What we remember and what we tell: The effects of culture and self-priming on memory representations and narratives

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Two experiments were conducted to explore culture and self-priming effects on memories of Caucasian and Asian American adults (N = 526). In the experimental conditions, either the collective or private self was primed prior to retrieval. Participants then described their earliest childhood memories (Study 1) or recalled a fictional story (Study 2). Systematic cultural differences in memory content were obtained across both memory tasks, independent of priming conditions. Caucasians tended to recall specific, one-moment-in-time events that focused on the individual as the central character. Asians tended to provide memories of general, routine events centring on collective activities and social interactions. Priming effects also emerged: memory content reflected the particular aspect of the self being primed. Findings are discussed in light of the interactive relation between memory representations and memory narratives and the role culture plays in remembering.

In recent comparative studies, researchers have reported cultural differences in adults’ childhood recollections. On average, the earliest memories reported by European and Caucasian American adults occur at about age 3.5, which is more than 6 months earlier than those reported by native Koreans and Chinese as well as by overseas Asians (MacDonald, Uesiliana, & Hayne, 2000; Mullen, 1994; Wang, 2001). In addition, early memories reported by Caucasian Americans are often voluminous, specific, self-focused, and emotionally elaborate. By comparison, the childhood memories of Chinese tend to be skeletal, routine-related, centred on relationships, and emotionally unexpressive (Wang, 2001). These content and stylistic differences in memory are apparent by early preschool years. Compared with their Korean and Chinese peers, Caucasian American children provide autobiographical accounts that are more elaborated, specific, and self-focused, and less socially oriented (Han, Leichtman & Wang, 1998; Wang, 2004; Wang & Leichtman, 2000).

Because most autobiographical memory research depends on participants’ verbal recall, questions remain regarding the interpretation of the cross-cultural findings. Do cultural differences in memory narratives indicate different memory representations of event information, or do the differences reflect different norms of expression in diverse cultures? Conceivably, each culture provides a “model” of what a life history should be like and, therefore, creates a type of “response bias” in memory narratives rather than actual differences in memory representations (Bruner, 1990; Conway & Pleydell-Pearce, 2000). For

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example, the poor recall that Mayan children exhibit when recounting an event to an adult is more indicative of culturally appropriate forms of interaction than of memory deficiencies (Rogoff & Mistry, 1990).

The question of whether culture exerts an influence only at the stage of memory retrieval or also at encoding mirrors an enduring issue in traditional memory research: To what extent do memory narratives reflect underlying memory representations? A comparative approach that investigates culture effects on memory representations and memory narratives would shed light on this question. Empirical data to date have shown that although culture affects autobiographical remembering in many ways (for a review, see Wang, 2003), one particularly important mechanism is cultural self-construal (Mullen, 1994; Pillemper, 1998; Wang, 2001).

**CULTURAL SELF-CONSTRUAL AND MEMORY**

Psychological and anthropological studies have indicated that conceptual representation of the self varies across cultures as a function of differing values and social orientations, despite substantial individual variation within a particular society. Many Western cultures tend to value individual autonomy, self-expression, and personal sufficiency. In such cultures, the self can be generally characterised as *independently oriented*. People perceive themselves as bounded and distinct, separate from others and their social context. In contrast, in many Asian cultures that stress social hierarchy, group solidarity, and interpersonal harmony, the self can be characterised as *interdependently oriented*. People tend to regard themselves as unbounded and inextricably connected to others within a relational network or a reigning social order (Fiske, Kitayama, Markus, & Nisbett, 1998; Geertz, 1973; Markus & Kitayama, 1991; Triandis, 1989).

One important characteristic of cultural self-construal lies in the different degrees of saliency and elaboration of private versus collective aspects of the self. *Private* self focuses on personal qualities, attitudes, beliefs, or behaviours that are not particularly related to other people. *Collective* self focuses on demographic categories, social roles, and group memberships that emphasise the individual’s connections to a larger social setting (Greenwald & Pratkanis, 1984; Triandis, 1989).

Although, in general, the self is constituted by defining features reflecting both the uniqueness of an individual and the commonalities the individual shares with others (Kihlstrom, 1993; Markus & Wurf, 1987), the centrality or importance of these features differs between independent and interdependent self-construals (Markus & Kitayama, 1991; Triandis, 1989). Studies using open-ended self-descriptions (Ross, Xun, & Wilson, 2002) and questionnaires such as the Twenty Statements Test (TST; Kuhn & McPartland, 1954)\(^\text{1}\) have consistently revealed that Westerners provide more information about personal attributes and beliefs (e.g., “I am tall, intelligent, good-natured”) and less information about the collective self (e.g., “I am a girl, a member of the Chen family, a student”) than do Asians (Bochner, 1994; Trafimow, Triandis, & Goto, 1991; Wang, 2001).

These divergent cultural self-portrayals have powerful effects on the way people sample, process, and retain information from the environment (Markus & Kitayama, 1991; Triandis, 1989). Independent selves tend to be sensitive and responsive to information focusing on their personal roles, feelings, and thoughts, which is subsequently deeply processed and elaborately represented in their memory system. In contrast, interdependent selves are often attuned to information centring on social interactions and collective activities, with exclusively self-focused information being less salient. To further understand the interplay between cultural self-construal and autobiographical memory, Wang (2001) examined self-descriptions and earliest childhood memories in Caucasian American and Chinese college students. Among Americans, a focus on private aspects in self-descriptions was associated with early, coherent, detailed, emotionally charged, self-focused memories. Among Chinese, a focus on collective aspects in self-descriptions was related to later, brief, skeletal, emotionally unexpressive, relation-centred memories. Although susceptible to a variety of interpretations, these correlational results are consistent with the proposition that cultural self-construal serves as a filter for individuals’ memories of their life experiences.

\(^1\)In the TST test, participants were asked to describe themselves by completing 20 sentences—each phrased “I am”—with a short phrase. This test has been widely used to assess variation in the organisation and salience of self-related information across cultural groups.
Patently, the interplay between cultural self-construal and memory starts early in life. Parents employ childrearing practices in a myriad of daily exchanges with their young children that instil cultural ideologies and beliefs pertinent to the self (e.g., Miller, Wiley, Fung, & Liang, 1997; Shweder, Goodnow, Hatano, LeVine, Markus, & Miller, 1998; Wang, Leichtman, & Davies, 2000). Culture-specific ways of perceiving and evaluating oneself thus become an integral part of children’s developing self-concepts and shape their personal remembering. As shown in a recent study (Wang, 2004), Caucasian American children as young as age 3 and 4 more frequently described themselves in terms of personal attributes and inner traits than their Chinese peers who provided more self-descriptions of social roles and categories. Caucasian children also recalled more self-oriented, less social memories than did Chinese children. Thus cultural self-construal emerges early in development and can further affect the way early memories are encoded and retained over time.

PURPOSES OF THE PRESENT STUDY

Research has shown that, depending on particular contexts, situations, or incidental cues, some cultural beliefs may become more accessible to an individual than others, which in turn influences an individual’s cognition, emotion, behaviour, and even self-perception (Hong, Morris, Chiu, & Benet-Martinez, 2000; Ross et al., 2002; Trafimow, Silverman, Fan, & Law, 1997). For example, Ross and his colleagues (2002) used language to shift the cultural frame adopted by bilingual Chinese-born Canadians. Compared with participants who completed the tasks in English, those responding in Chinese reported more collective self-descriptions, lower self-esteem, and more agreement with Chinese values. Presumably the language manipulation altered the accessibility of different cultural beliefs, which in turn affected self-knowledge. Recent research has also examined the effects of shifting cognitive frames on memory (Libby & Eibach, 2002; Marian & Neisser, 2000; Schrauf, 2000; Woike, Lavezzary, & Barsky, 2001). Following this line of inquiry in the present studies, we used priming to shift the self-construal of participants of either a Caucasian American or Asian cultural background. We then examined their subsequent memory narratives of earliest childhood experiences and of a fictional story.

Because the content and accessibility of memory information are influenced by how the self is structured (e.g., Conway & Pleydell-Pearce, 2000; Neimeyer & Raesides, 1991; Ross, 1989; Ross & Wilson, 2000; Wang, Leichtman, & White, 1998), priming a particular aspect of the self is likely to increase the retrieval of memory content pertaining to that aspect of the self. Specifically, when individuals are primed to be attuned to their personal attributes and predilections, that is, the private aspects of the self, they are likely to provide memory accounts that emphasise individuality and autonomy. In contrast, when individuals attend to the social groups to which they belong, that is, the collective aspects of the self, they may tend to recall memories that centre on social activities and interactions. The effect of priming on the age of earliest memory is also of interest. On the one hand, participants may be well aware of their earliest memory and therefore be impervious to the effects of priming. However, a recent study by Wang, Conway, and Hou (in press) showed that memory accessibility varied with nature of the recall task. When participants were asked to recall as many childhood memories as they could, their earliest memories were almost 10 months earlier than in studies where only the earliest memory was requested (e.g., MacDonald et al., 2000; Mullen, 1994; Wang, 2001). A focus on the private aspects of the self is associated with earlier first memories than a focus on the collective aspects of the self (Wang, 2001). Consequently, priming the private self may trigger earlier memories if the accessibility of earliest memories is relatively malleable.

An analysis of the representation versus narrative interpretations of cultural differences in memory yields three hypotheses pertaining to the effects of self-priming. According to an “encoding” account, culture primarily affects how events are encoded and initially represented in memory. If memory representations vary with culture, then recollections should reflect cultural differences regardless of participants’ self-construal at retrieval. According to a “retrieval” account, cultural differences reflect divergences in memory narratives rather than in initial memory representations. From this perspective if Asians and Caucasians are primed at the time of retrieval to focus on similar aspects of self-construal, then cultural differences in memory should dissipate. Finally, both accounts could have some validity, such that recollections reflect independent encoding and retrieval processes. This “encoding-
retrieval” hypothesis would predict both culture and priming effects in memory.

We conducted two studies to test these hypotheses. In Study 1, we examined early autobiographical memories of Caucasian and Asian participants after priming different aspects of cultural self-construal. Focusing on earliest childhood memories allowed us to examine culture and priming effects on both the content and accessibility of memories and to compare the results with existing cross-cultural data that show strong cultural differences in such recollections (MacDonald et al., 2000; Mullen, 1994; Wang, 2001). In Study 2, we assessed participants’ memories of a fictional story to test the generalisability of our findings. Including the story recall task allowed us to control for possible confounding effects of previous rehearsals and to administer priming manipulations at both encoding and retrieval stages.

STUDY 1

In the first study, we examined the effects of culture and priming on the earliest childhood memory provided by Caucasian and Asian college students. Before providing their memories, participants in the priming groups first described themselves as either a unique individual (private self-prime) or a member of various social groups (collective self-prime). Previous research suggests that this manipulation should temporarily alter participants’ self-construal, rendering either private or collective aspects of the self salient (Trafimow et al., 1991). Participants in the control group described objects in nature. All participants then provided their earliest childhood memory. The Study thus had a 2 (Culture: Asian, Caucasian) × 3 (Condition: Control, Private self-focus, Collective self-focus) design.

An encoding account of cultural differences predicts a main effect of culture on memory variables that is not qualified by priming effects. A retrieval account of cultural differences predicts a main effect of priming condition, such that the retrieved memory content is semantically consistent with the self-primes. A retrieval account also predicts a significant interaction between Culture and Condition. Effects of culture evident in the control condition should dissipate in the two experimental conditions in which self-focus is primed. Finally an encoding-retrieval account predicts independent main effects of both Culture and Condition.

We examined social, emotional, and cognitive characteristics of memories that are related to cultural self-construal as shown in previous research. Specifically, compared to people with an interdependent self-construal, people with an independent self-construal often report earlier childhood memories (Mullen, 1994; Wang, 2001), are more likely to recall specific, one-time events unique to the individual (e.g., “the time I won the spelling competition”), and focus more on their own roles, emotions, and autonomy and less on social interactions or other people in their memory accounts (Han et al., 1998; Wang, 2001; Wang & Conway, in press).

Method

Participants

A total of 271 undergraduate students at Harvard and Cornell participated in this study to receive partial course credit or $5. The sample consisted of 136 Caucasians (44 men and 92 women) and a mixed group of 132 Asians (46 men and 86 women). Among the Asians, 85 were Chinese, 22 were Koreans, 3 did not provide specific information, and 22 were of other East- and South-Asian cultural backgrounds. The data from three participants who had one parent of Asian and one of Caucasian or African descent were eliminated from the analyses.

Procedure

Participants met with a trained research assistant in small groups of one to five. They were assured of the confidentiality and anonymity of the study. They were randomly assigned one of the three versions of the questionnaire booklet. The first part of the questionnaire contained the self-priming manipulation. In the private self-priming condition, participants read:

How would you define yourself as a unique individual? List ten personal qualities, attributes, beliefs, or behaviours that do not relate to others and make you unique. For example, “I am smart” and “I am honest”.

In the collective self-priming condition, participants read:

How would you define yourself as a member of a social group? List ten memberships of social groups with which you are likely to be experien-
ceng a “common fate”. For example, “I am a Catholic” (membership in a religious group) and “I am a daughter” (membership in a family group).

Participants in the control condition were asked to complete ten sentences about nature, such as “The tree is _” and “The sky is _”.

After the self-priming, participants were asked to take a moment to think of their earliest childhood memory and to describe it in writing as precisely as they could. It was emphasised that the memory must be their own recollection from earliest childhood, not an episode that they only saw in a picture or heard about from someone else. Following the description, participants were asked to estimate their age at the time of the target episode and to answer how often they had previously talked about the memory on a 7-point scale. They then provided demographic information.

Coding

Participants provided self-descriptions appropriate to their respective priming condition. We recorded participants’ age at earliest memory in months and the frequency of their prior recollection. We then performed content analyses using a coding scheme adapted from Wang (2001).

Memory focus. Each memory was coded as either “individual” or “social”. Individual memories focused on purely personal experiences (e.g., success, frustration, fears, nightmares). Social memories centred on activities of a social group such as the family, neighbourhood, or school. Memory content was categorised based on the central focus rather than the contextual background of each event.

Memory specificity. Each memory was coded as either “specific”, referring to events that happened at a particular point in time (e.g., “When I was about 4, I got stung by a bee”), or “general”, referring to events that occurred regularly or on multiple occasions (e.g., “I used to play with other kids in the woods”) (Pillemer, 1998).

Memory emotionality. The frequency of participants’ spontaneous mention of emotions in their memory narratives was coded.

Autonomous orientation. Participants’ tendency to express autonomy and self-determination in their memories was coded, using the narrative content analysis scheme developed by Wang and Leichtman (2000). The number of occurrences of the following instances was counted and combined to produce a score of autonomous orientation for each participant: (1) reference to personal needs, desires, or preferences; (2) reference to personal dislikes or avoidance; (3) reference to personal evaluations, judgements, or opinions regarding other people, objects, or events; and (4) reference to retaining control over one’s own actions and resisting group or social pressure.

Number of other people. The number of other people that participants mentioned in their memory was counted.

Interaction scenario. The number of instances that involved social interactions or group activities in the earliest memory was counted (e.g., “We went to our summer house” and “The teacher told John to be quiet”). Propositions, defined by Fivush, Haden, and Adam (1995) as subject-verb constructions, were used as the coding unit. Each unique or implied verb in an independent clause forms a new propositional unit (e.g., “My dad carried me and walked around the room” was two propositions, whereas “We laughed and laughed” was one). Propositions irrelevant to social interactions or group activities (e.g., “I fell in a pond”) were not coded.

Three independent research assistants, all blind to the hypotheses and the experimental condition of the participants, first coded 20% of the data. The average inter-coder reliabilities (r) were from .83 to 1.00. Disagreements were resolved by discussion among the coders. Two assistants then each coded half of the remaining data.

Results

Preliminary analyses revealed no effects for gender; the results are therefore reported collapsed across this variable. There were no significant group differences in the volume of earliest mem-
mory as indexed by the number of words participants used ($M = 75.09, SD = 46.47$). Table 1 lists the means of all continuous variables by culture and priming groups. A multivariate analysis of variance (MANOVA) on all continuous variables revealed main effects of culture, $F(5, 253) = 5.20, p = .0001$, and condition, $F(10, 506) = 2.03, p = .03$, as well as a Culture $\times$ Condition interaction, $F(10, 506) = 1.96, p = .04$. We performed 2 (culture) $\times$ 3 (priming condition) ANOVAs on individual continuous variables and logistic regression analyses on categorical variables. All $t$-tests are two-tailed.

Prior recollection. We did not find a significant main effect of culture or priming on the participants’ reports of the frequency of previous retrievals of their memories. A marginally significant Culture $\times$ Condition interaction emerged, $F(2, 261) = 2.87, p = .06$. Caucasians in the collective self-priming condition reported having talked about their memories less frequently than did their Asian counterparts, $t(86) = 2.32, p = .02$. No cultural difference was found in the private self-priming, $t(81) = -1.05, p = .29$, or control condition, $t(94) = 0.13, p = .89$.

Age of earliest memory in months. Caucasians reported earlier memories ($M = 40.96, SD = 16.01$) than did Asians ($M = 48.03, SD = 17.78$), $F(1, 257) = 10.91, p = .001$. There was also a marginally significant Culture $\times$ Priming condition interaction, $F(2, 257) = 2.34, p = .098$. As shown in Table 1, in both collective self-priming and control conditions, Asians reported significantly later memories than did Caucasians, $t(83) = 2.53, p = .01$ and $t(93) = 3.04, p = .003$, respectively. In the private self-priming condition, the dating of earliest memories did not differ by culture, $t(81) = 0.12, p = .90$.

Memory focus. Logistic regression analysis on the focus of earliest memory revealed significant main effects of culture and priming, $\chi^2(1, N = 268) = 6.22, p = .01$ and $\chi^2(2, N = 268) = 10.91, p = .004$, respectively. More Caucasians (39.71%) than Asians (25.76%) provided “individual” mem-

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<tr>
<th>Variable</th>
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<th>Collective self-priming</th>
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Wang (2001) found a partial correlation at $r(1, N = 0.001)$ between the number of words and the number of propositions. Here we used the number of words to index memory volume. Controlling for memory volume across tests did not change the pattern of results in either study.
ories, dwelling on their own experiences. Participants in the private self-priming condition (46.99%) were most likely to provide individual memories, followed by those in control condition (28.12%) and then those in collective self-priming condition (24.72%). Participants in the private self-priming group provided significantly more individual memories than did those in the collective self-priming, \( \chi^2(1, N = 172) = 9.39, p = .002 \), or control groups, \( \chi^2(1, N = 179) = 6.83, p = .01 \). The latter two groups did not differ significantly from each other, \( \chi^2(1, N = 185) = 0.28, p = .60 \). Culture and priming independently affected the content of earliest memories.

**Specificity.** Logistic regression analyses revealed that Caucasians (85.29%) were more likely than their Asian counterparts (68.18%) to report specific rather than repetitive events, \( \chi^2(1, N = 268) = 8.53, p = .004 \). The Priming and Culture \( \times \) Priming effects were nonsignificant (private: 78.31%; collective: 82.02%; control: 70.83%).

**Memory emotionality.** There were no significant effects of participants’ spontaneous references to emotions in their memories.

**Autonomous orientation.** Caucasians (M = 0.46, SD = 0.78) were more likely than their Asian counterparts (M = 0.24, SD = 0.74) to report personal predilections and opinions, \( F(1, 262) = 5.38, p = .02 \). There was no significant priming effect or Culture \( \times \) Priming interaction.

**Number of other people.** Asians included more other people in their memories (M = 2.89, SD = 2.14 vs M = 2.23, SD = 1.67) than did Caucasians, \( F(1, 262) = 7.75, p = .006 \). The Priming effect and Culture \( \times \) Priming interaction were not significant, \( F(2, 262) = 0.59, p = .56 \), and \( F(2, 262) = 2.08, p = .13 \), respectively.

**Interaction scenario.** A significant effect of priming, \( F(2, 262) = 7.52, p = .0007 \), revealed that participants in the collective self-priming condition (M = 2.37, SD = 1.61) were more inclined to report social interactions in their earliest memory than were those in either private self-priming condition (M = 1.77, SD = 1.55), \( t(170) = 2.49, p = .01 \), or control condition (M = 1.50, SD = 1.56), \( t(183) = -3.74, p = .0002 \). The latter two groups did not differ significantly from each other, \( t(177) = -1.16, p = .25 \). No other effects approached significance.

**Discussion**

The multivariate analysis across memory measures yielded both culture and priming effects and their interaction. Five of the seven memory measures further revealed cultural differences that replicate those obtained in past research. Although less pervasive, priming main effects occurred on two measures. The direction of priming effects was consistent with the particular aspect (collective vs private) of self being activated. Participants who described their unique attributes prior to the recall reported individual-focused memories, whereas those who initially focused on the collective self tended to report memories that were more group-oriented and centred on social interactions. The two significant priming effects occurred on memory measures semantically associated with the self-primes. In contrast, measures such as the date and specificity of the earliest memory seem less directly connected to a private or collective self-construal. However, other measures that seem linked to the self-primes (number of other people in the memory and autonomous orientation) were not significantly impacted by it.

Our analysis of a retrieval interpretation of cultural effects suggested that cultural differences in recall should decrease if Asians and Caucasians focus on similar aspects of self-construal. In terms of our design, a retrieval interpretation implies that cultural differences apparent in the control condition should dissipate in the two priming conditions. This pattern of interaction was not statistically significant on any measure. The closest approximation occurred on the assessment of the age of the earliest memory. Private self-priming appeared to reduce the magnitude of the effect of culture (i.e., it raised the memory accessibility among Asians), but collective self-priming did not. If similar findings were obtained on other measures of memory, we could perhaps argue that the private self-prime was more effective in altering the self-construals of Asians than the collective self-prime was in altering the self-construals of Caucasians. However, we hesitate to make much of a lone finding emerging from a marginally significant interaction.

In sum, the effects of self-priming were not as overwhelming or consistent as a “retrieval” account should predict. Cultural differences generally persisted regardless of priming manipulations, indicating that the cognitive frame at the time of retrieval is not the sole determinant of
recall. The findings are generally more consistent with an encoding interpretation, in which cultural discrepancies in recall reflect differences in how information is originally represented in memory.

Our interpretation of the recall data is rendered somewhat equivocal, however, by an additional finding. Participants reported that they had previously talked about their memories. It is possible that participants were actually recalling their earlier retrieval(s), rather than their original encoding when reporting the memory events. The identified cultural differences could then reflect (earlier) retrieval effects rather than (or in addition to) original differences in memory representation. To examine this possibility, we conducted additional analyses controlling for frequency of earlier retrievals; the pattern of results did not change. If participants cannot respond to this question about prior recollection with precision, however, the value of these additional analyses is questionable.

**STUDY 2**

In Study 2, we created a memory in the laboratory by showing participants a cartoon book and then asking them to recall the story. This procedure guaranteed that participants would base their subsequent recall of the story on their memory representations rather than previous retrievals. Past research has shown that the self not only influences the processing of self-related information but also affects the interpretation of seemingly arbitrary information (for a review, see Greenwald, 1980). As the most general and overarching schemata of an individual’s self, cultural self-construals influence various aspects of cognition, emotion, motivation, and behaviour (Markus & Kitayama, 1991, 1998). Therefore despite the many differences between the two types of memories, we expected that the pattern of culture and self-priming effects for story memory would be consistent with that for personal memories.

To parallel the autobiographical memory task in Study 1, we primed private and collective self-construals in one group after participants read and before they recalled the story. When presented at this point in time, priming could only influence retrieval processes (After condition). In addition, for exploratory purposes we examined whether the magnitude of priming effects would increase if the prime occurred prior to encoding and could thus impact both encoding and retrieval. In a second experimental group, we administered the priming manipulation before participants read the book (Before condition).

**Method**

**Participants.** A total of 255 Cornell undergraduate students participated in this study for partial course credit or $5.00. Of these 135 were Caucasians (36 men, 98 women, and 1 who did not report gender) and 120 were Asians (45 men and 75 women). Among the Asians, 67 were Chinese, 25 were Koreans, 9 did not provide specific information, and the rest were from other East- and South-Asian cultures.

**Procedure.** Participants were told that they would take part in a self-concept study. They met with a trained research assistant in small groups of one to five and were assured of the confidentiality and anonymity of the study. In the After condition, the research assistant told participants that they would read a cartoon book for about 5 minutes before the experiment began in order to feel comfortable and relaxed. Each participant read a book entitled “Bear Goes to the Market”, which depicts various episodes that occur when the main character Bear goes to the market with Bear Mom. Eighteen pages in length, the book has illustrations but no words. We expected that this format would encourage personal interpretations of events and increase the likelihood of both cultural and priming effects in recall. The storyline included social scenarios as well as individual cognitive and affective responses.

Subsequent to reading the book, participants in the After condition were given a one-page questionnaire that included the self-priming manipulation. Caucasians and Asians were randomly assigned to a private self-priming, collective self-priming, or control condition. The instructions were the same as in Study 1. After they had completed the questionnaire, participants provided demographic information on a separate sheet. Then, to their surprise, participants were asked to write as precisely as they could what they remembered about the cartoon story.

The procedure in the Before condition was identical to that in the After condition, except that participants began the study by completing one of the self-priming questionnaires. They then read the cartoon book “Bear Goes to the Market”,
provided demographic information, and were asked to describe as precisely as they could what they remembered about the story.

Coding. Participants provided self-descriptions as instructed. Their memories of the cartoon book story were coded for volume, emotionality, autonomous orientation, and interaction scenario, with the same coding scheme used in Study 1. The number of peripheral characters participants introduced in their story was counted, excluding the main character Bear who was mentioned by every participant. This variable was similar to the measure of “number of other people” in Study 1. In addition, to capture the specificity of the story memory, we coded each phrase in participants’ memory as either a “specific description” that referred to a definite episode in the story (e.g., “Bear didn’t get to buy the big cake”) or as a “general description” concerning a broad impression of the story (e.g., “All characters had red eyes” and “The pages were different colors”). The difference between the number of specific and general descriptions formed an index of the specificity of participants’ story memory. The measure of memory focus used in Study 1 was omitted because it is too broad to capture differences in memory content for a single story containing various episodes.

Two research assistants first coded 20% of the data for reliability ($r$), which ranged from .91 to 1.00. Disagreements were resolved by discussion among the coders. One assistant then coded the rest of the data.

Results

Preliminary analyses showed that the timing of the self-priming (before or after story-reading) did not significantly affect participants’ subsequent recall of the story. We therefore pooled the two conditions for the analyses reported below. There were no significant group differences in the volume of story memory as indexed by the number of words participants used ($M = 127.61, SD = 58.35$).

Table 2 lists the means by culture and priming condition. A multivariate analysis of variance (MANOVA) that considered all memory variables as a function of culture and priming condition revealed main effects of culture, $F(4, 246) = 12.33, p < .0001$, and condition, $F(8, 492) = 4.93, p < .0001$. The interaction was nonsignificant, $F(8, 492) = 0.50, p = .86$. We conducted 2 (culture) × 3 (priming condition) ANOVAs on individual variables.

<table>
<thead>
<tr>
<th>Table 2: Group means of memory variables in Study 2</th>
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<tbody>
<tr>
<td>Variable</td>
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<tr>
<td>Specificity</td>
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<td>Caucasians</td>
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<td>Emotionality</td>
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<td>Asians</td>
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<tr>
<td>Number of peripheral characters</td>
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</table>

*The non-significant difference between the two timing conditions could mean that in both timing conditions only retrieval was affected. As illustrated in the equation A + B = B’, A could be 0 and thus B equals B’; or B in interaction with A is lower than B’ which gives room for A > 0. Unfortunately, the current experimental set-up did not allow a separate check on each effect.
Specificity. As in Study 1, Caucasians scored higher on memory specificity than did Asians, $F(1, 249) = 6.45, p = .01$. As in the earlier study, the priming effect and the Culture × Priming interaction were nonsignificant.

Emotionality. Consistent with the findings in Study 1, there were no significant effects on participants’ spontaneous references to the feeling states of story characters.

Autonomous orientation. There were significant main effects of culture and priming on autonomous orientation, $F(1, 249) = 12.14, p = .0006$, and $F(2, 249) = 6.17, p = .002$, respectively. Caucasians ($M = 0.68, SD = 0.83$) referred more frequently to Bear’s preferences and opinions than did Asians ($M = 0.36, SD = 0.58$). Participants in the private self-priming condition ($M = 0.63, SD = 0.78$) scored higher on autonomous orientation than did those in the collective self-priming ($M = 0.57, SD = 0.75$) and control conditions ($M = 0.22, SD = 0.51$). Both private and collective self-priming groups differed significantly from the controls, $t(150) = -3.32, p = .001$, and $t(150) = -2.94, p = .004$, respectively. The difference between the two priming groups was nonsignificant, $t(204) = -0.55, p = .59$.

Number of peripheral characters. Asians ($M = 4.03, SD = 1.64$) included more peripheral characters in their recall than did Caucasians ($M = 3.61, SD = 1.29$), $F(1, 249) = 5.19, p = .02$. There was also a significant priming effect, $F(2, 249) = 3.86, p = .02$. Participants in the collective self-priming condition ($M = 4.13, SD = 1.63$) reported more peripheral characters than did participants in the private self-priming ($M = 3.60, SD = 1.43$), $t(204) = 2.46, p = .01$, and control conditions ($M = 3.57, SD = 1.10$), $t(150) = -2.16, p = .03$, who in turn did not differ significantly, $t(150) = -0.13, p = .90$.

Interaction scenario. The number of social interaction scenarios participants described in their story memories was affected by priming, $F(2, 249) = 7.86, p = .0005$. Participants in collective self-priming condition ($M = 8.18, SD = 4.05$) had the highest mean score, followed by those in the control condition ($M = 7.43, SD = 3.52$) and then those in private self-priming condition ($M = 6.17, SD = 3.14$). Participants in the collective self-priming and control conditions were more inclined to report social interactions in their story memory than were those in the private self-priming condition, $t(204) = 3.98, p < .0001$, and $t(150) = 2.21, p = .03$, respectively. The former two groups

<table>
<thead>
<tr>
<th>Variable</th>
<th>Culture effect</th>
<th>Priming effect</th>
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<tbody>
<tr>
<td>Age at earliest memory</td>
<td>Caucasians &lt; Asians</td>
<td>Caucasians = Asians in private priming</td>
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<tr>
<td>Study 1</td>
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<tr>
<td>Memory focus (individual memory)</td>
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<td>Private &gt; Collective</td>
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<td>Study 1</td>
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<td>Study 2</td>
<td>Caucasians &gt; Asians</td>
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<tr>
<td>Specificity</td>
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<td>Study 1</td>
<td>Caucasians &gt; Asians</td>
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<td>Study 2</td>
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<td>Emotionality</td>
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<td>Study 1</td>
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<td>Study 2</td>
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<td>Autonomous orientation</td>
<td>Caucasians &gt; Asians</td>
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<td>Study 2</td>
<td>Caucasians &gt; Asians</td>
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<td>Number of others</td>
<td>Caucasians &lt; Asians</td>
<td>Private &lt; Collective</td>
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<td>Study 1</td>
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<td>Study 2</td>
<td>Caucasians &lt; Asians</td>
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<td>Private &lt; Collective</td>
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<td>Study 2</td>
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did not differ significantly from each other, \( t(150) = -1.12, p = .26 \). The priming effect is consistent with that in Study 1. In addition, as in Study 1 Asians \( (M = 7.63, SD = 3.89) \) reported about the same number of interaction scenarios as did Caucasians \( (M = 6.87, SD = 3.51) \), \( F(1, 249) = 1.75, p = .19 \).

Table 3 summarises the significant effects of Studies 1 and 2.

**Discussion**

The multivariate analysis across memory measures revealed both culture and priming effects. Culture effects were further obtained on three of the five memory measures (see Table 3). Compared with their Asian counterparts, Caucasians provided more specific descriptions about what happened in the story, showed a greater concern with the protagonist’s roles and predictions, and introduced fewer peripheral characters in their story memories. Despite the very different types of recall, each of these effects replicates cultural differences obtained in Study 1. Priming effects also emerged on three memory measures. Priming private-self increased participants’ focus on the protagonist’s personal autonomy, whereas priming collective-self led participants to recall more peripheral characters and social interactions.

That priming effects were as pervasive as culture effects in this study attests to the potency of the priming manipulation. It is thus important to note that, as in Study 1, there is little evidence to suggest that priming attenuates the effects of culture. Instead, priming and culture exert independent effects on recall. The evidence across the two studies fails to support an interpretation of cultural differences in recall that focuses exclusively on retrieval. Instead the data suggest that cultural differences in self-construal can influence both memory representation and retrieval.

Consistent with Study 1 results, there was no significant culture or self-priming effect on participants’ spontaneous references to emotions in their memories. These findings deviate from a previous study (Wang, 2001) where Caucasian Americans tended to provide more emotionally elaborate childhood memories than did mainland Chinese. Perhaps Asian Americans are more similar to Caucasians in emotional expressiveness due to acculturation, a possibility that merits future investigation.

**GENERAL DISCUSSION**

The findings from the two studies are remarkably consistent despite differences in the types of memories and measures. We find that priming does influence the content of memories, especially in Study 2 where the memory is for a story rather than for one’s own life. Importantly, however, the priming effects do not eliminate or even reduce the magnitude of cultural differences in memory. Evidently, priming and culture exert independent influences on memory.

The persistence of cultural differences suggests the importance of encoding processes. Underlying memory representations appear to vary as a function of cultural differences. The effects of priming imply that the transformation of memory representations into memory narratives comprises a further reconstructive process at the time of recall. Priming effects were more pervasive in Study 2, suggesting that new, unrehearsed memories are probably more susceptible to such manipulations than are older, well-established memories. It appears that cultural self-construal serves both as a constructive filter affecting the way information is initially encoded and represented in memory, and as a reconstructive filter that shapes memory over the course of retention and at the time of each retrieval.

In previous cross-cultural research examining culture and priming effects on psychological processes such as causal attribution and self-perception (e.g., Hong et al., 2000; Ross et al., 2002; Trafimow et al., 1991), priming effects overshadow cultural differences. Conceivably, the varied pattern of results stems from the different priming techniques utilised in the studies. We suspect, however, that the differences also reflect the psychological process being investigated. Compared with the relatively prolonged process of memory construction from representation to narrative, making attributions often involves spontaneous, online responses and is therefore more likely to be influenced by a momentary shift in mindset. Priming might impact self-descriptions for a different reason. Semantic self-knowledge is complex, abstract, and varied. Priming might lead individuals to focus on a limited subset of their knowledge and ignore other aspects. In contrast to self-knowledge, information concerning personal episodes and stories in the present studies is concrete and specific, and hence affected, but not overwhelmed, by priming. Notably, some dimensions of memory (specificity, emotionality) are not
influenced by priming in either of the studies. The lack of influence might indicate that this information is retrieved as it was originally encoded and represented in memory, or indicate certain long-practised, ingrained retrieval styles. The variability in results suggests the importance of examining when and why priming does or does not influence memory.

The current findings suggest that the relations between memory representations and memory narratives are dynamic and interactive. The extent to which memory narratives reflect underlying memory representations varies as a function of the characteristics of retrieval contexts. When the frames individuals adopt at encoding and retrieval are similar, memory narratives and representations are likely to be highly consistent. In some reminiscing situations, however, individuals' mental frames may shift from encoding to retrieval and alter the nature of the memory (e.g., Anderson & Pichert, 1978). In relation to our findings, we propose that several reconstructive processes may be operating, separately or simultaneously. When a discrepancy occurs between the mental frames at encoding and retrieval as a function of time, changes in physical or social contexts, or deliberately induced retrieval mode, memory narratives may vary because rememberers selectively focus on different aspects of memory representations. Additionally, the mental frame at retrieval can lead to reinterpretation of the event information encoded in memory. As a result, an individual might tell diverse stories about the same episode at different times, under dissimilar circumstances, or with different people. Each of these story versions can be equally "true" and restrained by the original memory representation (Ross, 1997). In extreme cases, such as with emigration or repeated suggestions, memory narratives can substantially depart from original memory representations due to new mental frames at retrieval (Leichtman & Ceci, 1995; Otoya, 1987). Also, memory reports can produce alterations in memory representations, which eventually become a blend of the original representation and what people subsequently said or thought happened. Thus, what we remember and what we tell exhibit a constant interaction during which memory representations and memory narratives sustain, confine, modify, and even alter each other.

REFERENCES


