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LANGUAGE-DEPENDENT RECALL OF AUTOBIOGRAPHICAL MEMORIES IN
ENGLISH-MANDARIN BILINGUAL SINGAPOREANS

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AUTOBIOGRAPHICAL MEMORIES IN BILINGUAL SINGAPOREANS

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ABSTRACT

Children start to form autobiographical memories (i.e., personal experiences and ideas about the self) early on and this plays a key role in one's identity and psychological well-being. Previous research has shown that language plays an important role in forming autobiographical memories. Conversations about experiences and reminiscing about the past have been shown to play a critical role in the development of autobiographical memory. In this study, English-Mandarin bilingual participants ($N = 22$) recalled autobiographical memories in response to six cue words in the first target language (English or Mandarin), and in the second language a week later (English or Mandarin). Results revealed no significant difference in the age of memories recalled in one's first learned language (English) than memories recalled one's second learned language (Mandarin). However, significant differences were found in self-focus ratios between the two languages.

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BIOGRAPHICAL SKETCH

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CHAPTER 1

INTRODUCTION

In *The Principles of Psychology*, William James (1890) highlighted the importance of human memory as a major component of the self. Autobiographical memories, which include personal experiences and ideas about the self, are formed early on in life, and play a key role in one's identity and psychological well-being (Conway & Pleydell-Pearce, 2000). Furthermore, language plays an important role in cognitive processes, personality formation, and has been shown to have effect on autobiographical memories (Marian & Kaushanskaya, 2005; Matsumoto, 1994). Beginning in childhood, language develops through social interactions, and aid in the organization of past experiences as it is incorporated into the formation of autobiographical memories (Nelson & Fivush, 2004). With the relationship found between autobiographical memories and language, can salient differences be observed in the content, and in the age of when the autobiographical memory is reported to have occurred, when the language of recall is varied?

CHAPTER 2

BACKGROUND

2.1 Language and Autobiographical Memories

Specific, long-lasting, and significant to the self, autobiographical memories form one's life history by incorporating several components such as narrative understanding and production, memory systems, parent conversation style, self-representation, among others. Autobiographical memories develop gradually, across preschool years through social interaction and cognitive development. It can be differentiated from other kinds of memory as it comprises interactions between the self, goals, emotions, and personal meaning.

Language has a fundamental and interconnected socio-cultural tool in the development of an autobiographical memory system. Memory development depends on social interactions, aided by conversations, which then lead to further language growth. Over time, the child learns to talk about personal episodes, incorporating social forms and moves away from producing fragmented memories (Nelson, 1993). As toddlers begin to use language, parents too, begin to talk about past and future events. Another crucial factor for the development of autobiographical memories is how it helps the individual develop a distinction between self and others. This is because conversations also aid in the child's development of the concept of time (past, future) (Nelson, 1996).

In the preschool years, children acquire the fundamentals of their native language. But what about memories in the early nonverbal stages of their lives? A study by Simcock and Hayne (2002) looked at memory recall in 27, 33, and 39-month-old children. An engaging and complex play event was created, and their memory of this event was tested either 6 or 12 months after. They wanted to investigate if the specific words that children used in the recall were part of their

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vocabulary at encoding. The authors found that words a child used to describe the event were always part of the child's productive vocabulary at the time of the experience. This reiterates that fact that language skills at time of event determines what can subsequently be recalled.

Other than for expression, language is imperative in the development of autobiographical memories for three reasons: (1) The use of language aids in the organization and evaluation of autobiographical memories; (2) Language allows children to engage in conversations about past experiences, which allows them to develop systematized representations of their earlier experiences; (3) Language assists in the formation of the awareness that memories are representations of the past, and therefore, can be evaluated from different perspectives (Nelson & Fivush, 2004).

2.2 Childhood Amnesia

Language acquisition not only plays a multifaceted role in the emergence of autobiographical memories, but also of the offset of childhood amnesia. In the past, autobiographical memories were regarded as childhood amnesia (Freud 1963) refers to the phenomenon in which memories before the ages of 3 to 4 are not available to adult consciousness, although memories from later childhood are easily recalled. An early study by Henri and Henri in 1987 asked adults to recall their earliest memory from childhood. No memories were reported before 2 years of age, but almost three quarters of participants reported memories between 2 to 4 years of age (Pillemer & White, 1989). Furthermore, the average age of an earliest memory is $3^{1/2}$ years of age, with almost no memories being recalled before age 3, and a significant drop in frequency of accessible memories from age 3 to 6 when compared with later life periods. This is also known as the forgetting curve for recall of childhood memories by

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adults. Today, the onset of autobiographical memories is understood to be the opposite of childhood amnesia (Nelson, 1993).

There have been claims that the amnesia we experience with regard to memories before the age of 2 is partially due to the difficulty in assessing memories that were encoded prior to language acquisition. The greatest increase in an individual's vocabulary occurs between 2 years 6 months and 4 years 6 months of age, and this corresponds to the average age of adults' earliest memories (Waldfogel, 1948). In addition, a lag between the earliest memory and language was observed by Morrison and Conway (2009). In this study, adults recalled specific memories in response to cue words, and a gap between the age of memory that was associated with the word, and the age at which the word is typically acquired was found. This indicates that language acquisition is an important first step in encoding verbally accessible memory system, and can determine the period of childhood amnesia (Hayne & Jack, 2011).

Later developments of memory encoding, retrieval and expression also contribute to the prognosis of childhood amnesia. With the increase in fluency of language, the encoding and retention of detailed and organized memories are supported (Nelson, 2004). Children are able to make sense of events around them, increasing the likelihood that the event will be remembered. Furthermore, language is also able to reactivate memories with the appropriate retrieval cues (Fagen & Rovee, 1983). Exposure to a reminder about the experience reduced likelihood of forgetting and returned memory ability to what it was at the original encoding.

Studies have shown that childhood amnesia cannot be explained by forgetting alone. In a study on earliest personal memories in 5-year-olds, 8- to 9-year-olds, 12- to 13-year-olds, and 18- to 20-year-olds earliest personal memories, Tustin and Hayne (2010), found a positive correlation with participants age and age of earliest memory, whereby the age of the earliest

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memory increased as age of participant increased. This finding has been replicated in other studies, and this suggests that childhood amnesia may not be the failure to encode autobiographical memories during childhood, but instead, the encoded memories are forgotten as we age. A reason for this selective forgetting involves the encoding specificity principle, which is the ability of a given cue to elicit a recollection depends on how the episode was encoded (Tulving et al., 1970).

2.3 Encoding Specificity Principle

Remembering, is the joint outcome of past stored information, and present information available in the current cognitive environment. More than just the activation of the learned association, remembering involves interaction between previously stored information and factors in the current environment that are responsible for bringing a memory into conscious awareness (Tulving, & Thomson, 1973). Simply put, how an item is retrieved depends on how the item is stored, which then depends on how it is encoded (Tulving, 1979). Much work has been done to confirm the encoding specificity principle, and studies have shown that this phenomenon is apparent across age groups (Puglisi, Park, Smith & Dudley, 1988).

Pioneering the demonstration of the effects of encoding specificity using cue words, Tulving and Pearlstone (1996) tested recall of words either in the presence of retrieval cues or with no cues. In this case, category names (e.g. four-footed animals--cow, rat; professions--engineer, lawyer) were used. Mean recall of participants displayed that cued recall was higher as compared to non-cued recall, indicating the possibility that words in the non-cued recall were available in storage, but non-accessible for retrieval. In a similar study, Tulving and Osler (1968) once again emphasized the importance of contingency between encoding and retrieval. Participants were presented with 24 words to be remembered, with either (1) one weakly

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associated cue word, (2) two weakly associated cue words, and (3) the absence of a cue word.

The findings showed that cue words facilitated the recall of the words, more so when presented both at encoding and recall of the words.

2.4 Bilingual Memories

Investigating how being bilingual can affect memory, Schrauf (2000) argues that bilinguals possess dual cultural-linguistic self-representations that act as filters for the retrieval of past events. The author states that memories, when retrieved using one's first language, may be higher in frequency, detail, and emotion compared to using one's second language. A proposed explanation is that remembering is state dependent. In line with previous research, the state at the time of retrieval should match the state of encoding for successful retrieval. Another explanation given was that in speaking a second language, one activates a 'language specific self', which act as a filter for socially constructed, linguistically mediated memories. Different languages are not only codes for a common world, but also act as an integral part of the construction of sociocultural worlds.

This phenomenon of encoding specificity was can also be observed in a study by Bugelski (1977). Bilingual Spanish-English who did not currently use Spanish to communicate, were prompted with both English and Spanish words to assist in memory recollection. Almost three quarters of their thoughts were from adulthood when cued with English word, and when cued with Spanish words, almost half of their thoughts referred to childhood experiences rather than current activities. Replicating the findings, Otoyá (1987), in working with Spanish- English bilinguals, found that Spanish prompts produced earlier memories than memories than did English prompts.

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In a similar study done with Japanese-English bilinguals and United States monolinguals showed how language is able to affect the content of autobiographical memories (Matsumoto & Stanny, 2006). Participants were required to retrieve memories and provide one earliest memory in response to cue words. Japanese bilinguals were cued with 20 English and 20 Japanese words, and United States monolinguals were cued with 40 English words. When cued with Japanese words, Japanese bilinguals provided more and earlier memories than when cued with English words. Frequency of recalled memories also increased when the cue language matched the language used for storage. Additionally, the average age of overall memories was reported to have occurred earlier for American monolinguals than Japanese bilinguals.

In line with the encoding specificity, a similar study with Russian-English bilinguals by Marian (2002) predicted that memories with the same linguistic environment at encoding and retrieval would be more accessible. So, English memories would be better recalled in the English language interview, and Russian memories would be better recalled in the Russian language interview. In the first experiment, sixteen Russian-English pairs of cue words were selected (Set 1) *summer, neighbors, birthday, cat, doctor, getting lost, frightened, bride*, and (Set 2) *snow, friends, holiday, dog, blood, contest, laughing, and newborn*. Participants were interviewed, speaking only in the appropriate language, and had to tell stories about events in their lives using the cue words to assist the recollection. The hypothesis was confirmed, and participants who were interviewed in Russian retrieved more memories from the Russian-speaking period of their lives, and the same results were found when participants were interviewed in English, with them retrieving more memories from the English-speaking period of their lives.

As seen in multiple studies with different populations, language and memory are interdependent. The cue words that matched encoding elicited the recall of memories due to the

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ability of language to assist in the retrieval of memories when the word matches the environment of encoding. In early development, only stimuli that match cues at time of encoding will serve as effective retrieval cues. The earlier in life the memory occurred, the less likely we are to encounter a cue that will initiate retrieval later on (Hayne, 2004). Thus, cognitive and social changes that occur during development increase the likelihood that early memories will be forgotten.

Changes in language or culture can also impair retrieval of memories; individuals who pick up a new language during early development retrieve childhood memories more successfully when cues from the old language is used compared to the new language (Wang, 2003; Schrauf, 2000). Additionally, bilingual adults report earlier memories when retrieval of memories are cued using their first language than using their second language. As memories become less accessible as we get older, due to the lack of retrieval cues, many recollections formed in beginning childhood are obliterated from our autobiography (Hayne & Jack, 2010). This places importance on the environment as the discrepancy between encoding conditions and recall conditions can affect memory recall.

Other than the age of memories, the content of autobiographical memory is largely affected by culture (Ross & Wang, 2010). Cross culturally it has been observed that different populations display differences in the content of memories when asked to recall autobiographical memories. A study with Australians and Asian found that more autonomous memories were provided by Australians and more memories on relatedness were provided by Asians (Jobson & O'Kearney, 2008).

Comparing between languages for an individual, a study done with children from Hong Kong found that the language that the children were interviewed in changed the content of the

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memory accounts. Children interviewed in English gave more self-focused accounts, and higher agreement with western values. On the contrary, children interviewed in Chinese provided more socially oriented self-descriptions, and lower agreement with western values (Wang, Shao, & Li, 2010). This is in line with the fact that the European American culture focuses on being an individual, having unique characteristics, and possessing autonomy, the Chinese culture focuses on social roles, togetherness and camaraderie (Wang & Conway, 2004). Although one is not fully immersed in the culture, speaking the language alone can already affect the way one thinks.

This then, raises the question of whether the same phenomenon can be observed in Singaporeans, while residing in the same country, learns two very different languages at the same time, where the definition of each language exposure is not significant. Will their first or second learned/acquired language have more impact on the recollection and content of autobiographical memories, or will both languages play an equally important role in memory formation, without any salient difference being observed? Additionally, when a specific culture is not tied to a specific language for the population (e.g. interdependence in Easterners, independence in Westerners), what then, can be expected from the content of the memories?

CHAPTER 3

THE PRESENT STUDY

3.1 Bilingualism in Singapore

A multicultural country located in Southeast Asia, Singapore is home to 5.5 million people, four different races (Chinese, Malay, Tamil, Others/Eurasian) and four official languages (Wee, 2002). From birth, Singaporeans are exposed to a multitude of cultural variation, through the interactions with other multicultural Singaporeans. Immersing oneself in cultural variety not only in schools, but also in the home environment.

Although English is the medium for education, children are also required to study a second language, often introduced in preschool (Chua, 2011). The exposure to and acquisition of two languages early on may influence the development of autobiographical memories. Having it mandatory for children of all races to pick up a second language exposes them not only to their home language, but also enables them to think and speak in an alternative one.

Singapore's employment of the bilingual policy in 1966 was intended for Singaporeans to learn English for instrumental reasons (political, social) and also to arm Singaporeans with the language skills needed to survive in the modern-day world (Chua, 2004). Bilingualism can be defined as the capacity of an individual to use and to code-switch between two languages in the course of communication (Hoffman, 1991; Skutnabb-Kangas, 1981).

In Singapore, the government believes in an early learning framework for its language policy. The English language is taught from the time a child enters school, and a strong emphasis is placed on creating a foundation for language skills (Chua, 2011). To encourage Singaporeans to not lose touch with their heritage, the Education Ministry's second language policy states that every pupil learn an official second language.

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With the great number of bilinguals in Singapore, one could wonder how memory formation, that is, encoding, storage and retrieval is affected by the exposure of different factors in the environment.

This study will explore autobiographical memory recall in college aged English-Mandarin bilingual Singaporeans through the use of language-dependent recall. Specifically, if autobiographical memories recalled differ based on the language of recall (English, Mandarin). This study wants to investigate if cue words of two different languages are able to elicit divergent memories. Additionally, this study wants to compare the content of these autobiographical memories, to locate if there are differences in the frequency of social or personal content when recalled in English and Mandarin.

In line with the literature, the first hypothesis of this study was that autobiographical memories recalled in English would be reported as occurring at an earlier age compared to memories recalled in Mandarin. The second hypothesis was that memories recalled in English will contain more personal content than memories recalled in Mandarin, which would contain more social content. The third hypothesis was that the mean age of the reported memory increases as birth order increases.

Taking into account that bilingual Singaporeans are exposed to two languages early on in childhood, the ultimate goal of this study is to determine if salient differences can be observed in the content, and the age of when the autobiographical memory is reported to have occurred, when the language of recall is varied.

CHAPTER 4

METHOD

4.1 Participants

Twenty-two Singaporean English-Mandarin bilinguals (6 males and 16 females) were recruited by word of mouth. Their mean age was 23.5 years. All participants reported English to be their first language, and Mandarin as their second.

4.2 Measures and Materials

As Cue words have been shown to facilitate memory and recall (Watkins, 2001), six English cue words were selected, and translated into Mandarin: Book (书); Doctor (医生); Dog (狗); Friends (朋友); Frightened (害怕); Laughing (笑). The cue words were determined by picking the most appropriate words for the population, from previously identified words that were shown to successfully elicit memories (Marian & Neisser, 2000).

4.3 Demographic and Language Information

Other than basic demographics (e.g. gender, date of birth, ethnicity, birth order) the questionnaire was comprised of items for information on language, including first language, second language, age of acquisition of each language, and if the acquisition was sequential (one after another) or simultaneous (at the same time).

4.4 Procedure

Participants were first contacted through electronic mail (email) upon expressing interest in participating in the study. A specific computerized link was then be assigned, and emailed to participants, giving them access to the study. In the first part of the experiment, participants were shown instructions in the target language, either English or Mandarin, specifying that they are to, in detail, recall an event before age 7 that comes to mind in response to the cue words. They

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were then shown a cue word, and for each word, recall and type out the memory in the target language about a specific event in their life. Additionally, they were also required to give the closest estimate of their age when the event occurred. Participants were encouraged to provide the first memory that comes to mind.

After a one-week interval, in the second part of the experiment, the target language was varied according to the language previously completed. Participants went through the same procedure, recalling memories in response to the same cue words, except this time, all instructions and cue words were in the alternative language. The order of the language was counterbalanced across participants. A demographics and language questionnaire was completed at the end of the study. Participants were remunerated S\$10 for their time.

4.5 Coding

Coding was completed in the original language of the response. Using an adapted coding system from Wang & Conway (2004), two bilingual coders coded a total of 123 open-ended responses after reliability was established. The responses were coded for frequency of (1) personal activities and statements that only involved the participant (e.g. I went to the beach) and (2) social activities and statements that involved collective groups (e.g. my sister and I were happy). The interrater reliability averaged 90%.

CHAPTER 5

RESULTS

5.1 Age of Language Dependent Memory Recall

A paired-sample t test was conducted to compare the age in months of earliest memory recalled in English and in Mandarin. Although memories recalled in English were shown to have occurred at an earlier age, the analysis yielded no significant difference in age of memory between memories recalled in English ($M = 67.88, SD = 10.60$) and in Mandarin ($M = 75.41, SD = 20.94$), $t(21) = 1.67, p = .11$. Cohen’s effect size value ($d = .45$) suggests a moderate effect.

5.2 Content

To investigate content, a paired-sample t test of ratios of self focus (personal/social) between languages was conducted to compare the differences in frequency of personal and social content within the two languages. Analysis showed a significant difference of content between languages (Figure 1) $t(21) = 2.88, p = .009$. Participants, indeed, recalled different self focus ratios of social and personal content in English compared to in Mandarin.

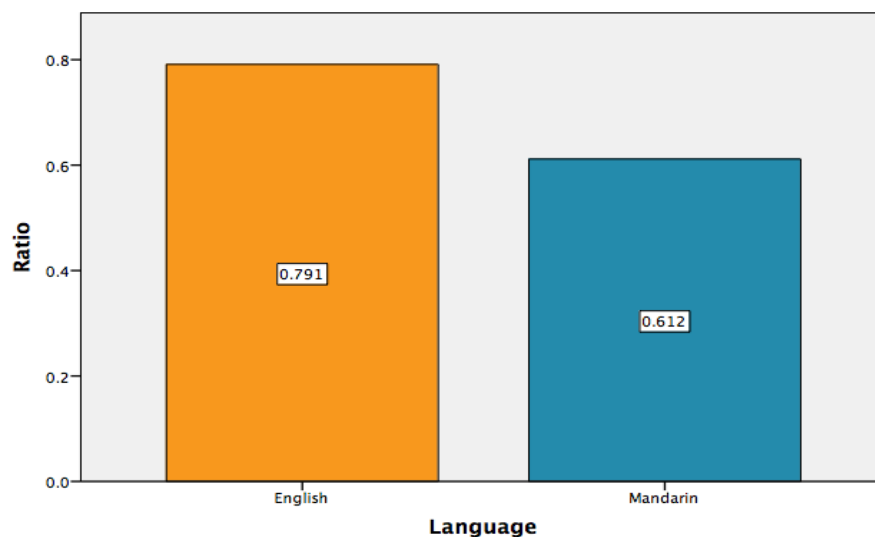


Figure 1. Ratio of Self-Focus (Personal/Social) Between Languages

5.3 Birth Order

A significant correlation between age of reported memory in English and birth order was found, $r(22) = .55$, $p = .008$. Participants who were first born ($M = 5.22$, $SD = .48$) reported memories occurring significantly earlier than second born participants ($M = 6.29$, $SD = 1.14$), who had an almost identical age of memory for third born participants ($M = 6.28$, $SD = .69$).

Furthermore, there was no significant difference between males ($M = 12.62$, $SD = 2.51$) and females ($M = 11.69$, $SD = 2.00$) regarding the age of the earliest memories, $t(20) = .26$, $p > .05$.

CHAPTER 6

DISCUSSION AND CONCLUSION

The central objective of this study was to investigate if the language of recall by English-Mandarin bilingual Singaporeans could affect the age and content of memory. The hypothesis predicted that a participant with English as his/her first language would have “English memories” taking place at an earlier age compared to “Mandarin memories,” as early memories were formed with English as the linguistic environment. Although this study did not find significant differences in the age of memory recalled in participant’s first and second language, the pattern found is as expected, that the age memories recalled in English were lower than the age memories recalled in Mandarin.

With regard to content, the pattern of the findings support the notion that content of memory is affected by language of recall. Bilingual children have different selves that are associated with different languages, that are related to ways of thinking (Wang et al., 2010). Due to a change in language, the interdependent self, an alternative frame of thinking and recall was activated when memories were recalled in Mandarin, thus having a higher frequency of social content in the memory. Personal content was also higher in memories recalled in English, which could indicate the “activation” of the independent self.

The positive correlation between the age of the earliest memories and birth order is consistent with previous findings. Other than being affected by individual factors such as cognitive development, it has been proposed that autobiographical memories is shaped by a child’s discussion of events with adults such as their parents. It has been found that parents talk more with first-born children, and this decreases across birth order. Thus the age at which autobiographical memory emerges increases across birth order (Mullen, 1993).

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Results of this study provide insight into how Singaporeans bilinguals form autobiographical memories, and what factors can affect its construction. Unlike previous studies that have looked at participants who are exposed to a single language in one country, and another language in a second country, this study looks at a population that is required to acquire and be proficient in a second language from an early age, while being surrounded by many others. With the importance placed on bilingualism in Singapore, findings of this study offer implications on the cognition of Singaporeans, and whether or not the type of language spoken can directly affect memories. It was found that the age of the memory was not affected by language of recall, but the content was. This sheds light on the ability of the sample to possess “bicultural selves”. This can have practical implications on the importance of fostering bilingualism from a young age, and also the types of languages that could be useful in creating the bicultural self. This can increase one’s adaptability to different cultures simply through the acquisition of a language.

A potential drawback of this study would be the inability to determine the accuracy of the self-reported memories. Confounds such as false memories or incorrect memories could potentially affect the overall findings. Since this study is completed through self-report, the memories cannot be confirmed in any manner, and have to be taken at face value. A larger sample size could also make the differences found in the study more salient.

Future directions could be including bilingual Singaporeans who speak other languages, or looking at whether trilingual Singaporeans form memories and recollect autobiographical memories in a different manner, based on the language of recall.

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