 10% in the young group).

In order to evaluate Hypothesis 2, we first examined participants’ ratings of emotional valence for typically negative content categories as a function of age. In the young group, 36 memories fell into the negative content categories of ‘Accidents/illness’, ‘Stressful events’ and ‘Deaths/funerals’ The mean ratings of their emotional valence was low ($M=1.89, SD =$

1.28) indicating negative valence. In the old group, there were 7 memories in these categories and the mean rating was quite high ($M=3.80$, $SD = .84$) indicating positive valence. The difference between these means was significant *Mann-Whitney test* ($U = 24.00$, $p < .001$, one-sided (effect size Cohen's $d = 1.68$). Thus, while young people rated their memories of typically negative contents as negative, older people tended to rate these as neutral (e.g., “*I had a hernia operation, sever with gauze, 1982, returned to work, being careful, eight days after*”) or even positive (e.g., “*My mothers funeral 29 years ago today at Garston Crematorium in the morning...*”).

Next, we examined participants' ratings of emotional valence for typically positive content categories as a function of age. In the young group, 27 memories fell into the positive content categories of ‘Holidays’, ‘Going out’, ‘Romantic involvement’ and ‘Special Occasions’. The mean emotional rating of these memories was very high ($M=4.15$, $SD = 1.09$) indicating positive valence. In the old group, there were 20 memories and their mean rating was also high ($M= 3.94$, $SD = .94$). The difference between these means was not significant *M-W* ($U = 236.50$, $p = .17$, one-tailed (effect size Cohen's $d = 0.27$). Thus, older people did not rate memories with typically positive contents as more positive than young people.

Finally, the emotional valence ratings were examined for each age group as a function of memory content category (positive vs. negative). In the young group, the memories of typically positive categories were rated significantly higher ($M = 4.15$, $SD = 1.09$) than those in typically negative categories ($M = 1.89$, $SD = .94$) *Wilcoxon* ($Z = 114.00$, $p < .001$, two-tailed; Cohen's $d = 1.53$. In the old group, however, the ratings of memories in typically positive and typically negative categories were both high ($M = 3.94$ and $M = 3.80$, respectively) and not statistically different *Wilcoxon* ($Z = 48.50$, $p = .80$, two-tailed).

Mood-congruency hypothesis

Like emotional valence, mood was also rated on a five-point scale (1 = very negative to 5 = very positive). In order to evaluate the mood-congruency hypothesis we examined the relationship between participants' ratings of emotional valence of memories and their mood immediately before these memories occurred. The Pearson's correlation was positive and significant for both the young $r(125) = .43, p < .001$, and older groups $r(87) = .27, p = .006$, (both tests one-tailed). Thus, the relation between mood and emotional valence was moderate in the young group and weak in the older group. However, the difference between the strength of the correlation between mood and emotional valence for the young and old groups' was not significant $z = 1.31, p = .20$.

DISCUSSION

To our knowledge the present study is the first that attempted to systematically analyse the content of involuntary autobiographical memories and to examine whether there are any age differences in what is remembered. The coding procedure adopted in the study (i.e., focusing on the major themes of the memory content) was successful as indicated by high inter-rater reliability between the raters. Moreover, all involuntary autobiographical memories could be grouped into a relatively small number of categories ($N = 17$).

Several novel findings were obtained in the study. Some of these concern the types of categories that emerged from the content analysis notably the prevalence of memories primarily involving the experiences of other people and the absence of 'Conversations' in the old sample. However, the most important findings refer to the *positivity effect in old age*. The results showed that both age groups reported similar frequencies of memories that were typically positive in nature, but older adults reported remarkably few memories that were typically negative such as 'Accidents/illness' and 'Stressful events'. This finding is in line with hypothesis 1b. Interestingly, we found no evidence in support of hypothesis 1a as the

frequencies of involuntary autobiographical memories with a typically positive content (e.g., holidays) was not different between the young and old age groups. We therefore tentatively conclude that in order to maintain a positive self-concept in old age it may be more crucial to have a reduced number of negative autobiographical memories involuntarily entering the mind rather than an enhanced number of positive autobiographical memories.

Furthermore, while the evaluations of memories with a typically positive content did not differ between the two age groups, older adults rated memories with a typically negative content significantly less negative than younger adults. Previous research has shown that retrospective evaluations of negative emotions become less intense over time (Walker, Vogl & Thompson, 1997), and that this effect is particularly strong in older adults (e.g., Levine and Bluck, 1997; see also Kennedy et al., 2004). However, our findings are remarkable in that old people did not rate the valence of typically negative memories as merely less negative but instead tended to shift the affective valence of these memories into the neutral or even positive range (*cf.* Field, 1981). As a result, in the old group, the mean valence ratings of memories with a typically negative content did not differ from the similar ratings made for memories with a positive content.

These results are in line with the socioemotional theory of aging developed by Carstensen and her colleagues (Carstensen et al., 1999; Carstensen, Fung, & Charles, 2003). According to this theory time is perceived as limited with the approach of old age (or terminal illness in case of young adults) and people's goals shift from expanding their knowledge to finding emotional meaning and satisfaction in life. This shift in values and goals affects old people's emotional and psychological well-being as well as plethora of other perceptual and cognitive processes. For example, several studies have shown that while negative affect decreases with age (Carstensen et al., 2000; Gross, Carstensen, Pasupathi, Tsai, Goettestam-Skorpen, & Hsu, 1997;) positive affect and life satisfaction either remain

constant (Carstensen et al., 2000; Diener & Suh, 1998) or even increase across the life span (Agren, 1998; Lawton, Kleban, & Dean, 1993; Mroczek, 2001). In addition, Carstensen and her colleagues suggest that older people show a general preference for positive information and exhibit the positivity effect by rating memories of past events more positively than young people (Kennedy et al., 2004), by remembering disproportionately more positive than negative visual images (Charles, Mather & Carstensen, 2003) and by forgetting negative features of past choices faster than young people (Mather & Carstensen, 2003).

However, the results of the present study could suggest that the so-called positivity effect in old age is primarily concerned with how people process and retrieve negative information (at least in the case of involuntary autobiographical memories). Thus, older people did not recall a higher proportion of positive memories nor did they rate these memories as more positive than young people. Instead, they recalled remarkably few negative memories and, when recalled, rated these as mainly neutral or even positive. Therefore, rather than talking about a positivity effect in old age it is perhaps more pertinent to refer to this pattern of findings as absence of a negativity effect in old age (see Mather, 2004 for a similar suggestion). This reduction of negative memories (without an increase in positive memories) is likely to support a positive emotional self-concept in old age. Thus, recalling very few negative memories would help ensure life is viewed as having been positive and well lived, which according to Erikson (1982/1997) is vital for one's well-being in later life.

The marked absence of involuntary negative memories in old age could be due to several reasons. One possibility that was addressed in this paper was mood-congruency. It was hypothesized that participants current mood could largely determine the emotional valence of recorded memories. However, the correlations between the ratings of mood and emotional valence of memories were only medium to small in young and older participants,

respectively, which indicates that the mood-congruency hypothesis can not fully account for the positivity effect in old age (for similar conclusions see Charles et al., 2003; Kennedy et al., 2004).

Another possible variable that may affect the emotional valence of autobiographical memories is the valence of cues that trigger these memories. Kvavilashvili and Schlagman (2003) used positive, negative and neutral cue words to elicit both involuntary and voluntary memories in the laboratory. They found that there was a strong relationship between the emotional valence of cues which elicited the memories and the participants' ratings of emotional valence of these memories. Thus, positive, negative and neutral cue words tended to elicit positive, negative and neutral memories, respectively. This raises an interesting possibility of studying the joint effects of current mood and the affective valence of cue words on the elicitation of autobiographical memories in young and old participants.

An alternative and perhaps the most intriguing explanation of the positivity effect in old age is repression. For example, it has been shown that young individuals with a repressive coping style actively attempt to avoid experiencing negative affect and have trouble recalling negative memories (e.g., Holtgraves & Hall, 1995; Myers & Brewin, 1994; Newman & Hedberg, 1999). In young populations, the prevalence of repressive individuals is quite low, between 10 to 20% (Myers, 2000). However, in a recent study conducted by Erskine, Kvavilashvili and Kornbrot (2004), the percentage of repressive individuals was four times higher in the old (36%) than in the young sample (9%). Indirect support for the idea that older people are more likely to have a repressive coping style comes from studies showing that, at encoding stage, older adults process negative information differently from young people. For example, they display an automatic tendency to avoid negative faces (Mather & Carstensen, 2003), and this attentional bias is also evident in their brain activity. In a recent fMRI study conducted by Mather et al. (2001, cited in Mather 2004), older adults had greater

amygdala activity while seeing positive pictures whereas young participants displayed equal levels of activation for both positive and negative pictures.

This preliminary evidence could suggest that older adults use repression as a defense mechanism to avoid negative autobiographical memories involuntarily entering consciousness and threatening their subjective well-being. However, given the lack of research on repressive coping style in old age the above idea should be treated cautiously. It is obvious that more research needs to be conducted in the future to examine the possible role of repression in recalling negative involuntary autobiographical memories in old age.

Having discussed the main findings in relation to the positivity effect in old age and its possible underlying mechanisms it is also necessary to briefly examine some additional findings that emerged from the study. These findings deserve attention because they raise important issues concerning the nature and definition of autobiographical memory. Current definitions invariably assume that the crucial feature of autobiographical memory is the involvement of the self as the protagonist or central actor in the memory. For example, according to Fivush (1988) 'autobiographical memory is not simply memories of previously experienced events; it is memory of the self engaging in these activities' (p.277). However, at least two categories identified in the content analysis seem to deviate from this definition.

First, the most frequently observed content category for young and older adults concerned 'Persons'. These were memories primarily about the experiences of other people (e.g., a family, friend, colleague, stranger) in which the rememberer was apparently a passive observer rather than a central actor. Current definitions of autobiographical memory do not exclude other people from one's autobiographical memories. If anything, the majority of autobiographical memories do include interactions of self with other people (Hyman & Faries, 1992). However, the 'Person' memories recorded in our study were different in that they did not seem to involve such interactions, often the rememberer was not even a recipient

of another person's action let alone an actor himself/herself (e.g., '*my children making a snowman*', '*a young girl at Cliff College taking an early morning service looking entranced whilst singing the hymn...*' or '*the ex colleague had to resign after punching an important customer in the face...*'). The emergence of a 'Persons' category in the content analysis was unexpected as it was explicitly explained to all participants that involuntary autobiographical memories are memories of "your own personal past". However, it appears that both old and young adults did consider them to be part of their own past and recorded them into their diaries.

Second, the category 'Objects/places' did not feature the rememberer or any other person and given the very short descriptions of these memories, it is obvious that they were recalled as brief visual images without any additional contextual details (e.g., '*a beach in Sri Lanka*', '*my office in Baker Street*' or '*first pair of high heeled shoes*'). Can one regard these fragments of the past also as autobiographical memories? Kvavilashvili and Mandler (2004) conducted several diary studies and did distinguish involuntary autobiographical memories from involuntary semantic memories. The latter were defined as involuntary occurrence of brief contents of one's factual knowledge of the world and autobiographical facts (Conway, 1987) such as remembering a previous schoolteacher's name or an image of an old office building without any personal/contextual detail. On the other hand, Salaman (1970) in a study of her own involuntary memories considered these fragments of past events as autobiographical: '*...I sometimes caught an aspect of a street, the hour of the day, a colour, a face: unmistakable fragments of (my) Russian memories.*' (p.15). It appears that the participants in the present study also considered these fragments of information to be autobiographical. However, as the study of involuntary memory is in its infancy it may be necessary to differentiate involuntary semantic and autobiographical memories in the future research (cf. Kvavilashvili & Mandler, 2004).

Yet another category from the content analysis that raises definitional issues is ‘Conversations’. Are memories of past conversations autobiographical memories? Larsen (1992), for example, would distinguish them from autobiographical memories by calling them narrative memories. The latter involve recalling non-personal information (such as news, conversations, jokes, etc.) without any additional contextual detail (e.g., when and where this information was obtained). Thus, according to Larsen (1992) merely recalling the contents of a past conversation without any personal details would not be much different from recalling lists of words in a laboratory experiment. Given that performance on laboratory memory tasks deteriorates with age it is perhaps unsurprising that older people did not experience (record) any memories about past conversations.

In conclusion, although some novel and interesting findings emerged from this exploratory study some caution is required. First, due to the inherent difficulty with this form of data collection the sample size was relatively small and the gender ratio was uneven. Given that there are some gender differences in how people encode and recall autobiographical memories it is necessary for future research to carry out content analysis of autobiographical memories in search for gender specific content categories. Second, it is unclear whether the present pattern of results concerning the absence of negativity effect in old age can also be obtained for voluntary autobiographical memories. Preliminary evidence suggests that this may not be the case. For example, when old people were asked to deliberately remember their most vivid memories they tended to recall a relatively large number of negative events such as illnesses (Cohen & Faulkner, 1988) and accidents (Fitzgerald, 1988). It appears that in old age negative memories are not necessarily forgotten but they may become increasingly inaccessible or unavailable for involuntary recall. This important question clearly awaits further investigation in the future.

Overall, despite some limitations, the present findings indicate that content analysis of autobiographical memories may be a useful and valid method for obtaining important information about the possible nature and functions of autobiographical memory in everyday life and across the lifespan. The results also highlight the importance of distinguishing between involuntary and voluntary autobiographical memories and the necessity to conduct further studies to clarify the differences and/or similarities between the underlying mechanisms of the two types of autobiographical memory retrieval.

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Table 1. Percentages (frequencies) of memories by content category and age group

| Content Category | Percentages (frequencies) | | | |
|---|---------------------------|-------|-----------|------|
| | Young Group | | Old Group | |
| | (n = 11) | | (n = 10) | |
| Persons (i.e. primarily about other people) | 17% | (21) | 14% | (14) |
| Accidents including injuries and illnesses | 13% | (16) | 1% | (1) |
| Stressful events | 12% | (15) | 2% | (2) |
| Holidays | 11% | (14) | 6% | (6) |
| Conversations | 8% | (10) | 0 | (0) |
| Leisure/sports activities (including hobbies & games) | 6% | (8) | 12% | (12) |
| Objects/places | 5% | (6) | 10% | (10) |
| Going out (e.g. going to the pub/dancing) | 5% | (6) | 5% | (5) |
| Work/university | 5% | (7) | 9% | (9) |
| Romantic involvement (e.g. being intimate, romantic dinners, receiving gifts for valentine day) | 4% | (5) | 3% | (3) |
| School | 5% | (6) | 6% | (6) |
| Deaths/funerals | 4% | (5) | 4% | (4) |
| Miscellaneous | 2% | (3) | 5% | (5) |
| Special occasions (birthdays, weddings, engagements, parties) | 2% | (2) | 6% | (6) |
| Births | 1% | (1) | 3% | (3) |
| Travelling/journeys | 0% | (0) | 4% | (4) |
| War/army | - | | 9% | (9) |
| Total memories | 100% | (125) | 100% | (99) |

Table 2. Percentages (frequencies) of participants' ratings of their memories' emotional valence for the young and old age groups

| Age Group | Memory Valence | | | | | Total |
|-----------|----------------|----------|----------|----------|---------------|------------------------|
| | Very Negative | Negative | Neutral | Positive | Very Positive | |
| Young | 24% (30) | 7% (12) | 16% (20) | 22% (28) | 28% (35) | 100% (125) |
| Old | 1% (1) | 3% (3) | 45% (39) | 25% (22) | 25% (22) | 100% (87) ^a |
| Total | 15% (31) | 7% (15) | 28% (59) | 23% (50) | 27% (57) | 100% (212) |

^aThe reduced number of memories is due to missing values for ratings of emotional valence.

APPENDIX 1: Initial list of categories produced by each independent rater

| Rater 1 | Rater 2 |
|--|--|
| 1. Births | 1. Birth of someone |
| 2. Deaths/funerals | 2. Death or funeral of someone |
| 3. Birthdays/parties | 3. Social activities e.g. parties, birthdays |
| 4. Going out | 4. Eating out |
| 5. Weddings | 5. Weddings and engagements |
| 6. Romantic involvement | 6. Love and sexual experiences |
| 7. Games | 7. Hobbies |
| 8. Sports/exercise/leisure | 8. Sports activities (including exercise) |
| 9. Persons | 9. Other people's experiences |
| 10. Holidays | 10. Holidays |
| 11. Travelling/trips | 11. Journeys |
| 12. Accidents | 12. Accidents |
| 13. Stressful events | 13. Unpleasant experiences |
| 14. Medical Conditions | 14. Illness and injuries |
| 15. Remembering what someone has told us (conversation, stories, jokes etc) | 15. Past conversations with people |
| 16. Army/war | 16. War time |
| 17. Miscellaneous | 17. Unclassifiable |
| 18. Work | 18. Work/university |
| 19. School/university | 19. School |
| 20. Objects | 20. Places |
| 21. Pets/animals | 21. First time experiences |
| 22. Unacceptable behaviour | 22. Watching sports (live and TV) |
| 23. Learning experiences | |

APPENDIX 2: Examples of involuntary autobiographical memory descriptions for young and old groups.

| Categories | Young | Old |
|--|--|---|
| Persons (i.e. primarily about other people) | I recalled my daughter collecting her GCSE results. | I remembered my mother singing 'two little girls in blue'. |
| Accidents/illness | I remembered coming up in a load of dry patches on my face, during exam time. | I had hernia operation (severe with gauze) 1982 returned to work (being careful) 8 days after. |
| Stressful events | An argument with my brother. | Getting stuck in a lift. |
| Holidays | On the last day on my holiday last year we had used the hotel showers as we had already vacated the room, and they were much nicer than the showers in our room. | Taking wife of that time and three daughters to a farm in Devon on holiday where the children helped with animals – milking, feeding etc. First thing former wife said was 'did you bring your wellingtons' – very muddy. |
| Conversations | Elaine at work telling me about her husband getting back from St Lucia, they have an alarm clock that sounds like a cock, and he thought he was back in St Lucia where you are woken up by real cocks. | - |
| Leisure/sports activities (including hobbies & games) | Remembered being on the exercise bike, feeling very tired and out of breath. | I got a hole in one on the 6 th hole of BPGC course, playing with an 83 year old in a winter 12 hole competition. We both saw the ball spiral down the flag into the hole! Very exciting. |
| Objects/places | My first black mini. | Dozens of cars I have owned over the years – I changed for a new car about every two years, also owned lorry which changed every ten years. |
| Going out | Me and my mates in the pub – very drunk – making lost of noise. | Standing outside Westminster Theatre just for the atmosphere. |
| Work/university | Being late for work and having to run from the station. | That I had once been the social sec. Of the tennis club and that it was quite hard work organising lost of social events etc. |
| Romantic involvement | Last valentine's day I gave my girlfriend some sexy underwear – we had a really nice night. | First time I was intimate with a woman near St Paul's Cathedral in London. |
| School | Being in school and making fun of the teacher. | Leaving school and parting with old friends. |
| Deaths/funerals | I recalled the night my granddad died. I remembered it exactly and felt how I felt that night for a split second. | My mothers funeral 29 years ago today at Willerby Crematorium in the morning. |
| Special occasions (birthdays, weddings, engagements, parties) | My dads birthday last year, we went to Lily's in London, it was a really good night, my dad really enjoyed himself. | Celebrating a friends birthday at a restaurant off Tottenham Court Road, then going to dance at Annabel's (only time I have ever been there) and my husband proposed to me as we danced there! |
| Births | My friend's birth of her little girl about 2 years ago, I was there, but had to leave because it was too much. | I remembered having just given birth to my eldest daughter and my husband taking his first look at her said he thought she looked rather small!! She is now 6ft tall! |
| Travelling/journeys | - | Travelling on a train to Scotland, meeting a friend at the station. |
| War/army | - | A place in Italy during the war and being machine gunned in market square. |

