Distribution Agreement

In presenting this thesis or dissertation as a partial fulfillment of the requirements for an advanced degree from Emory University, I hereby grant to Emory University and its agents the non-exclusive license to archive, make accessible, and display my thesis or dissertation in whole or in part in all forms of media, now or hereafter known, including display on the world wide web. I understand that I may select some access restrictions as part of the online submission of this thesis or dissertation. I retain all ownership rights to the copyright of the thesis or dissertation. I also retain the right to use in future works (such as articles or books) all or part of this thesis or dissertation.

Signature:

Aylin Tasdemir _____

Date

CONSISTENCY OF EARLIEST MEMORIES: If the Event is the same, is the Story (or memory)?

by

Aylin Tasdemir

Master of Arts

Psychology

_____

Patricia Bauer, Ph.D.
Advisor

_____

Robyn Fivush, Ph.D.
Committee Member

_____

Linda Craighead, Ph.D.
Committee Member

Accepted:

_____

Lisa A. Tedesco, Ph.D.
Dean of the James T. Laney School of Graduate School

_____

Date

CONSISTENCY OF EARLIEST MEMORIES: If the Event is the same, is the Story (or memory)?

By

Aylin Tasdemir

B.A., Halic University, 2008

Advisor: Patricia Bauer, Ph.D.

An abstract of thesis submitted to the Faculty of the

James T. Laney School of Graduate Studies of Emory University

in partial fulfillment of the requirements for the degree of Master of Arts in Psychology

2012

Abstract

CONSISTENCY OF EARLIEST MEMORIES: If the Event is the same, is the Story (or memory)?

By Aylin Taşdemir

Earliest memories, as our first memories in which we have a "self" and an ability to recode a memory after childhood amnesia, has rarely been questioned for the consistency of memories and their content. In order to fill this gap and provide a new direction to the earliest memory literature, in the present research, we examined the consistency of adults' earliest memories over a 4-year longitudinal study and also sought to determine some of the factors associated with consistency. In order to measure consistency, we created a new consistency scheme and coded all memories for narrative breadth and coherence to observe if these facts affect the consistency scores. Results indicated 1) adults reported the same event as their earliest memory almost each time they were asked; 2) these events on the other hand, contain a few common components which stayed stable in each report; 3) completeness was not a determiner of stability whereas coherence prevented time and place information from being lost over time. Implications of these findings are discussed as a source for understanding the nature and specialty of earliest memories' content.

CONSISTENCY OF EARLIEST MEMORIES: If the Event is the same, is the Story (or memory)?

By

Aylin Tasdemir

B.A., Halic University, 2008

Advisor: Patricia Bauer, Ph.D.

A thesis submitted to the Faculty of the

James T. Laney School of Graduate Studies of Emory University

in partial fulfillment of the requirements for the degree of Master of Arts in Psychology

2012

Acknowledgments

First, I would like to thank my advisor, Dr. Patricia Bauer for her contributions and guidance throughout the project. I would also like to thank to my other committee members: Robyn Fivush and Linda Craighead, for their suggestions and constructive feedback when I needed. Special thanks to Marina Larkina and Ayla Nolen for the coding assistance as well as all of the researchers who interviewed with participants and all of the other members of Memory at Emory lab. In addition, thanks to all of the participants for their collaboration. Finally, I would like to thank my family for all their emotional support regardless being thousands miles away, and my fiancé, Mehmet Özdeş, for his encouragement and understanding during thesis process.

Table of Contents

List of Table and Figures

CONSISTENCY OF EARLIEST MEMORIES: If the event is the same, is the story (or memory)?

As the first personal or autobiographical memories, earliest memories mark the border between the time before which we have a personal past and times that we remember. Due to the enormous value of these memories, numerous studies have been conducted regarding earliest memories with subjects from various age groups (Bruhn & Davidow, 1983; MacDonald, Uesiliana, & Hayne, 2000; Peterson, Grant, & Boland, 2005; West & Bauer, 1999). Because of the motivation to learn the nature of childhood amnesia (i.e., inability to recall events that occurred before age of 3.5 to 4) (Pillemer & White, 1989) many contemporary studies have been conducted to identify the age and the characteristic of earliest memories and focus on the relationship between these features and culture (Fivush & Nelson, 2004; MacDonald et al., 2000), and cognitive development (Bauer, 2007). Many other studies of early memories have aimed to determine reconstruction of early childhood events as an important component of psychotherapy (Josselson, 2000; Pillemer & White, 1989). However, only a small number of studies have examined the consistency in reports of earliest memories. In other words, adults have rarely been questioned for their earliest memories and the components of those memories in different reports to observe if they remember the same events, and whether they include the same content. The absence of focus on stability in reports of earliest memories has limited our knowledge of the contributors to stability of both earliest memories as a whole and their details, and thus why they survive childhood amnesia. That gap also has limited our understanding of the role these memories play in maintaining the stability of "self" over time. In order to discover these factors, in the present research, we examined the consistency of adults' earliest memories

over a 4-year longitudinal study and also sought to determine some of the factors associated with consistency.

Freud (1905) defined earliest memories as representations of essential expressions of inner life experience in the present. Since Freud's time, they have been studied from clinical, cognitive, and developmental perspectives. Clinical perspectives tend to view earliest memories as conscious productions that may reveal deep personality trends and reflect a person's characteristic ways of creating and living in the world (Josselson, 2000). Cognitive perspectives on the other hand, concern the structure of earliest memories, how the memories are organized, and what features they have (Bauer, 2007). Developmental perspectives focus on the beginning of autobiographical memory with earliest memory studies (Dudycha & Dudycha, 1933; Eacott & Crawley, 1998; Pillemer & White, 1989; Usher & Neisser, 1993) and on the "offset" of childhood amnesia: adults' inability to remember the first 3-3 1/2 year of life (Pillemer & White, 1989).

Though there has been little empirical work on the question of the consistency of earliest memories, there is lack of theorizing about consistency. According to Adler (1937), earliest memories include "hints about why an individual's life plan was elaborated into its own particular form" and early memories are in harmony with current interpersonal behavior besides being a track of past (Watkins, 1992). Earliest memories thus are not casual: they are the tracks of our perception about ourselves. Hence, as our perceptions of ourselves change, so will our interpretation and the style of telling about our earliest memories. As such, the expectation is that earliest memories may not remain stable. In contrast to Freud's association between earliest memories and repression and traumatic experiences, Adler argued that current perceptual frame is the central factor in interpreting early memories (Bruhn & Davidow, 1983). Hooker and

McAdams (2003) argue that differences among re-constructions of earliest memories reflect aspects of personality because life stories are the integration of social context, beliefs, and the person's narrative identity (McAdams et al., 2006). Mayman (1968) speculated that "early memories are critical fantasizes around which a person's character structure is organized" (McAdams et al., 2006). In summary, these perspectives suggest that earliest memories are reorganized in different period of times, logically resulting in a lack of consistency.

In contrast, Stone, Barnier, Sutton, and Hirst (2010) argue that autobiographical memories may be consistent, as a result of telling and retelling of the stories to others. Specifically, they argue that consistency in different reports of memories could be caused by "socially shared retrieval-induced forgetting" (SS-RIF) effect. In other words, when participants shared the narratives once, they tend to recall the same narratives and same information in the narrative. Also, once these narratives are told more than one time, they tend to be constructed more coherently. Applied to earliest memories—which often are the subject of retelling (Larkina & Bauer, in press)—the prediction would be of consistency across reports.

In contrast to abundant theory, there is little empirical research. Instead, almost all of the contemporary research on earliest memories has been conducted to clarify the age of earliest memories, their characteristics (e.g.,, the emotional content), whether they are recalled in first or third person perspective, and their relation with the development of personality (Dudycha & Dudycha, 1933; Eacott & Crawley, 1998; MacDonald et al., 2000; Peterson et al., 2005; Usher & Neisser, 1993; West & Bauer, 1999). To test these features, researchers have used a variety of techniques, including asking adults to recall their earliest memory, to recall a specific event with an exact date such as birth of younger sibling or death of a family member, to record all the childhood memories they can recall, and to recall earliest memories using cue word given by

experimenter (Jack & Hayne, 2007; Usher & Neisser, 1993). Yet virtually none of these studies has focused on consistency.

Consistency has not been a focus in the literature on earliest memories, yet it has been studied in the literature on "flashbulb memories": "vivid, detailed and long-lasting memories for the circumstances in which people learned about a shocking public event" (Brown & Kulik, 1977), such as the explosion of the Challenger shuttle in 1986, September 11, Estonia Ferry Disaster, Death of Princess Diana, and the death of the first president of Turkey (Berntsen & Thomsen, 2005). To study the consistency of flashbulb memories, researchers have concentrated on several factors: long and short term consequences (Er, 2003), arousal/affect mechanism at the time of encoding (Christianson & Engelberg, 1999; Conway, Skitka, Hemmerich, & Kershaw, 2009; Curci, Luminet, Finkenauer, & Gisle, 2001), coherence, the amount of details, confidence, and reaction (Bohannon & Symons, 1992). Another motive for focus on consistency is its potential relation with accuracy and coherence of memories. Consistency has been a focus in judges' and juries' decisions for eyewitness testimonies as well as research in this area as a determiner of accuracy and reliability (Brewer, Potter, Fisher, Bond, & Luszcz, 1999; Smeets, Candel, & Merckelbach, 2004). However, with the exceptions of flashbulb memories and forensic studies, consistency has rarely been a major concern in the adult autobiographical memory literature. (Fivush, Hamond, Harsch, Singer, and Wolf (1991) observed tested consistency in memories of young children.)

To our knowledge there are only two studies that focused on consistency in adults' earliest memories. Josselson (2000) asked adults about their earliest memories at different time points, when they are 21, 33, and 43 years of age, and observed the consistency in the characteristics of earliest memory. At each time, participants were asked to tell their earliest

memories, and their reports were compared and examined for stability. Josselson (2000) chose these ages to observe possible changes in earliest memories in adolescence and middle ages. She found that one-third of the participants repeated at least one memory at the age of 21, 33 and 43. Also, 54% of the participants provided the same events as their earliest memories at the ages of 21 and 33, and 58% of the participants reported the same memory at the ages of 33 and 43. Only 21% of the participants failed to repeat a memory across the interviews. These results indicate moderate to high consistency over a long period of time. For present purposes, the findings are limited, however, because Josselson (2000) did not focus on the characteristics of the memories and their possible relations with consistency. In addition, little attention was paid to the relation between consistency and the completeness and coherence of earliest memories and how the details and the reconstruction of earliest memories might be modified over shorter periods of time.

The second study of consistency in earliest memories was with children. Peterson, Warren, and Short (2011) asked 4- to 13-year-old children their earliest three memories at two points in time, separated by 2-years. They predicted an increase in consistency with age. Consistent with this expectation, they found that 80% of the memories that younger children (age 4 to 8 years) stated in their first reports and disappeared in following reports. For the children who did not recall the same memory the second time, interviewers read the previous memories for the children. Even when they were provided with their earlier memories, 4- to 5-year-old children recognized only 61% of their earlier reports. The proportion of the recognition of non-recalled memories increased with age (76% for 6-7, 85% for 8-9, 91% for 10-11 and 97% for 12-13 year olds). Thus, older children (age of 11 to 13) were better able to recall and recognize their earlier statements. The results of Peterson et al. (2011) suggest that with age, earliest memories

become increasingly stable. However, potential change in reports of earliest reports in adults still is unknown.

In summary, earliest memories have been studied may times, yet consistency has not been a major focus. Since earliest memories are neither likely be as surprising or consequential as the events that engender flashbulb memories nor as traumatic as the experiences that likely lead to eyewitness testimony in a criminal case, the results of these studies cannot fully inform the question of the degree of consistency in adults' earliest memories. Moreover, the studies by Josselson (2000) and Peterson et al. (2011) are informative yet limited in what they can tell us about consistency in adults' reports and the factors that may relate to consistency or lack thereof. Accordingly, the present study was designed to address the consistency of adults' earliest memory reports. More specifically, participants were asked to report their earliest memories multiple times, each one year apart. We examined whether they mentioned the same life events at each telling. Also, we examined the age of earliest memory, as well as differences between more consistent memories and inconsistent ones in terms of coherence and completeness. The first hypothesis of the present study is that the reports of earliest memories will be consistent. We base this prediction on the results of Stone et al. (2010) and on the fact that the retellings were relatively closely spaced, and not expected to span major personality or life period changes. To evaluate consistency, we tested whether the event nominated as the earliest memory was the same at each report. In addition, we tested whether the report of the event was consistent, in terms of the age, completeness and coherence of the narrative, and the specific information provided about the event. The second aim of the research was to determine some of the factors that relate to consistency. We examined relations between measures of completeness and

coherence or organization of the reports. We predicted that more complete and better organized memories would be more consistent than less complete and disorganized ones.

We make these predictions because more detailed memories prevent the main story and critical information fragments from being forgetting over time, resulting in greater stability. For the same reasons, we expected to find a positive relation between coherence and consistency of memories.

METHOD

Participants

A total of 43 middle age women were recruited from a larger sample of women who accompanied their children during a longitudinal study conducted with 4- to 8-year-old children. Fourteen participants (M = 36.45, SD = 3.9) attended 4 sessions, 15 participants (M=39.51, SD=3.55) attended 3 sessions, and 7 participants (M=36.51, SD=5.57) attended two 2 sessions. The final 7 participants provided memories in one session, and thus their reports were excluded. As a result, 36 participants' reports were evaluated.

Procedure

Participants visited the laboratory for a longitudinal study. Sessions were spaced one year apart. After each session with their children, mothers were interviewed about their earliest memories. In total, 6 interviewers were involved in data collection and women were interviewed by a different person at each session. The interviewer asked, "Could you tell me your earliest memory?" The interviews were open-ended. The only prompt that the interviewers provided was for the women's age at the time of her earliest memory, if the time was not provided spontaneously. All interviews were recorded on DVDs.

Coding

The reports were transcribed from the DVDs and checked for accuracy. The first step in assessing the consistency of reports of earliest memories was to determine whether the event that was the subject of the report was the same at each retelling. For events that we consistent, we then evaluated whether the narrative reports differed in completeness, coherence, or specific content. Each coding scheme is described in turn below.

CONSISTENCY OF THE EVENT

The narratives were examined to determine whether the participant nominated the same event as her "earliest memory" at each session. An event was considered the "same" if a naïve listener could call the person's report the same event as nominated in her previous report. All comparisons were to the earliest memory nominated at the subjects' first session. Thus if the same event was nominated at Session 1 and Session 2, the earliest memory was considered to be consistent at the level of the event. This level of comparison was available for all 36 participants who took part in two (or more) sessions. For participants who took part in three (or more) sessions (N = 29), they were considered consistent if the same event was nominated at all three sessions. Similarly, for participants who took part in all four sessions (N = 14), they were considered consistent if the same event was nominated at all four sessions. All subsequent coding was conducted on consistent events only.

The second step in coding was to determine the completeness of the narrative, in terms of major narrative categories. For this purpose we used the coding scheme described in Bauer, Burch, Scholin, and Güler (2007) and also Van Abbema and Bauer (2005) (Appendix 1) Participants received 1 point for each of the major narrative categories of who, what object, what action, where, when, why, how description, and how evaluation. Off-topic talk, incomplete or unidentifiable prepositions (*We went to <u>XXX</u>.*), false starts (*"Let's see…"*), repetitions, and

head nods were not coded. The number of narrative categories represented in the report was the measure of narrative breadth, with a maximum of 8.0. Reliability of narrative breadth (WH) coding was established between two independent coders on 27.8% of the sample. Average reliability was 92.5%.

We next determined the coherence of the narratives on three dimensions, using the Narrative Coherence Coding Scheme (NaCCs) coding scheme developed by Reese, Haden, Baker-Ward, Bauer, Fivush, and Ornstein (2011). The dimensions of the NaCCs scheme are Context, Chronology, and Theme. (Appendix5). Narratives were coded for each dimension on a 4-point scale (0, 1, 2, 3). Reliability of coherence coding was established for two independent raters on 20% of the participants. Average reliability was 91.1% for Context, 86.5% for Theme, and 91.3% for Chronology.

Finally, we determined consistency in the content of the narratives. For content in each of the narrative categories described above, we determined whether the specific item was the same across sessions. For example, if at Session 1 the participant mentioned a specific person (who), we determined whether the same person was mentioned at subsequent sessions. Participants received 1 point for each consistent mention in each category. We then examined consistency in the details provided about the instance. If at Session 1, the participant mentioned that a specific person wore a red hat, and the hat was described in the same way at a subsequent session, the participant received 1 point. Reliability of coding was established by two independent raters on 28% of the narratives. Reliability was 83.6% for “main” and 77.6% for “details.”

RESULTS

The primary purpose of the study was to determine whether participants were consistent in their reports of their earliest memories. We first examined consistency at the level of the

event, asking whether participants identified the same event as their earliest memory at each of their sessions. When the events were different, no further analyses were conducted. When the event was the same, we then asked whether the participants were consistent in their reports of how old they were at the time of the event. We then asked whether the breadth of the narrative describing the event was the same, and whether the level of coherence of the report was the same. We then asked whether the content of the narrative was consistent across sessions, both in terms of the main elements of the report and the details provided about them. For most analyses, we followed the same analytic approach. Specifically, we compared Sessions 1 and 2 for all participants (N = 36). We compared Sessions 1, 2, and 3 for the participants who had three (or more) sessions (N = 29), and we compared Sessions 1, 2, 3, and 4 for the participants who had all four sessions (N = 14). Finally, we asked whether either narrative breadth or coherence predicted the consistency of reports, either at the level of the event or at the level of main elements.

Descriptive statistics on consistency at the level of the event (i.e., whether the same event was identified as the earliest memory) are provided in Table 1. As is apparent from the table, the participants were highly consistent in nominating the same event as their "earliest memory." Consistency ranged from 76% for participants who reported their memories at three sessions, to 86% across the first two sessions for participants who reported their memories at three or all four sessions. Thus at the level of the event, the participants were quite consistent in their reports of their earliest memories. All subsequent analyses were based on consistent events only.

The next question was whether there was consistency in the person's age of earliest memory. This question was included because age of earliest memory has been one of the major foci of earliest memory literature. Unfortunately, however, the specificity of our address of this question was limited because (a) not all participants identified their age, and (b) many of the

participants provided only general information about their age at the time of the event. They answered the question with a time span such as “I was 2, 3 or 4 years old” or they provided a very vague estimate, such as “I was under 2.” Therefore, we adopted a categorical approach. If the person indicated the same age or was within a half year more or less than the previous report, she was considered to be consistent in her report, and received a score of “1”. Otherwise the participant was considered inconsistent and received a score of “0”.

Descriptive statistics on consistency in age of earliest memory are provided in Table 2. Among the 36 participants who had two (or more) reports, 27 provided age information; 96% were consistent in the age they identified. As time went on, however, participants were less consistent. Whereas participants who reported their memories at three sessions were 96% consistent in the age they identified in Report 1 and Report 2, their consistency dropped to 74% when Reports 1-3 were considered. Even more striking was the drop in consistency by Report 4. Whereas participants who reported their memories at all four sessions were 100% consistent in the age they identified in Report 1 and Report 2, their consistency dropped to 78% when Reports 1-3 were considered, and to only 25% when all four reports were considered.

The next question was whether there was consistency in the breadth or completeness of the memories varied across reports. Breadth scores are reflected in Figure 1 for Reports 1 and 2 for all participants who nominated the same event at both sessions, for Reports 1, 2, and 3 for all participants who nominated the same event at three sessions, and for Reports 1, 2, 3, and 4 for participants who nominated the same events at all four sessions. To compare consistency across reports, we conducted one-way analyses of variance (ANOVAs), with 2, 3 or 4 levels of session. None of the analyses was statistically significant (all $Fs < 1.00$, $ps > .05$). Hence, all of the reports had consistent levels of breadth, regardless of the number of sessions.

We then examined consistency in the coherence of reports. Coherence scores are reflected in Figure 2 for each of the three dimensions, for Reports 1 and 2 for all participants who nominated the same event at both sessions, for Reports 1, 2, and 3 for all participants who nominated the same event at three sessions, and for Reports 1, 2, 3, and 4 for participants who nominated the same event at all four sessions. To compare consistency across reports, we conducted one-way ANOVAs with 2, 3, or 4 levels of session. None of the analyses was statistically significant (all $Fs < 2.70$, $ps > .05$). Thus, participants' memories were equally coherent across sessions.

We next addressed the question of consistency at the level of the content of the narratives. In Figure 3 are descriptive data for consistency in main elements of the narrative (who, what-object, what action, when, where, how-description, how-evaluation and why etc). Comparisons of the elements between Sessions 1 and 2 feature all subjects who reported the same event at the first two sessions ($N = 30$). Comparisons of the elements between Sessions 1 and 3 feature all subjects who reported the same event at these two sessions ($N = 24$), and comparisons of the elements between Sessions 1 and 4 feature all subjects who reported the same event at these two sessions ($N = 12$). The mean level of consistency in main components was 39% for the first and second reports, 36% for first and third reports and 31% for first and fourth reports. Thus although participants were highly consistent at the level of the event (see Table 1), they were not nearly as consistent at the level of the specific elements nominated in the wh-categories. Consistency at the level of the main elements did not vary across sessions, however (all $Fs < 1.84$, $ps > .05$).

We next conducted the analyses for the details that participants provided about the events. The categories of when, how-description, how-evaluation and why, were excluded from

analyses because there were too few observations for a valid analysis. In Figure 4 are descriptive data for consistency in details of the narrative (what –action, what-object, who, where and total). Participants were not especially consistent in the specific details they provided about the events. The mean levels of consistency in total details were 28% between Session 1 and 2, 20% for Session 1 and 3, and 18% for Session 1 and 4. Consistency at the level of the details did not vary across sessions, however (all $Fs < 2.2$, $ps > .05$).

Finally, we addressed the question of possible predictors of consistency. We first asked whether the breadth or completeness of the narrative provided at Session 1 predicted consistency either at the level of the event or the main elements. We did not address the question for details because of the relatively small number of observations. To test the question, we calculated Pearson correlation coefficients. At the level of the event, none of the correlations was significant. Thus the breadth of the narrative provided at Session 1 did not predict whether participants would nominate the same event at Sessions 1 and 2, Sessions 1, 2, and 3, or Sessions 1, 2, 3, and 4. We next calculated the correlations for the main elements. For the participants who attended Session 1 and 2, and mentioned the same event as their earliest memories, breadth of the first report of the memory was related to consistency in the category of "who" ($r=.63$, $p<001$). In other words, participants who had more complete first reports provided more consistent information for "who" across sessions 1 and 2. However, for those who attended 3 sessions, there was a negative relation between narrative breadth of the first report and consistency in "what action" ($r= -.53$, $p<.05$). Hence, participants who provided more complete memories in their first report tend to have less consistency in actions which they stated for the event. There were no relations for participants who provided memories at all four sessions.

We conducted parallel analyses for each dimension of coherence. There were no significant correlations between any category of coherence and event consistency across the first 2 (N=30) or 3 sessions (N=24). However, for the participants who attended all 4 sessions, chronology was positively related to consistency at the level of the event ($r=.78$, $p<.05$). Thus, participants who had more chronologically ordered memories tended to provide the same event as their earliest memory 4 times.

For the consistency in main elements, there were no relations between any of the coherence categories and consistency across the first two reports. On the other hand, for those who reported their earliest memories 3 times, a significant relation was found between context in first report and consistency in "when" information ($r=.44$, $p<.05$). In other words, participants who provided more specific information about time and place in their first report, tended to show more consistency in time information across three reports of their earliest memory. For the participants who attended 4 sessions, the theme category of coherence in the first report had a significantly correlated with consistency in "where" ($r=.79$, $p<.001$). The participants who reported events with a more complete theme that had a connection with current life or personality in the first report, tended to provide the same place information in their first and fourth reports.

DISCUSSION

To our knowledge this is the first longitudinal study of consistency in different reports of earliest memory in adults for both events and the contents of the memory. Although Josselson (2000) and Peterson et al (2011) conducted longitudinal studies in order to examine the consistency in earliest memories, they only questioned whether the participants tended to

nominated the same event or not. However, in the present study, we inspected consistency in the main components in addition to the event such as “Do same people exist in different reports of the earliest memory?” “Is the age of the memory that participant presented the same?”, “Does the participant report the same place as the location of the memory?” or as questioning more details like “Do objects, people or locations in the earliest memory have the same descriptions or not?” without explicitly asking these questions.

Josselson (2000) focused on the consistency of earliest memory as a reflection of personality changes across a very long time period. She did not examine the memories for either the stability of the narratives’ themselves or their components. Thus, while her approach explained the stability or instability of earliest memories from psychoanalytic perspective, she did not address cognitive or developmental perspectives. Even though the aim of the present study had completely different approach and sessions covered a relatively short term, results replicated Josselson (2000) with even higher scores across 2 reports (83%), 3 reports (76%) and 4 reports (79%) perhaps because of the differences in time spans.

We strongly believe that consistency plays an undeniable role in earliest memory by providing information to see what aspects of earliest memories survive across time. The results supported our expectation of a high level of consistency in the event across different reports. The proportion consistency was almost the same across 2 reports, 3 reports and 4 reports. The results are in keeping with Conway, Skitka, Hemmerich, and Kershaw’s (2009) argument about the consistency in flashbulb memories. Conway et al. (2009) claimed that when three reports are available, adults who provide consistent information in the first and second phases tend to present consistent memories in the third one as well. The potential explanation for this result also could be the effect of social sharing, SS-RIF (socially shared retrieval-induced forgetting)

(Stone, Barnier, Sutton, & Hirst, 2010); if the participants recalled the same memory two times they tend to recall the same memory on their 3rd and 4th reports.

Consistency in main components was relatively low, and details or descriptions of main components were even lower. This shows that although adults tend to nominate the same event as their earliest memories, they change the components (main components and their descriptions) of those stories as having more or less information on their second, third and fourth reports. These results could be a sign that in their earliest memories even though they recode a template of the memory, since young children do not have a mature verbal ability to recode all of the details as becoming adults (Dudycha & Dudycha, 1933), they fill the gaps in time from the expectations, pictures, or family stories. As another alternative, they may recode the earliest memories but lose most of their components in time and they were unable to recall the main elements of their earliest memories. Possibly, once they have reported their earliest memories they try to recall the event that they nominated last time rather than really trying to recall the event itself (Marsh, 2007). The stability of consistency across their 1st and 2nd reports, 1st and 3rd reports and 1st and 4th reports for all main categories and details strengthen this possibility. As Marsh (2007) argued, for the events they have conceptualized as earliest memories, adults borrow both few main components and details from their previous reports and fill the blanks with other information. Using these components as clues, they build complete memories which do not wholly overlap with the previous reports. Since it is relatively harder to recall the details than main components, they generally borrow main components. Also, because these reports are tied to each other with these components, the breadth and coherence scores tend to stay stable in each report.

We also examined predictors of consistency, in terms of the breadth and coherence of the narrative reports. The first finding was the relation between the breadth of the memory in the first report and consistency in "who" information across 2 sessions. This finding could be interpreted "who" information could be the clue to convey earliest memories to the following reports. However, breadth was not related with "who" category across 3 and 4 sessions perhaps because the completeness of the event does not promote any category as "who" information a change to survive. Also, surprisingly completeness of the story had a negative relation with "what action". Probably, as providing more complete memories, they recode these memories as a whole rather that recoding all actions separately. Whenever they do not have a complete story they more need to recode action fragments for later recalling.

Coherence of the earliest memory's first report was not strongly related to consistency in the main categories. The first finding was the relation between chronologically ordered memories and the consistency in the events. Potentially, because it is easier to structure the whole event if it has chronologically ordered actions, so adults recall the event more consistently. Also having more specific time and place, similarly make it easier to recall the time of the event during 3 sessions. One of the consistent main components across different report, thus, was "when" because of the coherence in the context. Finally, location (where) information was consistent between 1st and 4th reports for the higher theme scores' memories.

There were some limitations that should be improved for future studies. The first limitation as we stated before was having different number of reports of the participants. Since that was a longitudinal study and the participants came for another study for their children, it was hard to have all of the participants in all four sessions. Also, Cleveland and Reese (2008) posited that females provide more detailed memories than males due to socialization differences between

genders whereas MacDonald et al. (2000) argued that there is no significant difference between women and men's narratives. Thus, that would be beneficial to have the same study with men also. This would provide a chance to observe if this difference exists due to the gender of the participants or not.

For future directions, we believe the consistency of recent memories and earliest memories will be compared in terms of the proportions of consistency, coherence and breadth. Also, extending to younger and older children could provide information if children uses the same process to have stable earliest memories. In addition, due to the results for the relation between coherence categories and the consistency in time (when) and place (where), we believe these two facts convey a significant importance for permanency of memories even for the earliest ones; they deserve to be researched more closely.

REFERENCES

Bauer, P. (2007). *Remembering the Times of Our Lives: Memory in Infancy and Beyond*. Manhaw, NJ: Lawrence Erlbaum Associates.

Bauer, P. J., Burch, M. M., Scholin, S. E., & Güler, O. E. (2007). Using Cue Words to Investigate the Distribution of Autobiographical Memories in Childhood. [Article]. *Psychological Science (Wiley-Blackwell), 18*(10), 910-916. doi: 10.1111/j.1467-9280.2007.01999.x

Berntsen, D., & Thomsen, D. K. (2005). Personal Memories for Remote Historical Events: Accuracy and Clarity of Flashbulb Memories Related to World War II. [Article]. *Journal of Experimental Psychology. General, 134*(2), 242-257. doi: 10.1037/0096-3445.134.2.242

Bohannon, J. N., & Symons, V. L. (1992). Flashbulb Memories: Confidence, consistency, and quantity. In E. Winograd & U. Neisser (Eds.), *Affect and Accuracy in Recall: Studies of "flashbulb" memories* (Vol. 4, pp. 65-94). New York, NY: Cambridge University Press.

Brewer, N., Potter, R., Fisher, R. P., Bond, N., & Luszcz, M. A. (1999). Beliefs and data on the relationship between consistency and accuracy of eyewitness testimony. [Article]. *Applied Cognitive Psychology, 13*(4), 297-313.

Bruhn, A. R., & Davidow, S. (1983). Earliest Memories and the Dynamics of Delinquency. [Article]. *Journal of Personality Assessment, 47*(5), 476.

Christianson, S.-A., & Engelberg, E. (1999). Memory and Emotional Consistency: The MS Estonia Ferry Disaster. [Article]. *Memory, 7*(4), 471-482. doi: 10.1080/096582199387896

Cleveland, E. S., & Reese, E. (2008). Children remember early childhood: long-term recall across the offset of childhood amnesia. [Article]. *Applied Cognitive Psychology, 22*(1), 127-142. doi: 10.1002/acp.1359

Conway, A. R. A., Skitka, L. J., Hemmerich, J. A., & Kershaw, T. C. (2009). Flashbulb memory for 11 September 2001. [Article]. *Applied Cognitive Psychology, 23*(5), 605-623. doi: 10.1002/acp.1497

Curci, A., Luminet, O., Finkenauer, C., & Gisle, L. (2001). Flashbulb memories in social groups: A comparative test–retest study of the memory of French President Mitterrand's death in

a French and a Belgian group. [Article]. *Memory, 9*(2), 81-101. doi: 10.1080/09658210042000120

Dudycha, G. J., & Dudycha, M. M. (1933). Some Factors and Characteristics of Childhood Amnesia. *Child Development, 4*(3), 265-278.

Eacott, M. J., & Crawley, R. A. (1998). The offset of childhood amnesia: Memory for events that occurred before age 3. [Article]. *Journal of Experimental Psychology. General, 127*(1), 22.

Er, N. (2003). A new flashbulb memory model applied to the Marmara earthquake. [Article]. *Applied Cognitive Psychology, 17*(5), 503-517. doi: 10.1002/acp.870

Fivush, R., Hamond, N. R., Harsch, N., Singer, N., & Wolf, A. (1991). Content and Consistency in Young Children's Autobiographical Recall. [Article]. *Discourse Processes, 14*(3), 373.

Fivush, R., & Nelson, K. (2004). Culture and Language in the Emergence of Autobiographical Memory. [Article]. *Psychological Science (Wiley-Blackwell), 15*(9), 573-577. doi: 10.1111/j.0956-7976.2004.00722.x

Jack, F., & Hayne, H. (2007). Eliciting adults' earliest memories: Does it matter how we ask the question? [Article]. *Memory, 15*(6), 647-663. doi: 10.1080/09658210701467087

Josselson, R. (2000). Stability and change in early memories over 22 years: Themes, variations, and cadenzas. [Article]. *Bulletin of the Menninger Clinic, 64*(4), 462.

Larkina, M.,Bauer, P. (in press). "Family Stories" and their Implications for Preschoolers' Memories of Personal Events. *Journal of Cognition and Development.*

MacDonald, S., Uesiliana, K., & Hayne, H. (2000). Cross-cultural and gender differences in childhood amnesia. [Article]. *Memory, 8*(6), 365-376. doi: 10.1080/09658210050156822

Marsh, E. J. (2007). Retelling Is Not the Same as Recalling: Implications for Memory. [Article]. *Current Directions in Psychological Science (Wiley-Blackwell), 16*(1), 16-20. doi: 10.1111/j.1467-8721.2007.00467.x

McAdams, D. P., Bauer, J. J., Sakaeda, A. R., Anyidoho, N. A., Machado, M. A., Magrino-Failla, K., . . . Pals, J. L. (2006). Continuity and Change in the Life Story: A Longitudinal Study of Autobiographical Memories in Emerging Adulthood. [Article]. *Journal of Personality, 74*(5), 1371-1400. doi: 10.1111/j.1467-6494.2006.00412.x

Peterson, C., Grant, V. V., & Boland, L. D. (2005). Childhood amnesia in children and adolescents: Their earliest memories. [Article]. *Memory, 13*(6), 622-637. doi: 10.1080/09658210444000278

Peterson, C., Warren, K. L., & Short, M. M. (2011). Infantile Amnesia Across the Years: A 2-Year Follow-up of Children's Earliest Memories. [Article]. *Child Development, 82*(4), 1092-1105. doi: 10.1111/j.1467-8624.2011.01597.x

Pillemer, D. B., & White, S. H. (1989). Childhood Events Recalled by Children and Adults. In H. W. Reese (Ed.), *Advances in Child Development and Behavior* (Vol. 21, pp. 298-340). San Diego, CA: Academic Press.

Reese, E., Haden, C. A., Baker-Ward, L., Bauer, P., Fivush, R., & Ornstein, P. A. (2011). Coherence of Personal Narratives Across the Lifespan: A Multidimensional Model and Coding Method. *Journal of Cognition and Development, 12*(4), 424-462. doi: 10.1080/15248372.2011.587854

Smeets, T., Candel, I., & Merckelbach, H. (2004). Accuracy, completeness, and consistency of emotional memories. [Article]. *American Journal of Psychology, 117*(4), 595-609.

Stone, C. B., Barnier, A. J., Sutton, J., & Hirst, W. (2010). Building consensus about the past: Schema consistency and convergence in socially shared retrieval-induced forgetting. [Article]. *Memory, 18*(2), 170-184. doi: 10.1080/09658210903159003

Usher, J. A., & Neisser, U. (1993). Childhood Amnesia and the begginings of memory for four early life events. *Journal of Experimental Psychology. General, 122*(2), 155-165.

Van Abbema, D., & Bauer, P. (2005). Autobiographical memory in middle childhood: Recollections of the recent and distant past. *Memory, 13*(8), 829-845. doi: 10.1080/09658210444000430

West, T. A., & Bauer, P. J. (1999). Assumptions of Infantile Amnesia: Are There Differences Between Early and Later Memories? [Article]. *Memory, 7*(3), 257-278. doi: 10.1080/096582199387913

APPENDICES

Appendix1: Summary Table Of Narrative Breadth (Wh) Codes And Details Of The Main Components For Consistency Scheme

Narrative Breadth Co(WH)	**Description**	**Example**	**Example of "Detail" for "consistency coding scheme"**
what action	Activities performed by the participant, character or an object in the narrative are coded as what action. These activities include observable actions (walked), less observable actions like perceptions ("saw", "feel", "tasted"),past mental/cognition verbs (thought, pretended), dialog verbs (talked, said), physiological states (slept, waking up), emotional states (smiled, cried), and verbs that are statements of desire (wanted, needed)	*"I was **lying** on the couch." "She was **working** in the kitchen", "They were **building** a house in a rural area"*	*"We went on a trip, **driving** trip to the east coast."*
What object	Specific objects, mention of animals, mention of the event name (camp, party), mention of object information in context of a being verb, titles of songs and movies that are presented in the event are coded as "what object".	*"I was on the **couch."** "I remember **the bassinette** and looking at my brother **in the bassinette** and wondering what's this all about"*	*"I remember playing with **my** little people in the basement of our house"*

Who	Specific people, class of people, general references to person (e.g., somebody) and references to one's role in a play are coded as "who". General references (e.g., somebody) take credit if the participant refers to a specific person but not know his/her name.	***"My grandma** and **my mom** were in the kitchen."* *"I lived in New Jersey with **my parents**."*	*"My brother was **taller** than me"*
When	References to time; calendar or personal time terms (in the evening, Saturday, on my birthday), words or statements that provide information about the relative order in which event took place (after, before, then, while, as soon as), indication of duration of time (during, for two hours) take credit	"*My mom was sick **when** she had my brother."* *"I was **two and half**."*	*N/A*
Where	Location of the event in place (I stayed in **a trailer**), use of a preposition indicating place (in, next to, on), location that a person or object can go to (at school, on the table), or prepositions indicating place (in, near, next to), in summary all the information that could answer the question "where" take credit	*"I remember being at my grandpa and grandma's **house**."* *"She lived in **a bar**."*	*I do remember living in **my mom and dad's** house before they got divorced.*
How description	Mentions adverbs, adjectives, prepositional phrases that describe the physical or observable characteristics of an object, person or action take credit. Also, words used to make comparisons (looked like a soccer ball) take credit for how description. However, participants use two or more words as a single unit of meaning (high	"*She had a **white** dress with like **blue and green kind of on** it."* *"I played with a **little** boy and I got burr stuck in my hair."*	*N/A*

	chair). These words together receive what-object. (FOR CONSISTENCY SCHEME ONLY DESCRIPTIONS FOR THE PARTICIPANT'S HERSELF TAKE CREDIT)		
How evaluation	Personal evaluation of the event by the participant; intensifiers (really small), subjective modifiers (she was shy), and terms conveying information about emotion, relative preference, physiological state ("I **liked** it", "I was **afraid**")	*"It probably **scared** Jenny and she just let it go."* *"I was **very insistent** that I wanted the scooter for the picture."*	*"I remember being* **very** scared*, or just thinking about that that a bear was around."*
Why	Justification or causation statements that demonstrate the dependency of different aspects of the events (because, so, so that, if, until, in order to and since) are coded as why. If the participant's response answer "Why" question, the answer is coded as why	*"I remember those I lived in New Jersey with my parents until I was four.* ***So*** *it would have been before that.", "I got my head stuck in the bars down the sta-, you know how through the stairs thing, but that was later but earlier than that* ***because*** *I was really probably three or four."*	*N/A*

Appendix2: An Example worksheet for Consistency Content Coding of a Memory

		Time1 Main Events	***Time2 Main Events***	***Time3 Main Events***	***Time4 Main Events***
Main info.	**Details**				
what action					
walking in a park		1	1	1	1
what object					
Who					
my sister		1	1	1	
an adult			1	1	
my aunt		1			
	who died	1			
When					
less than two years old					
I was just starting to walk			1		1
Where					
in a park		1	1	1	
at a school				1	
	which was a across the street from my grandma's house			1	1
how description					
how evaluation					
Why					
because I see this in pictures					

Note: "1" presented the existence of the information for referring phase.

Appendix3: An example for the 2nd spread sheet of consistency coding for a participant's memory.

story1		**time 1**	**time 2**	**time3**	**time4**	**time1-2**	**time1-3**	**time1-4**	**time2-3**	**time2-4**	**time3-4**
what action:	main	1	1	1	1	1	1	1	1	1	1
	detail	0	0	0	0	0	0	0	0	0	0
what object:	main	0	0	0	0	0	0	0	0	0	0
	detail	0	0	0	0	0	0	0	0	0	0
who:	main	2	2	2	0	1	1	0	2	0	0
	detail	1	0	0	0	0	0	0	0	0	0
when:	main	1	1	1	0	0	0	0	0	1	0
	detail	0	0	0	0	0	0	0	0	0	0
where:	main	1	1	2	1	1	0	0	0	1	0
	detail	0	0	1	1	0	0	0	0	0	0
how description:	main	0	0	0	0	0	0	0	0	0	0
	detail	0	0	0	0	0	0	0	0	0	0
how evaluation:	main	0	0	0	0	0	0	0	0	0	0
	detail	0	0	0	0	0	0	0	0	0	0
why:	main	1	0	0	0	0	0	0	0	0	0
	detail	0	0	0	0	0	0	0	0	0	0

Note:. Numbers under time 1-2, 1-3, 1-4, 2-3, 2-4 and 3-4 demonstrate the consistent main or detail information for that specific combination.

Appendix4: An example of a participant's scores for breadth codes.

ID: **176**

	Event	**who**	**what object**	**what action**	**where**	**when**	**how description**	**how-evaluation**	**Why**
time 1	1	1	1	1	1	1	1	1	1
time 2	1	1	1	1	1	1	1	1	1
time 3	1	1	1	1	1	1	1	1	0
time 4	1	1	1	1	1	1	1	1	1

Note: "1" represents the existence of the specific "Wh" breadth code whereas "0" means there is no answer to this question in the story.

Appendix 5: The criteria for each score for NaCCs categories according to the Reese et al. (2011)

Score	Context	Chronology	Theme
0	Neither time nor location information is provided in the story.	Narrative contains no information about temporal order. ("*You know like, playing outside with my brothers, and the boys across the street, and our bedroom, you know I shared a bedroom with my two brothers. You know, so lots of things about that house, living there.")*	Narrative is off topic or described by several distracters that makes identification of the topic difficult.
1	Time point or location at any level of specificity.(*I remember walking in* ***a park*** *with my sister and my aunt who died.)*	Some events on the timeline and fewer than half of the temporally relevant actions can be ordered on a timeline with confidence.	Topic is identifiable and the narrative includes negligible development of the topic with causal linkages, personal evaluations and reactions, or elaborations of actions. (*I remember walking in a park with my sister and my aunt who died.)*
2	Time and location of the event and one of these dimensions is specific	between 50-75% of the relevant actions on a timeline can be placed but not reliably order the entire story from start to finish with confidence.	the narrative includes interpretations and/or elaborations of previously reported actions
3	Time and location information is specific (*I remember a time*	almost all of the temporally relevant actions can be ordered	In addition to the requirements for score 2 memories are connected to other autobiographical

	when my sister was in school, so I was somewhere between the ages of ***three and five****. I remember playing with my little people* ***in the basement of our house)***		experiences, future plans, or self

Appendix6: An example of Levels of Narrative Coherence on the NaCCS

		STUDY 105 COHERENCE CODES			
ID:		**story1_event**	**story1_theme**	**story1_context**	**story1_chronology**
176	**phase 1**	1	2	3	2
	phase 2	1	3	3	2
	phase 3	1	3	2	3
	phase 4	1	3	3	3
184	**phase 1**	1	1	3	0
	phase 2	2	1	2	3
	phase 3	2	1	1	3
	phase 4	2	2	1	3
177	**phase 1**	1	2	2	3
	phase 2	1	2	2	3
	phase 3	1	1	1	3
	phase 4	1	2	2	3
425	**phase 1**	1	1	1	0
	phase 2	1	1	1	0
	phase 3	1	1	2	0
	phase 4	1	1	1	0

Note: Each number represents the score of referring participant, report time, story and coherence category. High numbers illustrate higher scores for each category.

TABLE AND FIGURES

Table 1

Descriptive Statistics for Consistency at the Level of the Event

Number of Sessions Attended	Sample Size	Reports		
		1 and 2	1, 2, and 3	1, 2, 3, and 4
2 sessions	N = 36	83%	---	---
3 sessions	N = 29	86%	76%	---
4 sessions	N = 14	86%	79%	79%

Note: The diagonal represents the level of consistency across all available reports.

Table 2

Descriptive Statistics for Consistency in Age of Earliest Memory

Number of Sessions Attended	Sample Size	Reports		
		1 and 2	1, 2, and 3	1, 2, 3, and 4
2 sessions	N = 27	96%	---	---
3 sessions	N = 19	96%	74%	---
4 sessions	N = 14	100%	78%	25%

Note: The diagonal represents the level of consistency across all available reports.

Figure 1:

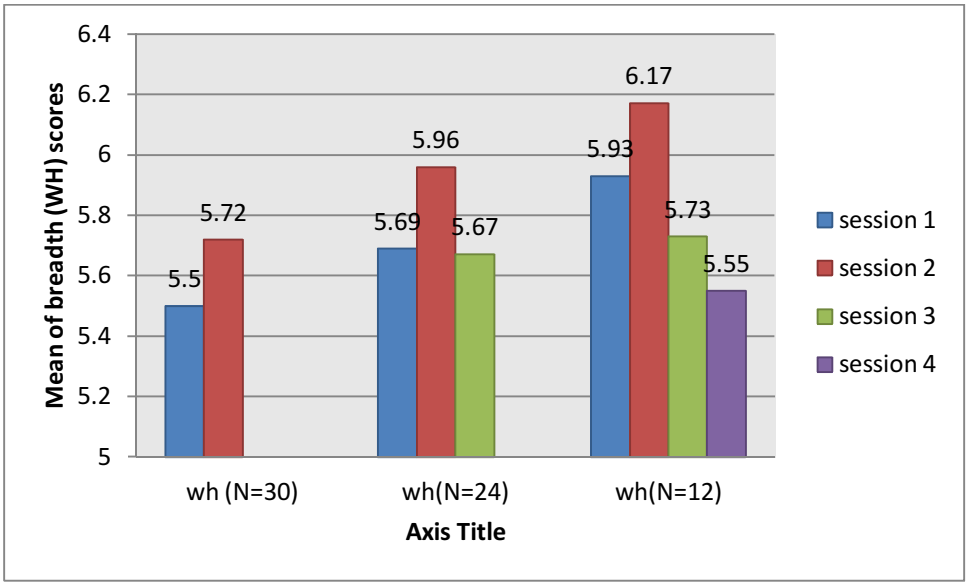

Figure 1: the Mean of Narrative Breadth (Wh) Scores

Note: There is no significant difference across the reports.

Figure 2:

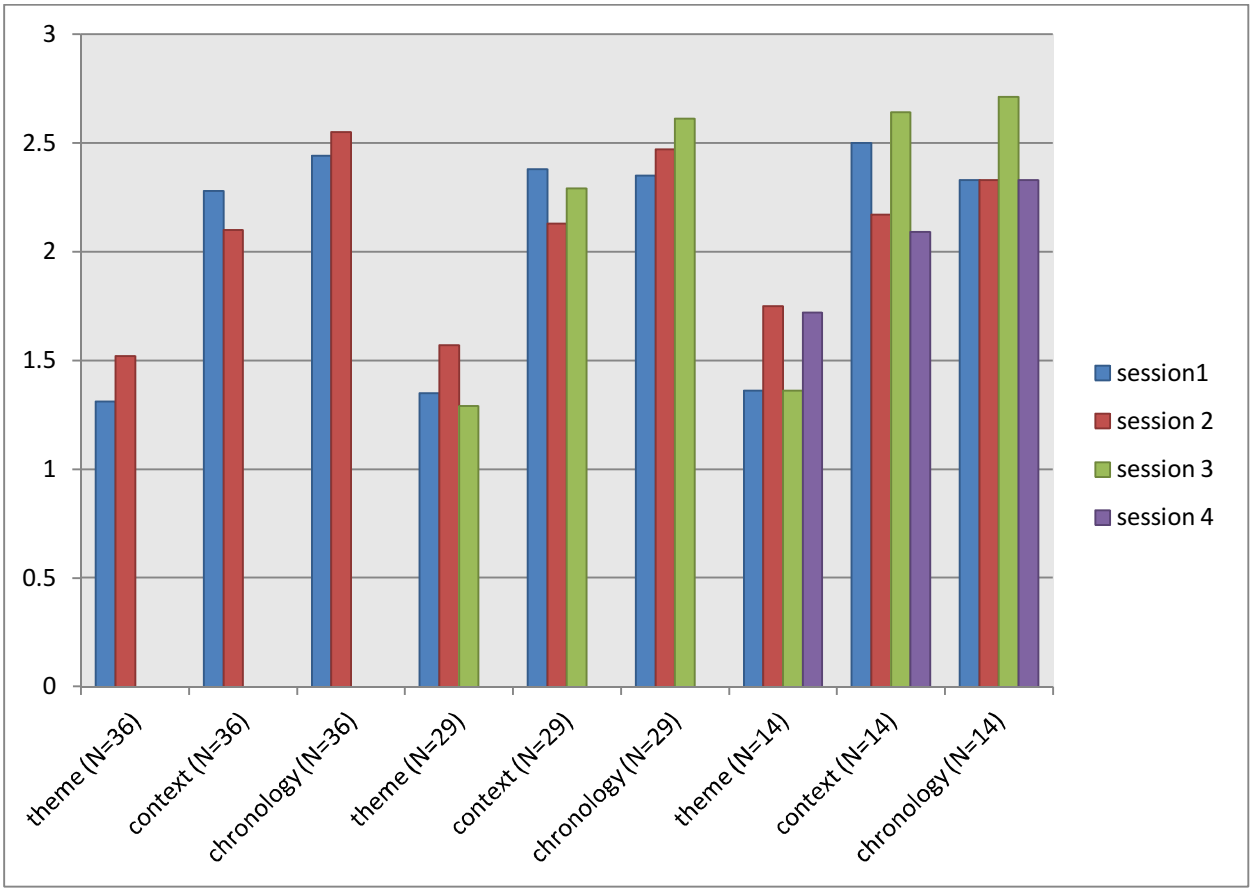

Figure 2: the Mean of the Naccs Scores

Note: There is no significant difference across the reports.

Figure 3:

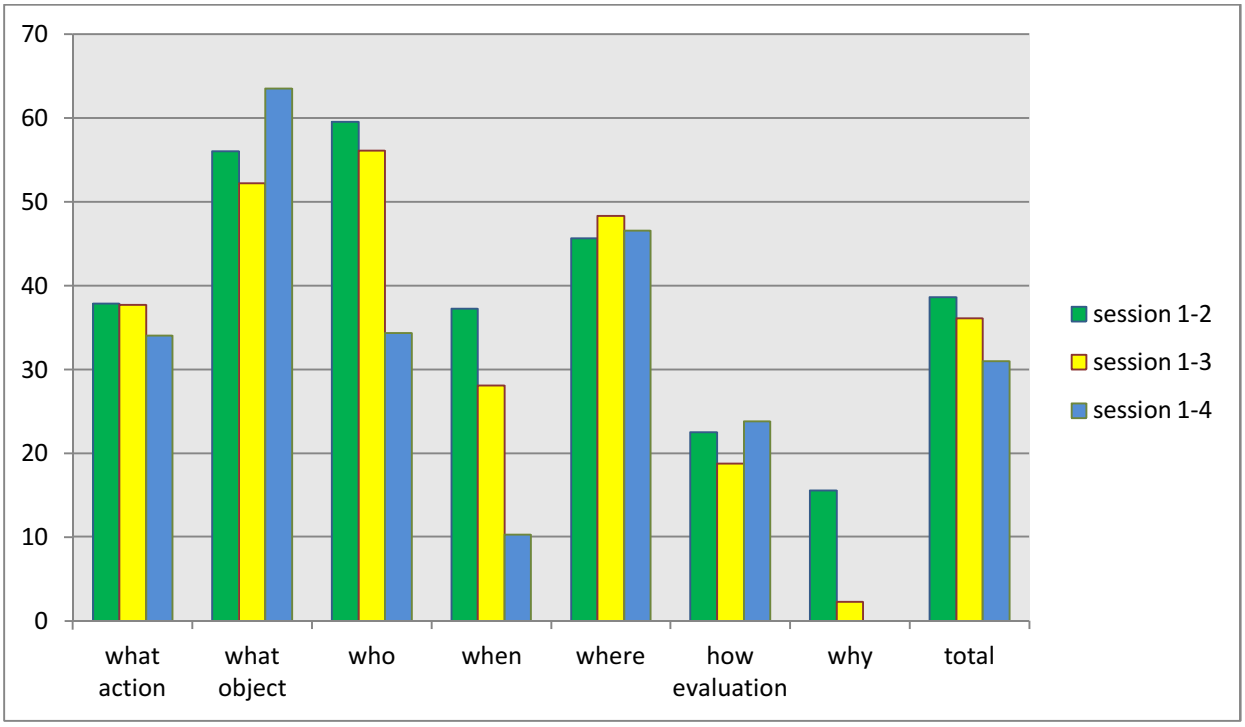

Figure 3: The Consistency Proportion Of Main Components the Event

Note: There is no significant difference across consistency in session 1 and 2, session 2 and 3, session 1 and 4.

Figure 4

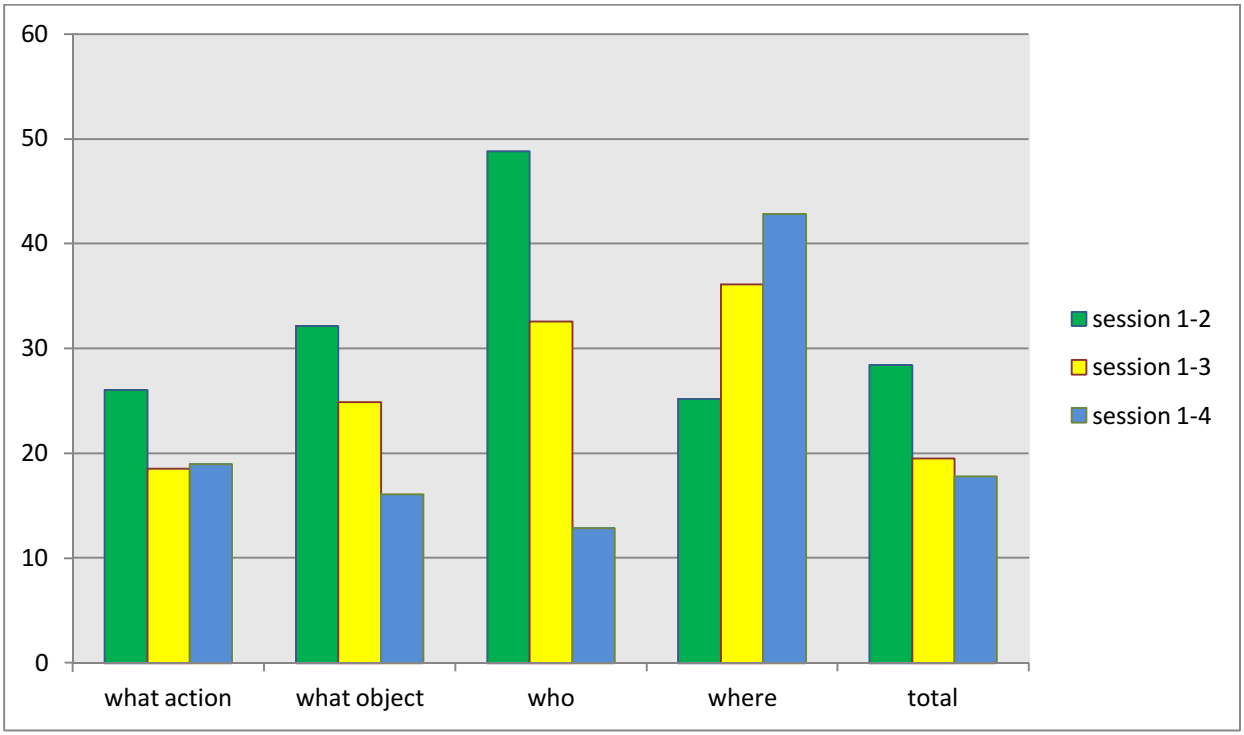

Figure 4: the consistency proportion of details (descriptions of main components)

Note: There is no significant difference across consistency in session 1 and 2, session 2 and 3, session 1 and 4.