Multilingualism and Memory

STEPHANIE A. KAZANAS AND JEANETTE ALTARRIBA

Research with multilinguals has highlighted the general memory advantages of knowing more than one language. For example, Schroeder and Marian (2012) have cited better executive functioning in bilinguals than monolinguals, and research in the medical field has found a buffering effect of multilingualism on memory loss in the elderly (e.g., Bialystok, Craik, & Freedman, 2007). Other research has emphasized the differences in memory capacity or memory effects in a native language (L1) versus a second (L2) or third language. Although the focus of this entry is on the more applied areas of memory research with bilinguals and multilinguals, a brief primer on some basic findings with these populations is useful.

Cook (1997) has noted that a bilingual participant’s short-term memory (STM) span appears to differ depending on whether they are tested in their L1 or L2 (with L2 span often shorter than L1 span). Some have argued that L2 processing may be more demanding on working memory (e.g., Ardila, 2003). However, a developmental aspect of memory can also explain this discrepancy: Very young children’s memory is organized by shapes and colors, while older children and adults rely on phonology to a much greater extent (Service & Craik, 1993). In addition, there is evidence that second language learning during childhood is especially dependent on phonology-related memory processes. A recent study with children growing up in a multilingual environment (e.g., the often-trilingual Luxembourg) has demonstrated how vocabulary development is highly dependent on verbal short-term storage (Engel de Abreu, Gathercole, & Martin, 2011). Thus, the relationship between mastering a new language and memory processes/abilities is a critical one.

Other research has compared both verbal and nonverbal memory performance. Papagno and Vallar (1995) tested multilinguals (Italian university students who spoke at least three languages) and bilinguals (Italian university students who spoke only one additional language). All participants completed the same battery of tasks: Raven’s progressive matrices, a vocabulary portion of the Wechsler adult intelligence scale (WAIS), auditory digit span, nonword repetition, paired-associate learning, visuospatial span, and a visuospatial learning task (the last two using Corsi’s block-tapping test). The authors found superior performance by the multilingual group on several tasks (with equivalent performance on the other tasks): the WAIS vocabulary test, auditory digit span, and nonword repetition. Papagno and Vallar (1995) suggest that auditory digit span and nonword repetition tap into aspects of a single construct: phonological short-term memory. Kaushanskaya and Marian (2009) have also noted how bilinguals perform better than monolinguals on novel word-learnng tasks. These findings— with university students— mirror those reported by Engel de Abreu et al. (2011) with children. Perhaps there are some applied implications from this set of findings: Foreign-language learning is highly dependent on acquisition and mastery of the sounds unique to that language. It is quite possible that performance on these types of tasks can predict some level of foreign-language learning aptitude.

Research on long-term memory with bilinguals and multilinguals is both broadly useful and diverse. We have constrained the remainder of this entry to a few particularly
fascinating areas: emotion memory, interpretation, and autobiographical memory. We conclude this review with brief sections on false memory and the buffering of memory decline in the elderly. As Cenoz (this volume) has astutely noted, research with a multilingual population has included both bilinguals and multilinguals; for this reason, our selection of the relevant literature has included findings from both populations (with an emphasis on findings from multilingual samples, whenever possible). In addition, in each section, we have included suggestions for future research questions and endeavors.

### Emotion Memory

In laboratory settings, researchers have documented better memory for emotion words than for concrete and abstract words (see e.g., Altarriba & Bauer, 2004). Consider, also, the finding that bilingual speakers prefer to use their first language for emotional topics (Pavlenko, 2005). When describing counseling settings, Altarriba and Santiago-Rivera (1994) have noted that language proficiency, acculturation, and several other factors play a significant role in treatment efficacy. By integrating these findings, Ayçiçegi-Dinn and Caldwell-Harris (2009) suggest that a person’s first language is perhaps “experienced as more emotional” (p. 291), which might lead us to expect stronger emotion-memory effects for words presented in a bilingual’s first language than their second language (but see Ferré, García, Fraça, Sánchez-Casas, & Molero, 2010).

In their study, Ayçiçegi-Dinn and Caldwell-Harris (2009) assessed the effects of four different tasks on memory for emotional (taboo, reprimands, negative, and positive) and neutral words. Each participant was randomly assigned to perform one of four tasks that varied in depth-of-processing: counting the number of letters with closed circles, translating from Turkish to English (or vice versa), rating a word for its emotional intensity, or listing word associates. All participants listed Turkish as both their native and dominant language (English was their second language). The authors found the highest recall rates for two of the emotional word categories: taboo words and reprimands. Positive words were recalled more often than negative and neutral words; negative word recall did not differ from neutral word recall—a surprising finding, given recall for taboo words and reprimands. Ayçiçegi-Dinn and Caldwell-Harris (2009) noted that differences in recall according to language varied by task type. With certain tasks, such as the emotion-intensity rating task, participants recalled more of the words presented in Turkish than in English. The opposite effect was found in the translation task, but there was no effect of language in either the letter-counting task or the word association task.

Thus, it appears that the effect of the emotional quality of a word on memory depends on how it is processed. In their study, Ayçiçegi-Dinn and Caldwell-Harris (2009) also noted the similarity of emotion-memory effects in their bilinguals’ first and second languages. One final finding is of particular interest: Several participants commented that encountering reprimands in English (“Stop that”) were surprising to them, which may account for higher recall in some of the tasks. Perhaps future research can manipulate age of acquisition to determine if item effects (within categories, like reprimands) vary according to when—and in what language—words and phrases were learned. Some recent findings by Ferré et al. (2010) indicate that, with balanced bilinguals, the emotional intensity of a word is matched across languages. The authors note that these results may be specific to memory tasks. Again, these results may differ, when comparing bilinguals of varying levels of proficiency and age of acquisition.
**Translation/Interpretation**

In another applied area, researchers have asked what role simultaneous interpreting—a skill that is made possible through proficiency of multiple languages—plays in memory. Specifically, how do short-term and working memory capacities differ across novice and expert interpreters? In the first study of its kind, Köpke and Nespoulous (2006) compared performance on three types of tasks: those measuring short-term retention (digit span, pseudo-word span, word span, semantically related word span, and phonologically related word span), others measuring storage and processing (free recall with articulatory suppression during encoding, category probe, rhyme probe, and listening span), and a Stroop task. Their sample included four main groups of participants: professional interpreters (experts), student interpreters (novices, still enrolled in interpreting schools), French–English bilinguals (mainly foreign-language teachers), and French monolinguals (university students). All participants completed a language history questionnaire to verify their L1 (French) and professional experience.

The most important results on task performance across the four groups differed on three of the more complex tasks: free recall with articulatory suppression, the semantic probe task, and the listening span task. In each of these tasks, which require working memory capabilities similar to those needed when interpreting, the two interpreter groups always outperformed the two control groups. Perhaps the more interesting finding was that the novice interpreters numerically (though not significantly) outperformed their expert counterparts. How can this be? Should we not expect that these working memory abilities would become more refined with years of professional experience in the multilingual world? Köpke and Nespoulous (2006) suggest that “novice and expert processing are fundamentally different processes” (p. 15), where expert interpreters may develop other processes, such as more specialized skills that do not depend on working memory, per se. As the authors suggest, future studies testing the effect of interpretation experience on memory task performance should be careful to match all participants on variables such as age, memory training, and motivation to improve their interpreting skills. Köpke and Signorelli (2012) agree, citing issues with participant selection as an explanation for these results. These possible confounds indicate some limitations to the findings described by Köpke and Nespoulous (2006); however, their work was meant to be exploratory and should encourage additional research.

**Autobiographical Memory**

For those who study autobiographical memory, a very robust memory phenomenon has been documented: the “reminiscence bump,” a high recollection for events occurring between the ages of 10 and 30. Although there are many possible explanations for this phenomenon (e.g., maturational factors, such as the development of language, the hippocampus, and the self), the cognitive mechanisms underlying the reminiscence bump are more crucial to this discussion. For example, novel events are more memorable because they are more distinctive by their very nature (Hunt & Einstein, 1981). One event in particular that is characteristic to many bilinguals and multilinguals is both novel and followed by a long period of stability, which enhances memory organization: migration and settlement in a new location. Schrauf and Rubin (1998) tested for a reminiscence bump in older adults who had immigrated to the United States between the ages of 20 and 35. Their sample included both bilinguals and trilinguals with varying fluency, though all indicated that Spanish and English were their native and second languages, respectively. Each participant was given a set of 50 single-word cues and asked to provide a personal
memory related to that word (one day in Spanish and another day in English, with the order counterbalanced across participants).

Schrauf and Rubin (1998) compared their data with a group of English monolinguals and found that when the age of immigration coincided with the typical period of the reminiscence bump (early 20s), the bump was much higher than the comparable group of monolinguals. However, when immigration occurred later (such as late 20s through early 30s), the bump was shifted to that age. According to the revised hierarchical model (RHM; Kroll & Stewart, 1994), the language of the cue should not affect access to autobiographical memory, as a common store links the lexicons to each other and memory itself. The authors found support for the RHM: participants had equal access to their memories. Perhaps more importantly, Schrauf and Rubin (1998) noted how their participants retrieved earlier memories in Spanish (the language they primarily spoke prior to migration) and later memories in English (their L2) (for a review of both experimental and clinical work, see Schrauf, 2000). This finding—recall for memories encoded in the language used at the time of the event—was also replicated by Marian and Neisser (2000) and Marian and Kaushanskaya (2004) with Russian–English bilinguals. Marian and Kaushanskaya (2004) also noted that participants adopted greater intensity when these languages matched at encoding and recall. In addition, their narratives included a cultural style similar to the culture of the language they were speaking (e.g., individualistic, collectivistic, etc.). These results suggest that memories appear to be coded in the language in which they occurred, and best recalled in that language (a type of encoding-specificity). However, in some cases, bilinguals adopt balanced proficiency in each language or a second language becomes well practiced to the point of functional dominance. In these cases, as described by Schrauf and Rubin (1998), these participants have equal access to the memories, regardless of the language used to cue each memory.

While the focus of their paper was not on the content of retrieved memories, per se, other researchers have studied language-learning memoirs, in an effort to uncover the conventions that characterize the immigration experience (e.g., Pavlenko, 2001). For example, Hungarian linguist Lomb (1978) described sociocultural influences (e.g., an unemployment crisis in Hungary, the Russian occupation of Budapest, etc.) that led to her learning English and improving her Russian. Others, such as Lvovich (1997), recalled their attempts to learn a new language through imitation: “When I saw him [her French teacher] and heard him pronounce the first sound, I wanted to become who I have become—as a person, a scholar, a professional, and a woman” (as cited in Pavlenko, 2001, p. 228). These memories are especially important because they emphasize some of the motivations for these multilinguals learning several languages throughout their lives.

Pavlenko (2005) herself has noted, “To abandon Russian means to embrace freedom. I can talk and write without hearing echoes of things I should not be saying. I can be me. English is a language that offered me that freedom” (p. 22). What is perhaps the most remarkable observation from these collections is the vast number of autobiographies written by either English speakers (learning other languages) or those having successfully learned English as a second or third language. But, how do we characterize the language-learning memoirs of those unfamiliar with English? Perhaps future research can investigate the differences between the recollections of language-learning experiences of English speakers and non-English speakers.

**False Memory**

An area of particular interest to memory researchers, in general, is false memory. Having outlined an area of research that relies on bilinguals’ recollections—autobiographical
memory—it is important to briefly review findings from false memory studies. Within the false memory paradigm, participants are presented with lists of highly associated words (e.g., *table, sit, couch*). When asked to recall the words from each list, participants often recall with high confidence a word (e.g., *chair*) that was semantically related to the other words, but not presented at all: a false memory effect. A recent review by Graves and Altarriba (2014) describes studies with both monolingual and bilingual samples that demonstrate this effect. We discuss one of these studies in greater detail.

Marmolejo, Diliberto-Macaluso, and Altarriba (2009) used this paradigm with a bilingual sample, presenting the lists in either English or Spanish. Similarly, participants completed recall and recognition tasks in either English or Spanish. The authors found higher recall in English, the participants’ dominant language. In addition, false memory for the critical lure (e.g., *chair*) was higher when the words were presented and reported in English. Finally, recognition was highest when the lists were presented and recognized in the same language (with similar effects in both English and Spanish). Thus, the language used as both encoding (initial presentation) and later recall had a significant impact on the accuracy of memory. In fact, the results resemble an encoding-specificity effect, similar to those described earlier from autobiographical memory studies. To conclude, while these kinds of tasks are conducted in tightly controlled laboratory settings, findings from false memory research have clear implications for eyewitness testimony, instances of repressed/rediscovered memories, and other situations in which the inaccuracy of a person’s memory can have serious legal consequences.

**Memory and Aging**

A recent line of research has investigated the positive effects of bilingualism and multilingualism on those with age-related cognitive decline and dementia. In a study comparing monolinguals and bilinguals, Bialystok et al. (2007) found that bilinguals exhibited fewer memory-related symptoms. In their sample of 184 patients, bilinguals showed these symptoms approximately four years later than monolinguals. Moreover, computed tomography (CT) scans revealed that bilingual patients displayed significantly more brain atrophy than monolingual patients, indicating that symptom manifestation is greatly delayed in bilinguals (Schweizer, Ware, Fischer, Craik, & Bialystok, 2012). A more recent review found that these results are not the result of education, sex, occupation, or other possible confounding factors (Alladi et al., 2013). Their finding that these effects were not related to literacy rates is perhaps most interesting, as they were the first to test this hypothesis. In addition, their findings indicated that speaking more than one language seemed to delay the onset of several dementias, including frontotemporal and vascular dementia. Perhaps the mental “exercise” required of a bilingual provides some amount of protection or buffering from these types of impairments. Alladi et al. (2013) argue that these advantages are due to attention and executive functions. Other researchers have cited these functions as possible explanations for more preserved episodic memory in bilinguals than monolinguals (e.g., Schroeder & Marian, 2012). This line of research is especially important, as it has profound implications: The growing body of evidence suggests that a behavior or lifestyle can have a protective effect on general cognitive functioning and brain pathology. As many of these researchers have pointed out, future research should investigate the specific mechanisms responsible for these findings.
Summary

Applied memory research with bilinguals and multilinguals spans many fascinating topics, several of which were the focus of this entry. Each of these areas of research emphasizes some capacity or experience that is unique to bilinguals and multilinguals. With the knowledge that bilingualism and multilingualism will likely increase, research in these areas that simulate or embody the multilingual experience (as well as others, such as the developmental course of multilingualism, third language acquisition, etc.) will become increasingly relevant and applicable to a wide audience of both researchers and the general public, alike.

SEE ALSO: Bilingualism and Age; Bilingualism and Cognition; Cognitive Approaches to Translation; Crosslinguistic Influence and Multilingualism; Dynamics of Multilingualism; Multilingualism; Multilingualism and Emotions; Neurolinguistic and Cognitive Aspects of Interpreting; Research Techniques and the Bilingual Brain; Translation and Interpreting and Bilingualism; Working Memory in Second Language Acquisition

References


**Suggested Readings**


