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Functions of autobiographical memory in Taiwanese and American emerging adults

Hsiao-Wen Liao¹, Susan Bluck¹, Nicole Alea², and Ching-Ling Cheng³

¹Department of Psychology, University of Florida, Gainesville, FL, USA

²Psychology Unit, Department of Behavioural Sciences, University of the West Indies, St. Augustine, Trinidad & Tobago

³Department of Educational Psychology and Counseling, National Taiwan Normal University, Taipei, Taiwan

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The study addresses cultural and person-level factors contributing to emerging adult's use of memory to serve adaptive functions. The focus is on three functions: self-continuity, social-bonding and directing-behaviour. Taiwanese ($N = 85$, 52 women) and American ($N = 95$, 51 women) emerging adults completed the Thinking about Life Experiences scale, and measures of trait personality, self-concept clarity and future time perspective. Findings show that individuals from both cultures use memory to serve these three functions, but Taiwanese individuals use memory more frequently than Americans to maintain self-continuity. Culture also interacted with person-level factors: in Taiwan, but not America, memory is more frequently used to create self-continuity in individuals high in conscientiousness. Across cultures, having lower self-concept clarity was related to greater use of memory to create self-continuity. Findings are discussed in terms of how memory serves functions in context and specific aspects of the Taiwanese and American cultural context that may predict the functional use of memory in emerging adulthood.

Keywords: Function; Autobiographical memory; Culture; Self-continuity.

Researchers have argued for the importance of understanding the functions of autobiographical memory (e.g., Baddeley, 1988; Bruce, 1985). Current models of autobiographical memory (Conway, Singer, & Tagini, 2004) suggest that human memory is not a static recorder but a dynamic responsive system. A functional approach to memory (e.g., Berntsen, 2007; Bluck, 2003) is based on the proposition that memories are retrieved in response to contextual demands (Neisser, 1997). That is, current theory (e.g., Bluck, Alea, & Demiray, 2010; Conway et al., 2004) suggests that autobiographical memory serves important psychosocial functions in context: environment

and person-level factors create the context in which remembering occurs. As such, the current study examined the effects of both cultural context and person-level factors on the use of autobiographical memory to serve three broad functions (Bluck & Alea, 2011) in a distinct developmental life phase, emerging adulthood, i.e., self-continuity, social-bonding and directing-behaviour. Self-continuity refers to maintaining a sense that one is the same person over time, social-bonding refers to creating and maintaining relations with others, and directing-behaviour refers to using the personal past to guide one's present and future behaviour (for further description, see Bluck, 2003).

Address correspondence to: Hsiao-Wen Liao, Department of Psychology, University of Florida, PO Box 115911, Gainesville, FL 32611, USA. E-mail: hsiaowenliao@ufl.edu

Embracing individual remembering as a person–environment interaction has conceptual consequences, particularly in regard to culture. Recent cross-cultural research suggests that both the use of autobiographical memory to serve psychosocial functions (Alea & Wang, 2015) and the need to achieve the developmental tasks of autonomy and relatedness may be universal (Wang, 2014). The extent to which individuals engage in frequent remembering to attain a given goal may vary. We posit that when cultural context provides less support for achieving a goal, individuals will use individual psychological resources to obtain it. Autobiographical memory is one such resource (Markowitsch & Staniloiu, 2011; Tulving, 2005). We argue that in cultures that provide less support, individuals will use autobiographical memory more frequently. For example, in a context with low support for maintaining social bonds, individuals may draw more frequently on autobiographical memory for social-bonding purposes.

Functions of remembering in East Asia: Past research

Culture has long been recognised as shaping the use of autobiographical memory (Nelson & Fivush, 2004). East Asian and American adults acknowledge the use of autobiographical memory to serve three broad functions (e.g., Wang, Koh, Song, & Hou, 2015). Due to different values and traditions, however, cultures vary in the extent to which they use memory to serve functions in everyday life (e.g., Kulkofsky, Wang, & Koh, 2009; Kulkofsky, Wang, & Hou, 2010; Maki, Kawasaki, Demiray, & Janssen, 2015) or have different foci when using memory to serve a given function (e.g., Wang & Conway, 2004). Kulkofsky et al. (2009), for example, show that American mothers more frequently reported maintaining social bonds as a reason for sharing memories with their children than did Chinese mothers. In another study, Chinese college students gave fewer functional reasons for memory use than their American counterparts (Kulkofsky et al., 2010). Maki et al. (2015) show Japanese college students less frequently use memories for self-continuity and social-bonding functions than American college students. Wang and Conway (2004) reveal that both Chinese and American middle-aged adults use autobiographical memories to maintain a sense of self and direct future

behaviours though they focus on different memory content to serve those ends. As such, the literature is mixed on the extent of differences between East Asians and Americans in their functional use of memory.

Additionally, within societies that share cultural traditions (i.e., East Asian cultures) there are varying patterns of societal change (Kagitcibasi, 2013) suggesting that researchers may want to consider individual societies instead of East Asia as a group. The current research focuses on a specific society, Taiwan. A recent study found that, as compared to urban young adults in China and Vietnam, Taiwanese young adults (ages 15–24) showed the highest tendency to hold non-traditional beliefs (e.g., conform to its societal expectations) that have been traditionally valued in Confucian-influenced societies (Cheng, Lou, Gao, Emerson, & Zabin, 2012). As such, given that the individuals' context when remembering guides the functions of memory (Alea & Wang, 2015), it is important to examine different societal contexts within East Asia and how they compare with, for example, the USA.

Effects of culture: The context of Taiwan

Little cross-cultural research has compared Taiwan to the USA. Using Kagitcibasi's (2013) autonomy-relatedness model, we argue that the sociocultural context of Taiwan has recently changed: both interdependent and independent attributes are now valued by young people. For example, Lee, Beckert, and Goodrich (2010) show that 42% of Taiwanese adolescents embrace both individualistic and collectivistic cultural values (individualistic, 27.75%; collectivist, 30.25%; mixed cultural values, 42%). This creates a complex task for Taiwanese emerging adults who are striving to form an adult identity (Liao, Bluck, & Cheng, 2014).

In contrast to the individualistic culture of the USA, Taiwan traditionally holds collectivistic values such as prioritising family responsibility and emphasising communal identity (Wang & Brockmeier, 2002; Yang, 2004). In response to recent societal change (Yeh, Liu, Huang, & Yang, 2007), however, Taiwan blends traditional values with Western individualistic ideals (Lee et al., 2010). This blended cultural environment is particularly salient for the upcoming generation of emerging adults. Demographics concerning family timing and college enrolment for this

generation suggest that developing relatedness and forging autonomy are both important. Taiwanese ages 18–27 show Western markers of emerging adulthood (Arnett, 2004): 70% go to college (R. O. C. (Taiwan) Ministry of Education, Department of Statistics, 2012) and delay marriage and childbearing until age 30 (R. O. C. (Taiwan) Ministry of the Interior, Department of Statistics, 2013). Traditional family structure and values also remain salient (e.g., family obligations, patrilineal structure; Yeh, Huang, & Chiu, 2006). As shown in recent research (Cheng et al., 2012), Taiwanese emerging adults' self-construals as relational-autonomous have been shaped by long-standing as well as relatively new cultural norms, which may relate to their functional use of memory.

The self-continuity function. Self-continuity refers to maintaining one's identity over time (Bluck & Liao, 2013; Sani, 2008). Emerging adults in the USA may forge self-continuity earlier and more effortlessly (Bluck & Liao, 2013) than those in Taiwan. Americans develop an independent sense of self early in their childhood (Harter, 2012) followed by a relatively stable self-concept in emerging adulthood (Kanagawa, Cross, & Markus, 2001). Societal push exists in the USA for developing a continuous, biographical identity beginning in adolescence (i.e., self-continuity; Erikson, 1963; Habermas & Bluck, 2000). By adulthood, Americans have spent decades in a cultural environment that values self-continuity in the form of a unique continually unfolding life story (Bluck & Habermas, 2000; McAdams, 2013).

The cultural architecture supporting self-continuity in modern Taiwan is not as straightforward as in the USA. One reason for this may be that Taiwanese individuals' sense of self is neither exclusively independent nor collective (Lee et al., 2010). Research shows that Taiwanese adolescents strive to hold both interdependent and independent self-views (e.g., Dual Autonomy Theory; Yeh et al., 2007). Taiwanese children have less cultural press to develop a continuous, biographical identity: they tend to be passive listeners during memory-sharing, accepting their parents' teachings (Fung, Miller, Lin, & Chen, 2012). Autonomy and relatedness are important developmental goals regardless of culture (Wang, 2014), but Taiwanese college students stress autonomy less in their autobiographical memories than do their US counterparts (Wang, 2006). As

East Asian culture traditionally supports a more context-dependent sense of self (English & Chen, 2011; Heine, 2001; Kanagawa et al., 2001), developing a continuous, individualised life story may present a more challenging developmental task for Taiwanese adolescents (Yeh et al., 2007) and may continue well into emerging adulthood. The Taiwanese need to develop an autonomous, continuous sense of self is tantamount in this life phase as they face the necessity of choosing a career and starting a family (Liao & Cheng, 2011). Given the different levels of support across these cultures for forming a continuous sense of identity, we expect Taiwanese emerging adults to more frequently draw on autobiographical memory as a resource in forging self-continuity.

The social-bonding function. The social-bonding function involves using the past to build and maintain relationships (e.g., Alea & Bluck, 2007; Webster, 2003). We speculate that Taiwan's societal structure may provide more support for creating social bonds due to its communal nature (Markus & Kitayama, 1991; Wang & Brockmeier, 2002). Though independent values are being forged, the interdependent culture remains central (Kagitcibasi, 2013) in Taiwan. As such, reminiscing and remembering may be less geared towards creating warm, intimate bonds (Fung et al., 2012). Social-bonding is already facilitated by a multitude of cultural practices, outside of memory, that foster an interdependent, socially connected self. In contrast, in the USA social-bonding is the most frequently reported function of autobiographical memory (Bluck & Alea, 2011; Kulkofsky et al., 2010). Personal story-sharing is common in daily American life (Pasupathi, 2001). Reminiscing about positive events with primary caregivers begins early in American's lives (Fung et al., 2012; Wang & Fivush, 2005) and continues across the lifespan. Memory-sharing can be seen as a way for American individuals to forge social bonds and maintain relationships (Wang & Ross, 2007). Research also shows that American mothers more frequently report social functions for memory-sharing than do Chinese mothers (Kulkofsky et al., 2009). Therefore, we expect American emerging adults to more frequently use memory to serve the social-bonding function than their Taiwanese counterparts.

The directing-behaviour function. The directing-behaviour function refers to using one's

past to solve current problems and guide future behaviour (Pillemer, 2001). Remembering can improve current performance (Pillemer, 2003), help solve current problems (Webster, 2003) or guide plans for the future (Bluck & Glück, 2004). The literature suggests that Eastern and Western cultures both use memory for directing-behaviour but sometimes with different foci. For example, Taiwanese mothers used memory to teach moral lessons (Fung et al., 2012). Wang and Conway (2004) found that Chinese adults' memories also conveyed more moral lessons than their US counterparts. Alternatively, American mothers more frequently used memories to teach children to solve everyday problems than did Chinese mothers (Kulkofsky et al., 2009). Cross-cultural use of memory to direct one's future behaviour may be particularly salient in emerging adulthood. Regardless of one's culture, directing one's future is a developmental task in this life phase (Arnett, 2004). For example, Maki et al. (2015) found no significant difference in American and Japanese college students in directing-behaviour function. In the current study, we expect no differences in Taiwanese and American emerging adults' overall frequency of use of the directing-behaviour function.

Effects of person-level factors

Remembering occurs in context, however, both culture and person-level factors create the environment in which remembering occurs. A primary claim of the Self-Memory System (SMS; Conway et al., 2004) model is that internal person-level context relates to retrieval and reconstruction of memories. As such, the current study differs from past research in bringing cultural context and person-level factors together to examine functional use of autobiographical memory in an East Asian context that has not yet been examined (i.e., Taiwan). Testing the effects of cultural context and person-level factors on the functional use of autobiographical memory assumes that culture may relate to, and interact with, person-level factors. We first review factors including gender, trait personality, self-concept clarity and future time perspective.

Some past research has found that women reminisce more than men (Canadians, ages 18–81; Webster, 1994), though findings are inconsistent (e.g., Webster, 1995; Webster & McCall, 1999). Other researchers (e.g., Pasupathi, McLean, &

Weeks, 2009) suggest that women speak more about their personal past as compared to men. In addition to the overall tendency for women to think and talk more about their past, findings show that older American women use autobiographical memory more than men to serve identity and intimacy functions (Pillemer, Wink, DiDonato, & Sanborn, 2003). This result has also been found in an adult lifespan sample (Canadians; Webster, 1995; Webster & McCall, 1999). Other research (young and older adults; Americans and Trinidadians), however, has shown no gender differences in functional memory use (Alea, Bluck, & Ali, 2015; Alea & Bluck, 2013). In a recent meta-analysis examining gender differences in autobiographical memory, Grysman and Hudson (2013) indicated that although differences are often found in content analysis of memory narratives, research using scalar measures results in mixed findings (e.g., Webster, 1994; Webster & McCall, 1999) or no gender differences (e.g., Alea et al., 2015; Alea & Bluck, 2013). We thus predict that women will show a greater overall tendency towards thinking and talking about their personal past. As our research methods are most closely aligned with that of Alea et al. (2015), we do not expect gender differences, however, in the functional use of memory. As gender effects may depend on culture, we explore gender and its interaction with culture as predictors of the functional use of memory. Note that gender is a complex variable and depending on how it is defined (Bronfenbrenner, 1977), could be conceptualised and measured in future research as a context-level variable.

Trait personality stabilises across emerging adulthood (Caspi, Roberts, & Shiner, 2005) and is shaped by culture (Hofstede & McCrae, 2004). Research shows that Americans are more extraverted than East Asians (i.e., Japanese and Chinese) and that Japanese and Hong Kong Chinese (but not those in China) show higher neuroticism than Americans (Taiwan not included; McCrae, Terracciano, & 79 Members of the Personality Profiles of Cultures Project, 2005). Given these findings, we anticipated Taiwan–US differences on extraversion and neuroticism. Research has shown that personality traits are sometimes associated with functional use of memory though these patterns are not always clear. For example, extraversion is positively associated with the social-bonding function in America and Denmark (Alea et al., 2015; Rasmussen & Berntsen, 2010) but not in Trinidad (Alea et al., 2015). Higher openness is associated

with the use of autobiographical memory to direct behaviour in Denmark. Also, those high in neuroticism use memory more frequently to establish self-continuity and those high in conscientiousness use memory more frequently for social-bonding (Rasmussen & Berntsen, 2010). Traits were thus expected to predict varying functions of memory both across and within cultures (see Costa, Terracciano, & McCrae, 2001).

Identity exploration and future goals are salient in emerging adulthood (Arnett, 2004) and have been related to the functional use of memory. We therefore included measures of self-concept clarity and future time perspective. Self-concept clarity assesses clarity in one's sense of self (Campbell et al., 1996). Past research is sparse but shows some cultural differences: Canadians reported higher self-concept clarity than Japanese people (Campbell et al., 1996). We thus explored cultural differences but, in line with past findings, predicted that lower self-concept clarity would predict using memory more often to serve a self-continuity function (Bluck & Alea, 2008). Future time perspective refers to one's sense of the future as positive and open-ended (Carstensen & Lang, 1997). Time perception has been shown to vary across cultures (Levine, 1997). A review indicates that Americans are more future-oriented whereas Chinese people focus more on the past (Brislin & Kim, 2003). As such, cultural differences in future time perspective were also assessed. Having a more open-ended future has been related to remembering past events more vividly in emerging adults (Demiray & Bluck, 2012). Future time perspective may also be linked to functional, particularly the directive, use of memory (Bluck & Alea, 2011).

The current study: Specific aims

The first aim is to examine cultural differences in the functions of remembering. Emerging adults in both cultures face the developmental challenge of forging self-continuity (i.e., autonomous self), forming social bonds (i.e., relational self) and directing-behaviour. Given the cultural contexts in the two societies, however, Taiwanese emerging adults are expected to rely on memory more frequently than Americans to forge a sense of self-continuity and less frequently to create social bonds. No differences are expected for the directing-behaviour function. We also expect that women may think and talk more about their

past but speculate that there will be no gender differences in the frequency of using memory to serve specific functions. The second aim is two-fold. We first examine cultural variation on person-level factors, expecting differences on all factors. The major focus, however, is examining how cultural and personal-level factors (including gender), jointly or interactively predict the functions of remembering.

METHOD

Participants

Participants were emerging adults in the USA ($N = 95$; $M = 19.32$ years, $SD = 2.8$, 51 women) and Taiwan¹ ($N = 85$; $M = 21.65$ years, $SD = 2.8$, 52 women). Both samples were recruited from large universities. The American sample received course credit and the Taiwanese sample was provided with a study guide on memory as compensation. Americans reported ethnicity as Caucasian (66.3%), Black (13.7%), Hispanic (8.4%), Asian-Pacific Islander (7.4%) or Other (4.2%). Taiwanese reported ethnicity as Aboriginal (3.5%) or Han (89.4% including 60% Minnan, 9.4% Mainlander, 5.9% Hakka, 14.1% mixed) or Taiwanese (4.7%). Two Taiwanese participants did not provide responses (2.4%).

Measures and procedure

Participants in both samples filled out the same battery of questionnaires in paper and pencil format in the order below. Both samples completed the measures in groups, the Taiwanese in a classroom setting. Completion took approximately 20 minutes. For administration in Taiwan, measures were translated into Chinese, back-translated by an independent person fluent in both languages, and compared for accuracy. Besides language of administration, measures and instructions were identical across cultures.

Demographics. Participants' self-reported their age, gender, ethnicity and health status. For health status, participants rated their current health on a 6-point scale (1 = *very good*, 6 =

¹One Taiwanese participant who indicated her ethnicity as Malaysian was excluded from the current study.

very poor) compared with their same-aged peers (Maddox, 1962).

Thinking about Life Experiences (TALE). The self-continuity, social-bonding and directing-behaviour functions were measured using the TALE (five items per subscale, Bluck & Alea, 2011). Participants responded on Likert scales (1 = *almost never*, 5 = *very frequently*). The first two items assessed the overall frequency of thinking back over and talking about one's past. The stem for the next 15 items was *I think back over or talk about my life or certain periods of my life...* Following the stem, functional items were presented. Example items included: *when I want to feel that I am the same person that I was before* (self-continuity); *when I want to develop more intimacy in a relationship* (social-bonding); *when I want to try to learn from my past mistakes* (directing-behaviour). Cronbach's alphas for self-continuity, social-bonding and directing-behaviour were respectively: .76, .65 and .60 (Taiwan); .84, .74 and .82 (USA).

The Big Five Inventory (BFI-10). A 10-item version of the BFI (developed to facilitate cross-cultural research; Rammstedt & John, 2007) was used in both samples to assess Openness, Conscientiousness, Extraversion, Agreeableness and Neuroticism. Participants responded using Likert scales (1 = *strongly disagree*, 5 = *strongly agree*) endorsing 10 personal characteristics (2 items per subscale; e.g., *I see myself as someone who is generally trusting*). In Rammstedt and John (2007), each 2-item subscale correlated with the corresponding subscale of the BFI-44 (r s ranged from .74 to .89). Inter-item correlations in the current sample showed significant correlations for Conscientiousness, Extraversion and Neuroticism (USA r s = .42, .41, .46, respectively, p s < .01; Taiwan r s = .38, .52, .51, p s < .01). Openness and Agreeableness showed some non-significant inter-item correlations (USA r s = .22, .08, p < .05, p = .42; Taiwan r s = .35, .14, p < .01, p = .20) and were thus not included in analyses.

Self-concept clarity and future time perspective. The Self-Concept Clarity Scale (SCCS, Campbell et al., 1996) and Future Time Perspective scale (FTP; Carstensen & Lang, 1997) were administered. The SCCS assessed the extent to which participants' self-concept is clearly defined and consistent. Participants rated agreement with twelve items (1 = *strongly disagree*, 5 = *strongly*

agree). The SCCS showed good reliability (USA, α = .86; Taiwan, α = .84). The 10-item FTP assessed the extent to which participants see their future as open-ended and full of opportunity. Items were rated on Likert scales (1 = *very untrue*, 7 = *very true*). Scale reliability was sound (USA, α = .72; Taiwan, α = .85).

RESULTS

Demographics

Americans reported their health on average as "good" (M = 1.88, SD = 0.7) and Taiwanese reported their health as "moderately good" (M = 2.92, SD = 0.92), $t(150.99) = -8.29$, p < .001. The American sample was slightly younger, $t(177) = -5.58$, p < .001. Age and health status were unrelated to memory functions and therefore excluded from further analyses. One-way analyses of variance (ANOVAs) showed no effects of ethnicity on functions in either sample.

Effects of cultural context

The first aim examined whether emerging adult men and women in different cultural contexts differed in the frequency of using autobiographical memory to serve self-continuity, social-bonding and directing-behaviour functions. Prior to examining that, we analysed the overall frequency of thinking and talking about the past from the TALE. Two-way ANOVAs showed that overall thinking about the past did not differ by culture or gender, F s(1, 173) = 3.36, 1.50, MSE = 0.68, p s = .07, .22, η_p^2 = .02, .01. There was no cultural effect for the frequency of talking about one's past, $F(1, 173) = 1.52$, MSE = 0.74, p = .22, η_p^2 = .01, but there was a gender effect, $F(1, 173) = 7.53$, p = .01, η_p^2 = .04. Women (M = 3.52, SD = 0.78) reported talking about their past more frequently than men (M = 3.18, SD = 0.95). Frequency of talking about the past was thus used as a control variable in analyses of memory functions.

A two-way mixed analysis of covariance with talking about the past as the covariate was used to test cultural and gender differences on the three functions of autobiographical memory. Bonferroni correction was applied with alpha set at .01 for post-hoc comparisons. Adjusted marginal means and standard deviations are reported in

Table 1. Results showed a main effect of culture, $F(1, 172) = 6.3$, $MSE = 0.27$, $p = .01$, $\eta_p^2 = .04$, with no gender effect. Pairwise comparison showed that Taiwanese used memory to serve the self-continuity function more often than Americans, $t(178) = 3.07$, $p = .002$, medium effect, $r = .22$. The expected cultural effect for the social-bonding function was not found.

We did not make predictions about relative use of the three functions between cultures. However, a within-subject interaction effect emerged for culture by function, $F(2, 344) = 3.33$, $MSE = 0.36$, $p = .04$, $\eta_p^2 = .02$. Americans used their memory to serve the directing-behaviour function more than self-continuity or social-bonding, $t_s(94) = 8.08$, 3.69 , $ps < .001$, $rs = .36$, $.64$. Social-bonding is used more often than self-continuity, $t(94) = 2.86$, $p = .01$, $r = .28$. In Taiwan, participants used memory to serve the directing-behaviour function more frequently than to maintain self-continuity, $t(84) = 3.48$, $ps < .001$, $r = .35$.

Cultural differences in person-level factors

Aim 2 was two-fold. The first was an intermediary step, which provided a description of how culture manifested in person-level factors. Two-way ANOVAs were used to identify differences in Taiwanese and American men and women. Differences were then explored for their relations to the different functional uses of autobiographical memory by culture (i.e., self-continuity function more frequent in Taiwan, as found in Aim 1). As these analyses did not focus on memory function, frequency of talking about the past was not used as a covariate.

Personality traits. Main effects for culture and gender were found for Conscientiousness, $F_s(1, 176) = 49.59$, 4.67 , $MSE = 0.68$, $p < .001$, $p = .03$, $\eta_p^2 = .22$, $.03$. As shown in Table 1, Americans reported higher Conscientiousness than Taiwanese, $t(176) = 7.06$, $p < .001$, $r = .22$. Women across the two cultures ($M = 3.40$, $SD = 0.98$) reported higher Conscientiousness than men ($M = 3.18$, $SD = 0.90$), $t(176) = 2.17$, $p = .03$, $r = .16$. For Neuroticism, the main effect of culture and gender emerged, $F_s(1, 175) = 3.93$, 8.46 , $MSE = 0.93$, $p = .049$, $.004$, $\eta_p^2 = .02$, $.05$, qualified by a culture by gender interaction, $F(1, 175) = 5.37$, $p = .02$, $\eta_p^2 = .03$. Gender differences were found only in the USA: women

($M = 3.20$, $SD = 0.97$) scored higher on Neuroticism than men ($M = 2.43$, $SD = 1.00$), $t(93) = 3.78$, $p < .001$, $r = .36$. Extraversion did not differ by culture or gender.

Self-concept clarity and future time perspective. Two-way ANOVAs examined cultural differences on men and women's self-concept clarity and on future time perspective. There were no cultural or gender differences for self-concept clarity, $F(1, 175) = 0.00$, 0.10 ; $ps = .93$, $.75$, $\eta_{ps}^2 = .00$. Descriptively, the total sample mean fell just above the mid-point on the scale ($M = 3.31$, $SD = 0.60$). That is, on average, participants rating of their self-concept as clearly defined and consistent was between neutral and slightly agree. For future time perspective, main effects of culture and gender emerged, $F(1, 176) = 52.00$, 5.26 , $MSE = 0.70$, $p < .001$, $p < .02$, $\eta_{ps}^2 = .23$, $.03$. As shown in Table 1, Americans held a more open-ended, optimistic sense of the future than did Taiwanese, $t(178) = 7.23$, $p < .001$, $r = .48$. Women ($M = 5.27$, $SD = 0.72$) had greater future time perspective than men ($M = 5.07$, $SD = 1.18$), $t(178) = 2.30$, $p = .02$, $r = .03$.

The self-continuity function: Culture and person-level predictors

The Aim 1 finding was that Taiwanese used memory more frequently to serve a self-continuity function. The current aim focused on the extent to which cultural context interacted with person-level factors to predict the functional use of autobiographical memory. In particular, analyses addressed whether differences in the use of memory

TABLE 1
Means and standard deviations of the three functions and person-level factors by culture

	America		Taiwan	
	M	SD	M	SD
Self-continuity	2.97 ^a	0.91	3.35 ^b	0.68
Social-bonding	3.26	0.79	3.42	0.58
Directing-behaviour	3.58	0.79	3.63	0.52
Conscientiousness	3.73 ^a	0.83	2.84 ^b	0.85
Extraversion	3.29	0.89	3.08	0.99
Neuroticism	2.84	1.05	3.11	0.94
Self-concept clarity	3.31	0.65	3.31	0.55
Future time perspective	5.59 ^a	0.72	4.73 ^b	0.97

Different superscripts within the same row indicate cultural differences at $p < .01$.

TABLE 2
Intercorrelations of the self-continuity function of memory with culture and person-level factors

	1	2	3	4	5	6	7	8
1. Self-continuity function	1.00							
2. Culture	.21**	1.00						
3. Gender	.03	.08	1.00					
4. Conscientiousness	-.08	-.47**	.11	1.00				
5. Extraversion	-.03	-.11	.04	.06	1.00			
6. Neuroticism	.06	.14	.23**	-.04	-.28**	1.00		
7. Self-concept clarity	-.18*	.01	-.02	.19*	.18*	-.36**	1.00	
8. Future time perspective	-.10	-.46**	.11	.30**	.30**	-.40**	.29**	1.00

* $p < .05$, ** $p < .01$.

to create self-continuity were jointly predicted by culture and person-level factors. We were particularly interested in those person-level factors that showed cultural differences: Conscientiousness, Neuroticism and future time perspective. Table 2 shows simple correlations for all variables in the models.

Hierarchical regressions examined culture in interaction with different sets of person-level factors as predictors of the self-continuity function. In each model, culture and person-level factors were entered in Step 1. Interaction terms were entered in Step 2. Except gender, person-level factors were centred to avoid multicollinearity. Frequency of talking about the past was assessed as a control variable in initial models. It did not predict the self-continuity function and its inclusion did not affect findings. We thus present finding from models without this variable.

Personality traits. To retain maximal statistical power, we first ran models for each of the three personality traits. Extraversion showed no effects so was not included in the final model. The final model was significant, $F(11, 167) = 2.26$, $p = .01$, $R^2 = .13$ (see Table 3). Step 1 again showed culture as a predictor of the self-continuity function. In Step 2, interactions contributed to the model, $\Delta F(7, 167) = 2.30$, $\Delta R^2 = .084$, $p = .03$, particularly the effect for Conscientiousness by culture ($\beta = .35$, $p = .04$). Follow-ups showed a positive correlation between the two variables in Taiwan ($r = .25$, $p = .02$), and not the USA ($r = -.12$, $p = .24$). The correlations differed, Fisher's $z = 2.48$, $p = .01$.

A two-way interaction was found for Neuroticism by gender ($\beta = .38$, $p = .01$), qualified by an interaction for Neuroticism by gender by culture ($\beta = -.31$, $p = .03$). Following up the three-way interaction, correlations between neuroticism and

the self-continuity function were not significant: Taiwanese men and women, .11 and $-.06$ ($ps = .55, .70$); American men and women, $-.26$ and $.23$ ($ps = .09, .10$). The interaction appeared to be driven by differences in correlations between American men and women, Fisher's $z = -2.35$, $p = .02$. Correlations for Taiwanese men and women did not differ, Fisher's $z = 0.73$, $p = .47$.

Self-concept clarity and future time perspective. The overall model was significant, $F(11, 167) = 1.97$, $p = .03$, $R^2 = .12$. As reported in Aim 1, Taiwanese used memory to serve a self-continuity function more frequently. As expected,

TABLE 3
Effects of personality and culture in predicting the self-continuity function

	Self-continuity function			
	B	SEB	β	t
Step 1				
Culture (America = 0, Taiwan = 1)	0.36	0.14	.22*	2.59
Gender (male = 0, female = 1)	0.00	0.13	.00	0.01
Conscientiousness	0.03	0.08	.04	0.46
Neuroticism	0.03	0.06	.03	0.45
Step 2				
Culture	0.68	0.21	.41**	3.18
Gender	0.24	0.21	.14	1.12
Conscientiousness (C)	-.022	0.14	-.25	-1.59
Neuroticism (N)	-.022	0.12	-.27	-1.79
Culture $\times$ gender	-.040	0.29	-.22	-1.36
Culture $\times$ C	0.48	0.23	.35*	2.11
Culture $\times$ N	0.29	0.18	.23	1.60
Gender $\times$ C	0.12	0.21	.11	0.59
Gender $\times$ N	0.45	0.17	.38**	2.65
Culture $\times$ gender $\times$ C	-.018	0.30	-.11	-0.58
Culture $\times$ gender $\times$ N	-.056	0.25	-.31*	-2.21

* $p < .05$, ** $p < .01$.

emerging adults who had a less clear sense of self used autobiographical memory more frequently to create self-continuity, $\beta = -.19$, $p = .01$. There were no future time perspective effects or interactions.

DISCUSSION

The current study examines cultural context and person-level factors related to the functional use of autobiographical memory in emerging adult men and women in Taiwan and America. Findings support several of our predictions: Taiwanese used memory more frequently to maintain self-continuity, and Taiwanese and American emerging adults reported similar frequency in the directive use of memory. The expected cultural effect for the social-bonding function was not found. Some person-level factors (i.e., Conscientiousness, Neuroticism, Future Time Perspective) varied by culture and gender; such differences were sometimes shown to be relevant to the functional use of memory.

Culture and the functions of remembering: Taiwan and America

Culture shapes the early development of autobiographical memory (Nelson & Fivush, 2004) and affects the functional use of memory in adulthood (Wang & Conway, 2004). Based on person-environment dynamics (Bluck et al., 2010), we argued in the introduction that the fabric of Taiwanese society provides less contextual support for the development of a continuous life story early in life. As predicted, Taiwanese reported more frequently drawing on their past to create self-continuity, to maintain a biographical sense of self over time (Bluck & Liao, 2013; Sani, 2008). This finding is not consistent with past research in another East Asian society (e.g., Japan; Maki et al., 2015). Our finding may be understood, however, as emerging adults pursuing the universal need for autonomy and relatedness (Wang, 2014) in the specific context of current societal forces in Taiwan (Lee et al., 2010; Yeh et al., 2007). In traditional collectivistic cultures, the environment does not emphasise the continuity (English & Chen, 2011; Heine, 2001) and uniqueness of one's self (Triandis, 1989; Wang & Conway, 2004). Self-development processes for Taiwanese children follow East Asian

values, stressing the importance of an interdependent self to foster harmonious social relations (Wang & Ross, 2007). In emerging adulthood, however, individuals across the two cultures face the task of taking on an adult identity to achieve autonomy (Arnett, 2004; Liao et al., 2014), partly through creating a continuous life story (Liao & Cheng, 2011). The task of maintaining a unique sense of self-continuity may require more reliance on individual resources when one has been raised in a collectivist society, resulting in more frequent use of memory to achieve this end. The current finding suggests that, in cultures experiencing an increasing mix of East Asian traditional and Western values (Cheng et al., 2012; Lee et al., 2010) individuals must forge a blended self that is both socially and individually oriented (Kagitcibasi, 2013; Yeh et al., 2007). The autonoetic tool of autobiographical memory (Markowitsch & Staniloiu, 2011) can act as a resource as they negotiate this complex path to adulthood (Habermas & Bluck, 2000).

Past research on cultural difference in use of memory for directing-behaviour is mixed. Our research is consistent with Maki et al. (2015) who also found no cultural difference in the use of memory to direct behaviour. Note, however, that emerging adults across both cultures in the current sample use memory most frequently to direct their future. Emerging adults across cultures appear to use memory to orient to the future (Klein, 2013). Our findings suggest that in emerging adulthood, both Taiwanese and Americans need to think about and plan for their future as they face the imminent tasks of developing a family and a career (Arnett, 2004). Both American and Taiwanese emerging adults feel that they have an open-ended future (though Americans report a more open future perspective) and are thus motivated to use memory as a resource to guide their future life trajectory (Baltes, 1997).

Other research, however, documents differences. Taking a novel approach, examining metacognitive knowledge about autobiographical memory, Wang et al. (2015) found that Asian American college students agree to a greater extent that autobiographical memory serves the directing-behaviour function compared to European Americans. Research on middle-aged adults has also shown cultural differences in the directing-behaviour function (Chinese and Americans; Wang & Conway, 2004). Through content coding, these authors found Chinese middle-aged adults more often expressed learning a moral lesson

from the past to direct their future. As such, future research might examine the use of memory to direct behaviour across cultures but also across life phases.

Although we expected Americans to use memory more than Taiwanese for social-bonding there was no cultural difference. There was, however, indirect support for our prediction: Americans reported using memory more frequently for social-bonding than to create self-continuity while Taiwanese showed no such preference. One possibility for the lack of clear cultural differences on the social-bonding function, however, is that the TALE (i.e., used in the current research) assesses use of memory to create and maintain social bonds without considering with whom one is creating bonds. Future studies that take the reminiscence context and the target of social-bonding into account (Alea & Bluck, 2003) may reveal cultural differences. For example, Kulkofsky et al. (2010; Chinese and American samples) showed that the sharing context can increase the frequency of reporting social functions. Americans, however, reported more social functions regardless of context particularly when recalling a social memory. As East Asians are more contextually dependent (Heine, 2001) including assigning functions to their memory (Kulkofsky et al., 2010), Taiwanese people may respond sensitively to conversational demands and cater responses according to their conversational partner (e.g., towards authority, or in specific relationships, with family, peers, others; Yang, 2004). Family versus non-family relations may be a particularly important dimension to assess in future research. Taiwanese individuals may use memory less to create warm social bonds with family. For example, research shows that American mothers' reminiscing stresses social-bonding more than Chinese mothers' (Kulkofsky et al., 2009). The use of memory to create social bonds outside the family (e.g., with peers) may be just as common in Taiwanese emerging adults as their American counterparts. Supporting this notion, the current study shows no differences in overall level of extraversion between Taiwanese and American emerging adults. Indeed, social-bonding has been argued to be important across cultures and responsible for the evolutionary development of autobiographical memory (Nelson & Fivush, 2004).

In conclusion, there is currently only a small number of studies examining autobiographical memory function in East Asian cultures, while it

is tempting to interpret these as reflecting real cultural differences. Note that different measurement techniques may actually be responsible for the differing findings across East Asian cultures. For example, Maki et al. (2015) used a preliminary version of the TALE (i.e., Bluck, Alea, Habermas, & Rubin, 2005) that contained more varied and numerous items than the validated TALE (Bluck & Alea, 2011). Wang and Conway (2004) examine functions that are spontaneously revealed through coding autobiographical memories across middle-aged adults' lifespan. Kulkofsky et al. (2010) used word cues to assess the functions of specific episodic memories. Wang et al. (2015) assessed functions from the perspective of meta-memory (i.e., knowledge about autobiographical memory). Participants in the current study, in contrast, were explicitly directed to think about their life and then asked whether they use autobiographical memories to serve functions using the validated TALE (i.e., Bluck & Alea, 2011).

Person-level factors and culture interactions in predicting functions of remembering

Our conceptualisation (Bluck et al., 2010) suggests that culture, person-level factors and their interaction may affect memory function (SMS; Conway & Pleydell-Pearce, 2000). As culture is a macro-level context (see also Alea et al., 2015), it is expected to show effects on person-level factors that may then predict the functional use of memory. Person-level factors may also, however, be moderated by culture in predicting functional memory use. Our primary interest was to examine when person-level factors directly predict functional memory use, and when they are moderated by the individual's culture. Our discussion thus focuses on the direct effects of person-level factors on functional memory use as well as on person-culture interactions.

Effects of person-level factors are largely direct ones with one exception: trait conscientiousness interacts with culture to predict the self-continuity function. Within Taiwan, but not America, individuals higher in conscientious more frequently use memory to create self-continuity. Conscientiousness refers to doing a thorough job. For Americans, a sense of self-continuity may be encouraged and constantly forged throughout development, so one may not need a high level of conscientiousness to engage in this process. We

have argued, however, that forging self-continuity is less supported in the sociocultural context of Taiwan and thereby requires more frequent use of individual resources. Taiwanese who are more highly conscientious may be more diligent in their attempts to create a strong sense of self-continuity, more frequently drawing on memories to do so. Those lower in conscientiousness may be willing to do a less thorough job of forging self-continuity. That is, among Taiwanese, it is those most concerned with doing a thorough job who actively used memory to create a continuous sense of self to prepare for adulthood. Regardless of mean differences between cultures, the effect of this person-level trait on the use of memory to create self-continuity is moderated by culture. This effect shows the importance of taking multiple levels of analysis (i.e., person-level, context-level) into account to understand memory function.

Across cultures, self-concept clarity, as expected, predicted the self-continuity function. Individuals with lower self-concept clarity reported more frequently using memory to create self-continuity (see also Bluck & Alea, 2008). This suggests that when emerging adults lack clarity they draw on their past to create a greater sense of self-continuity. There were no cultural differences in clarity of one's self-concept. Though this may seem counter-intuitive, past research has suggested that developing a clear, autonomous self is important for today's Taiwanese young people (e.g., Lee et al., 2010). Our finding is in line with theoretical (Wang, 2014) and empirical work (Yeh, Bedford, & Yang, 2009) that shows that across cultures, both autonomy and relatedness are crucial aspects of self-concept for emerging adults, though the timing of development and the content of one's self-concept may differ by culture.

Across cultures, women reported speaking more about their personal past with others than did men. This is in line with Webster (1994) who found that women reminisce more frequently than men (cf. Webster & McCall, 1999). Some research has suggested that women use memory more than men to serve identity and intimacy functions (e.g., lifespan sample, Webster & McCall, 1999; older adults, Pillemer et al., 2003). Consistent with past research using the TALE and assessing emerging adults (Alea et al., 2015), however, the current research did not show gender differences in the functional use of memory, or gender interactions predicting memory

use. A focus for future research may be to examine the interplay of gender and life phase on functional use of autobiographical memory.

CONCLUSION

Memory has been theorised to serve psychosocial functions (Bluck, 2003; Pillemer, 2003) in response to environmental, sometimes cultural, demands (Berntsen, 2007; Bluck et al., 2010). The current study highlights how culture shapes autobiographical remembering (Nelson & Fivush, 2004) specifically in emerging adults in Taiwan and America. The functional use of memory for maintaining self-continuity varied across cultures (i.e., Taiwan shows higher use), at the person-level across cultures (i.e., inverse relation to self-concept clarity), and in person-culture interactions (i.e., relation to trait conscientiousness, in Taiwan but not the USA).

The overall cultural difference in self-continuity between Taiwanese and Americans is not in line with past research comparing Americans and other East Asian cultures (Kulkofsky et al., 2009, 2010; Maki et al., 2015; Wang et al., 2015). This highlights the necessity of identifying patterns not only between Eastern and Western cultures but also within societies that share similar cultural traditions (Wang, 2014). We posit that these findings reflect the shift of values in current Taiwan towards viewing the self as autonomous (Lee et al., 2010). When self-continuity becomes a primary goal but the culture provides little support for it, autobiographical memory may be more frequently relied on as a cognitive resource towards that end (Markowitsch & Staniloiu, 2011).

This research has several limitations that should be noted. The study relied only on self-reports (i.e., the TALE). In future research, the TALE might be employed in tandem with other procedures including the use of experimental designs (e.g., Alea & Bluck, 2007) or content analysis of memory narratives (e.g., Kulkofsky et al., 2010; Wang & Conway, 2004). Other limitations include the lack of macro-level markers of culture and the lack of participants from different life phases. Despite its limitations, the current study adds to a growing body of research (Alea & Wang, 2015) on the functions that human remembering serves as people move across their lives around the globe.

DISCLOSURE STATEMENT

No potential conflict of interest was reported by the authors.

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