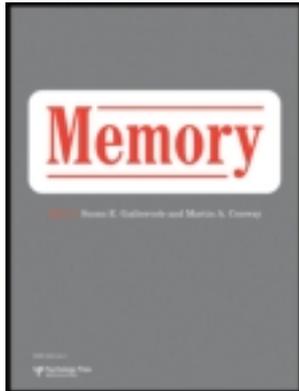


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Susan Bluck^a & Nicole Alea^b

^a University of Florida, Gainesville, FL, USA

^b University of the West Indies, St. Augustine, Trinidad

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Crafting the TALE: Construction of a measure to assess the functions of autobiographical remembering

Susan Bluck¹ and Nicole Alea²

¹University of Florida, Gainesville, FL, USA

²University of the West Indies, St. Augustine, Trinidad

Theory suggests that autobiographical remembering serves several functions. This research builds on previous empirical efforts (Bluck, Alea, Habermas, & Rubin, 2005) with the aim of constructing a brief, valid measure of three functions of autobiographical memory. Participants ($N = 306$) completed 28 theoretically derived items concerning the frequency with which they use autobiographical memory to serve a variety of functions. To examine convergent and discriminant validity, participants rated their tendency to think about and talk about the past, and measures of future time orientation, self-concept clarity, and trait personality. Confirmatory factor analysis of the function items resulted in a respecified model with 15 items in three factors. The newly developed Thinking about Life Experiences scale (TALE) shows good internal consistency as well as convergent validity for three subscales: Self-Continuity, Social-Bonding, and Directing-Behaviour. Analyses demonstrate factorial equivalence across age and gender groups. Potential use and limitations of the TALE are discussed.

Keywords: Autobiographical memory; Function; Measurement.

This paper reports the construction and validation of a brief measure for assessing three central functions of autobiographical memory. To introduce this new measure, background is provided on: (i) the functional approach as grounded in the ecological memory tradition, (ii) current literature on three major theorised functions of autobiographical memory (i.e., self, social, and directive functions), and (iii) preliminary empirical research (Bluck et al., 2005) that serves as a foundation for crafting the current measure. The study uses confirmatory factor analyses (CFA) with model respecification to fit the data and thereby construct the measure. Psychometric properties (i.e., subscale reliabilities and descriptives, convergent validity, factorial equivalence) of the newly developed Thinking About Life

Experiences (TALE) scale are presented. The discussion focuses on the strengths and limitations of the TALE, a copy of which appears in the Appendix.

THE FUNCTIONAL APPROACH TO AUTOBIOGRAPHICAL MEMORY

Over the last several decades researchers have described the benefits of taking a functional approach to memory (e.g., Baddeley, 1987; Neisser, 1978; Pillemer, 1992). From a functional perspective researchers must be concerned not only with understanding *how* autobiographical memory works but *why* humans remember personal experiences, often over long periods of time (Bruce,

Address correspondence to: Susan Bluck PhD, Department of Psychology, University of Florida, PO Box 115911, Gainesville, FL, 32611-5911, USA. E-mail: bluck@ufl.edu

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1989). Function can have (at least) two interrelated meanings, connoting either adaptive significance or real-world usefulness (Bluck & Alea, 2002; Pillemer, 2009). Some theorists have conceptualised function as adaptivity (e.g., Brown & Kulik, 1977). Questions of the adaptive significance of autobiographical memory in evolutionary terms, however interesting, are difficult to investigate (Kihlstrom, 2009). In the current research the simpler definition of function is adopted. That is, the research examines what individuals report using autobiographical memory for in daily life.

Examining memory function as compared to memory mechanism provides a different and potentially complementary view of the remembering individual (Neisser, 1982). The person is not seen exclusively as an information processor, with the emphasis of remembering largely being on memory performance and veridicality. Instead the individual is seen more broadly as an organism processing information *in an ecological context*. As such, the emphasis of remembering extends from memory performance to memory function or utility (Berntsen, 2007). Baddeley's (1988; see also Baddeley, 2009) classic paper is a hallmark of functional thinking: he called on researchers to establish replicable memory phenomena, but then to ask, for a given phenomenon, "What the hell is it for?" (p. 4). He discusses how the field might benefit from keeping this question at the top of the research agenda and particularly focuses on what could be learned about *autobiographical* memory by examining its function in daily life (for a review of his classic paper, see Bluck, 2009).

THREE FUNCTIONS OF AUTOBIOGRAPHICAL REMEMBERING

Since Baddeley's (1988) early work, autobiographical memory has been theorised to serve at least three broad functions: self, social, and directive (Bluck & Alea, 2002; Cohen, 1998; Pillemer, 1998; for reminiscence functions see also Webster, 1997) and empirical research is increasingly being done in these areas both in the autobiographical memory (e.g., Kukolfsky & Koh, 2009; McLean, 2005; Rasmussen & Berntsen, 2009) and the reminiscence traditions (e.g., Cappeliez & O'Rourke, 2002; Webster & Gould, 2007). The *self-function* involves retrieving auto-

biographical memories to maintain a sense of being the same person over time or to update the self while maintaining continuity (Conway, 2005). Autobiographical memory provides a person with knowledge of the self in the past that can be related to the present self and the projected future self so as to locate one's self across time (Conway, Singer, & Tagini, 2004; *extended self*, Neisser, 1988). Some researchers have also examined how autobiographical memory serves to maintain a positive view of self (e.g., Wilson, Gunn, & Ross, 2009). The *social function* of autobiographical memory involves retrieving memories to develop, maintain, and enhance social bonds (Alea & Bluck, 2003; Neisser, 1988; Nelson, 1993; Pillemer, 1998). Several researchers have argued that social bonding is the primary function of autobiographical memory (Neisser, 1978; Nelson, 1993). Memories provide material for conversations (e.g., Hyman & Faries, 1992; Pasupathi, Lucas, & Coombs, 2002; Webster, 1997), create intimacy in relationships (Alea & Bluck, 2007), and may be related to empathy (Bender, Lachmann, Pohl, & Chasiotis, 2011). The *directive function* involves retrieving past experiences to guide present problem solving (Bluck & Alea, 2002; Webster, 1997) and to direct future thoughts and behaviour (Baddeley, 1988; Bluck, Dirk, Mackay, & Hux, 2005; Pillemer, 1998).

These three broad categories provide a framework for conceptualising the functions of autobiographical memory (Bluck & Alea, 2002; Cohen, 1998; Pillemer, 1992). This conceptualisation has also been useful for empirical examination of specific functions (e.g., investigating intimacy as one of the social functions, Alea & Bluck, 2007; examining turning points in life as a specific type of directive memory; Pillemer, 1998). For clarity, note that though the three broad functions are conceptually distinct, at the level of the specific episode memories might easily serve more than one function at a given time (Bluck, 2003; Pillemer, 2003). In addition, while this conceptualisation covers a broad range, future theoretical work may find that these three broad functions are not exhaustively inclusive (Bluck, 2009; Pasupathi, 2003; Pillemer, 2009). In the literature to date, however, the self, social, and directive functions encompass the majority of thinking and research on the functions of autobiographical memory.

PRELIMINARY WORK

Even in studies that do not directly take a functional approach, researchers studying autobiographical memory often refer to the functions memory may serve as they interpret their findings. Empirical assessment of the functions of autobiographical memory has been limited due to the lack of a standard measurement tool. Given the intuitive conceptual appeal of function in the autobiographical memory literature combined with the relative paucity of empirical research (but see, e.g., Hyman & Faries, 1992), an initial study was undertaken. The study goal was to empirically examine people's use of autobiographical memory to serve self, social and directive functions (Bluck et al., 2005). Thus the goal of that study was not measurement development, but to investigate whether the three functions that have been repeatedly conceptualised in the theoretical literature would emerge in a factor analysis of actual empirical responses. The study ($N = 161$ young men and women) used a straightforward and face-valid approach of obtaining self-reports. Participants provided Likert-type scale ratings to express level of endorsement of 28 questionnaire items that represent the use of autobiographical memory to serve a variety of functions. Individual items were derived from a review of the theoretical literature (e.g., Cohen, 1998; Pillemer, 1992), discussion sections of empirical articles on other aspects of autobiographical memory in which functions are mentioned in interpreting results (e.g., Nelson, 1993), and book chapters in which previous authors have alluded to autobiographical memory's functions (e.g., Brewer, 1986; Neisser, 1978). As this was a preliminary study and the focus was not on measurement development, exploratory factor analysis (EFA) of this original questionnaire was used to examine participants' responses to the function items. EFA resulted in a four-factor solution representing a Self-Continuity factor, a Directive factor, and two Social factors. The two social factors focused on use of memory to initiate new relationships versus maintaining bonds in existing relationships: the function was essentially the same but the timing in the relationship differed. This research provided a good foundation for the current study in which a measurement tool is developed.

THE CURRENT STUDY: CRAFTING THE THINKING ABOUT LIFE EXPERIENCES (TALE) SCALE

The current research builds on the preliminary study in a variety of ways. While the central goal of the previous research was to empirically map the theorised functions of autobiographical remembering, the current study was specifically designed with the aim of developing a brief, valid measure. The current study also extends the past work through collection of a larger sample thereby allowing the use of confirmatory factor analysis, a more appropriate statistical technique for actual measurement development. The sample is also more heterogeneous. The previous research focused only on young adults. Older and younger community-dwelling men and women are included in the current sample, allowing for examination of factorial equivalence across different groups of individuals that was not possible in the initial study. The current study also includes several new measures that allow examination of convergent and discriminant validity for each of the subscales.

METHOD

Participants

Participants were 156 young adults (74 men, 82 women; M age = 22.54, $SD = 5.51$) and 150 older adults (75 men, 75 women; M age = 73.71, $SD = 6.98$). Younger participants were recruited from an undergraduate psychology participant pool and graduate programmes. They were compensated with research credit or with \$10. Older participants were recruited through a participant database, and were not compensated for participation. Of the total sample, 82% reported their race as Caucasian, 6% as Black, 5% as Hispanic, 4% as Asian or Pacific Islander, and 3% reported their race as Other. Older adults had an average of 21.55 years of education ($SD = 4.92$) and younger adults had an average of 18.04 years ($SD = 5.28$), $t(305) = 6.01$, $p < .001$. On a 6-point Likert-type scale (1 = *very good*, 6 = *very poor*) both age groups reported their health as being *good* to *very good* compared to others their own age (young: $M = 1.84$, $SD = .71$; old: $M = 1.79$, $SD = .94$), $t(305) = .47$, $p > .05$. All older adults were screened for dementia (Roccaforte, Burke,

Bayer & Wengel, 1992). The sample was typical in terms of age differences in basic cognitive functioning (Schaie, 1994). That is, older adults had better vocabulary ability (WAIS-R Vocab; Wechsler, 1981), and younger adults showed higher reasoning ability (Letter Series Task; Thurstone, 1962) and episodic memory performance (Auditory Verbal Learning Test; Rey, 1941).

Procedure and measures

The data were collected in a quiet university or community meeting room (i.e., public library). All participants completed the Thinking About Life Experiences scale (TALE-30; revised form of Bluck et al., 2005). The entire sample completed this scale in order to provide sufficient power for confirmatory factor analyses to obtain relevant subscales. In order to examine the relation between TALE-30 subscales and other relevant psychological constructs, a subset of participants ($n = 177$; 93 young and 84 old, balanced by gender) also completed the Self-Concept Clarity Scale (SCCS; Campbell et al., 1996), the Future Orientation Scale (FOS; Carstensen & Lang, 1996), and the Big Five Inventory (BFI; John & Srivastava, 1999). For participants who completed all measures, the TALE-30 was given first followed by the SCCS, FOS, and the BFI.

Thinking About Life Experiences Scale (TALE). The Thinking About Life Experiences scale assesses the self, social, and directive functions of autobiographical memory. A 30-item scale was administered in the current study from which a final 15-item scale was developed and tested for its psychometric properties. For clarity, the 30 items administered to participants will be referred to as the TALE-30. The final scale developed is simply called the TALE.

The instructions state: “*Sometimes people think back over their life or talk to other people about their life: it may be about things that happened quite a long time ago or more recently. We are not interested in your memory for particular events, but more generally in how you bring together and connect the different events and periods of your life,*” (i.e., autobiographical reasoning, Habermas & Bluck, 2000). Two questions are presented first to assess people’s overall tendency to think back over or talk about their life. Responses are made on a 5-point Likert-type

scale, with 1 = *almost never* and 5 = *very frequently*.

After these two baseline items participants are instructed to indicate how often they think back about or talk about their past to serve a variety of functions. The directions emphasise that there are no right or wrong answers, and that the entire scale should be considered when responding. The stem for each of the 30 items is: “*I think back over or talk about my life or certain periods of my life ...*” The stem completion items (see Table 1) are presented in random order. Responses are made on a 5-point Likert-type scale, ranging from 1 = *almost never* to 5 = *very frequently*. Original administration (Bluck et al., 2005) used 1 = *never* as the endpoint but this was very infrequently used. The current administration used 1 = *almost never* to capture rare usage. Items on the TALE-30 were based on items from the original scale (Bluck et al., 2005) with either no changes or slight modifications for clarity and subscale specification. New items were also developed to create subscales with equal numbers of items. Details about retained, modified, and new items are described below. The items from the administered TALE-30 appear in Table 1.

On the original questionnaire the *self-function subscale* contained four items. Three items were retained for the current self-function subscale. These include items 3, 10, and 6. One item was divided, for clarity, into two items: one about beliefs (9) and one about values (4). Four new self-function items were developed. These are items 1, 2, 5, and 7. The final item (8) originally loaded on the directive factor (Bluck et al., 2005) but in reworded form was conceptualised as a self-function factor.

For the *social function subscale*, items concerning both developing relationships (12, 16, 19) and nurturing relationships (11, 15, 18) from the original administration (Bluck et al., 2005) were retained on the TALE-30. One item was reformulated into two separate items: one about using autobiographical memory to introduce oneself to other people (17) and the other about disclosing information to others (20). Two additional items (13, 14), concerning using memory for developing intimacy and empathy were developed for this administration. In the previous administration EFA showed two social function factors, one for developing new relationships and one for nurturing existing relationships. These two factors, however, may have formed separately largely

TABLE 1
The 30-item Thinking About Life Experiences (TALE) scale

Item
<i>Self Function</i>
1 when I want to feel that I am the same person that I was before.
2 when I want to think about how I am different now than I was in the past.
3 when I am concerned about whether I am still the same type of person that I was earlier.
4 when I am concerned about whether my values have changed over time.
5 when I want to get a better sense of who I am now.
6 when I want to understand who I am now.
7 when I want to think about whether my life has a coherent story.
8 when I want to see if I have an overall theme in my life.
9 when I am concerned about whether my beliefs have changed over time.
10 when I want to understand how I have changed from who I was before.
<i>Social Function</i>
11 when I want to help someone by telling them about my own past experiences.
12 when I hope to also find out what another person is like.
13 when I want to develop more intimacy in a relationship.
14 when I want to empathize with something that someone else has experienced.
15 when I want to make someone else feel better by talking to them about my similar past experiences.
16 when I want to develop a closer relationship with someone.
17 when I want to introduce myself to other people.
18 when I want to maintain a friendship by sharing memories with friends.
19 when I hope to also learn more about another person's life.
20 when I want to let other people know more about me.
<i>Directive Function</i>
21 when I want to remember something that someone else said or did that might help me now.
22 when I think about my goals for the future.
23 when I am searching for a solution to a current life difficulty.
24 when I believe that thinking about the past can help guide my future.
25 when I want to try to learn from my past mistakes.
26 when I need to make a life choice and I am uncertain which path to take.
27 when I want to remember a lesson I learned in the past.
28 when I want to see whether my life is going in the right direction.
29 when I feel that if I think about something bad that happened I can learn some lesson from it.
30 when I am facing a challenge and I want to give myself confidence to move forward.

TALE-30 items were administered in random order, not in subscales as shown here.

due to item wording. Both fit into a conceptually driven social function focused on social bonding. In the current version the social function subscale contained items about both initiating and maintaining relationships.

Four items from the original *directive function subscale* were retained with no changes (22, 25, 26, and 29). Items 21, 23, and 30 were retained with minor changes to clearly specify timeframe, as per theoretical work on memory as a directive (e.g., Pillemer, 1998). That is, items emphasise using autobiographical memory to solve *current* life problems or guide *future* behaviours. Item 24, which did not load on any factor in the original administration, was reworded and retained, again with the goal of linking the use of autobiographical memory to guiding future behaviours. Two new items (27, 28) were developed. For concep-

tual clarification of autobiographical memory's function as a directive (Bluck & Alea, 2002; Cohen, 1998; Pillemer, 1992), any items that did not specify use of memory to guide current or future behaviour were dropped.

Self-Concept Clarity Scale (SCCS). The SCCS (Campbell et al., 1996) was included to provide convergent validity with the theoretical self-function of autobiographical memory. Individuals with low levels of self-concept clarity should use memory more often to serve a self-function. The SCCS is a 12-item self-report measure that assesses the extent to which the participant's self-concept is clearly defined and internally consistent. SCCS items direct people to think about the level of clarity and consistency in their view of themselves (e.g., "My beliefs about myself often conflict with one another", "In general I

have a clear sense of who I am and what I am”). Responses are made on a 5-point Likert-type scale, ranging from 1 = *strongly disagree* to 5 = *strongly agree*. Reliability of the SCCS has been reported in terms of internal consistency, and evidence is available for its convergent and construct validity (Campbell et al., 1996). Chronbach’s alpha in the current study was .87.

Big Five Inventory (BFI). Administration of the BFI (John & Srivastava, 1999) served to capture levels of extraversion and neuroticism. Higher levels of extraversion were expected to show convergence with greater frequency of use of the social function of autobiographical memory. Neuroticism was expected to be unrelated to any of the theoretical functions of autobiographical memory. The BFI is a 44-item self-report measure of the big five personality traits. Only the extraversion and neuroticism subscales were used in the current study. Questions assess the extent to which people agree or disagree with statements that describe them (e.g., “I see myself as someone who ...” “is talkative” “worries a lot”). Responses are made on a 5-point Likert-type scale, ranging from 1 = *disagree strongly* to 5 = *agree strongly*. Items were averaged to produce subscales indicative of the two personality traits: extraversion (Chronbach’s alpha = .82) and neuroticism (Chronbach’s alpha = .85).

Future Orientation Scale (FOS). The FOS (Carstensen & Lang, 1996) was used to provide convergent validity for the directive function of autobiographical memory. Those individuals that see their future as more open-ended should use memories more often to direct their future. The FOS is a 10-item measure that assesses the extent to which the participant sees their future as open-ended. Participants rate on Likert-type scale the extent to which statements (e.g., “Many opportunities await me in the future,” “My future is full of possibilities”) are *very untrue* (1) to *very true* (7). This measure has shown good construct validity in previous research (e.g., Lang & Carstensen, 2002). Chronbach’s alpha in the current study was .89.

RESULTS

Results are presented in four sections. In the first section two separate confirmatory factor analyses were performed: a four-factor replication of Bluck and colleagues (2005) and a theoretically

based three-factor model. The TALE-30 is then modified for better fit, resulting in the final 15-item TALE scale. In the remaining sections the psychometric properties of the newly developed TALE are presented. The second section describes the TALE subscales and demonstrates internal consistency on each subscale. The third section provides analyses of convergent and discriminant validity of the TALE subscales. In the fourth section, appropriateness of use of the scale for both younger and older adult men and women is demonstrated.

Confirmatory factor analysis

Confirmatory factor analyses (CFA) were conducted using AMOS 5 (Arbuckle, 2003). Results are provided for the replication model, Model 1, and the theoretical model, Model 2. Both models are overidentified (i.e., number of free parameters < number of data points) resulting in positive degrees of freedom suitable for running the CFAs (Kline, 1998).¹ The factors were scaled by fixing the loading of one indicator per factor equal to 1.0, giving the latent factor the same metric as the indicators.² Unidimensional measurement was specified: each indicator loads only on a single factor and measurement errors were not allowed to correlate, allowing for a more precise test of indicator validity (Anderson & Gerbing, 1988). The factors were allowed to correlate, as the initial exploratory factor analysis (Bluck et al., 2005) indicated that an oblique solution was preferred and that the factors were both conceptually and empirically related.

The parameters were estimated using a maximum likelihood method for both models (Byrne, 2001; Kline, 1998).³ The data were relatively normally distributed. Univariate skewness values range from .00 to -.91, with a mean of .34,

¹The sample size for the CFA was 290. Participants with missing data on the TALE were dropped from analyses (Gorsuch, 1983). Model 1: data points = 495, total parameters = 164; free parameters = 96, fixed parameters = 68, DF = 399; Model 2: data points = 465, total parameters = 96; free parameters = 63, fixed parameters = 33, DF = 402.

²Arbitrarily, the first indicator for each factor was set to 1.0. The alternative method for scaling a factor, setting the variance of the factor equal to 1.0, is generally not appropriate when conducting multiple-group CFAs (Kline, 1998).

³The maximum likelihood method was suitable as the sample is relatively large (asymptotic theory), the hypothesised model is valid, and the scale of the observed variables is continuous.

$SE = .40$. Univariate kurtosis values ranged from .02 to 1.07, $M = .64$, $SE = .34$.⁴ Models were evaluated using several diverse goodness-of-fit indices (see Worthington & Whittaker's, 2006, review of best practices in scale development). These include: Chi-square (CMIN), Chi-square/degrees of freedom ratio (CMIN/DF), Goodness-of-Fit Index (GFI), Root-Mean-Square Error of Approximation (RMSEA), and Incremental Fit Index (IFI). CMIN and CMIN/DF are reported as indicators of overall model fit. Although a non-significant CMIN indicates better fit, it is unlikely with a large sample size (Bentler & Bonett, 1980). There are a number of well-developed scales that do not show non-significant CMIN statistics with large sample sizes (e.g., Psychological Well-Being Scale; Ryff & Keyes, 1995). CMIN/DF values less than three are considered favourable (Marsh, Balla, & McDonald, 1988). Two absolute fit indices, measuring how well the CFA explains the relations found in the data, are reported: the GFI and the RMSEA (Jöreskog & Sörbom, 1984). Values $> .90$ for the GFI are considered acceptable, and values closer to .05 for the RMSEA are considered favourable, although values up to .08 are thought to be reasonable (Byrne, 2001). The IFI is reported to measure the improvement of the model over the baseline (null) model. Values above .90 are acceptable and values close to .95 represent superior fit (Bollen, 1989).

Replication model. This model was a replication of the four-factor solution found in Bluck and colleagues (2005) using the TALE-30. The original EFA (Bluck et al., 2005) included a self factor, a directive factor, and two social factors: developing relationships and nurturing relationships. As described in the Measures section, the current study included 10 indicators for the self factor, 10 for the directive factor, and 10 for the social factor (including items related to both developing and nurturing relationships). Fit indices for the replication model (four-factor solution) are reported in Table 2. Examination of the various indices suggests that there is only mediocre fit of the data to the model. The only index to reach acceptable

⁴Skewness and kurtosis values of zero indicate normal distributions. The average skewness value was not greater than twice the standard error of skewness, indicating that the distribution was relatively normal. None of the values was greater than 3.00, a relatively conservative criterion for skewness (Kline, 2001).

TABLE 2
Confirmatory factor analyses results: Replication model, theoretical model, and respecified (final) model

Models	CMIN	CMIN/		GFI	RMSEA	IFI
		DF				
Replication	1072.02**	2.67	.79	.07	.81	
Theoretical	1133.04**	2.82	.78	.08	.79	
Respecified (final)	177.99*	2.05	.92	.06	.94	

CMIN: non-significant CMIN indicates better fit though unlikely with large sample sizes; CMIN/DF: values < 3 are considered favourable; GFI: values above .90 are considered favourable; RMSEA: values $< .05$ indicate good fit, although reasonable up to .08; IFI: values above .90 are favourable. ** $p < .001$, * $p < .01$.

levels of fit was the CMIN/DF, which was below 3.00.

Theoretical model. The second model included the three theoretical factors discussed in the literature: a self factor, a social factor, and a directive factor. Fit indices are again reported in Table 2. The fit of the theoretical model was also only mediocre. The CMIN/DF was below 3.00, which is considered acceptable. None of the other fit indices reached acceptable criterion. A comparison of the fit indices between the two models suggests that the fit of the theoretical model is similar to fit of the replication model. Thus, model respecification was obviously needed.

Model respecification. The theoretical model, as opposed to the replication model, was respecified for two reasons. Neither model was clearly superior based on fit indices, so erring on the side of theory seemed appropriate. Theoretical rationale is as important as statistical results when determining and respecifying model fit: statistical fit in one sample does not always hold in cross-validation samples, whereas theoretical rationales for model fit are more likely to hold (Kline, 1998; Worthington & Whittaker, 2006). Several authors have postulated three theoretical functions of autobiographical memory (e.g., Bluck & Alea, 2002; Cohen, 1998; Pillemer, 1998). In addition, the four-factor solution (i.e., two social functions) found in Bluck and colleagues (2005) was unexpected, and might have been related to item wording. Note that to explore whether it would provide a more superior fit we also respecified the replication model. Once modifications began the theoretical model was superior. Only results for the theoretical model are reported below.

The theoretical model was respecified using three standard criteria (for a review see MacCallum, Roznowski, & Necowitz, 1992): modification indices for the regression weights and for the covariances, and the size of the factor loadings. These criteria were used on an item-by-item basis; one item was dropped at a time and the model fit was re-examined. Items were only dropped for the final model if doing so improved the fit of the model incrementally. This exploratory approach is considered appropriate (Gorsuch, 1997) because multiple misspecification errors (i.e., dropping several items at once) make model respecification less precise (Gerbing & Hamilton, 1996). Low factor loadings were also used in making respecification decisions. Developing a scale that had equal items for each factor was also a consideration.

Several items were dropped because the modification index for the regression weights suggested that they cross-loaded on at least one other factor. This includes self items 2, 5, and 6, social items 14, 17, and 20, and directive item 28. Others were dropped because the modification indices for the covariances suggested non-random measurement error (i.e., high item overlap; Byrne, 2001). Indices that were distinctly higher than others (e.g., .96 when most others were $< .20$) and items that were repeatedly sharing error variance with other items were considered, and the following were dropped: self items 7 and 8, social item 11, and directive items 22 and 30. Items with standardised regression weights less than .40 were simultaneously considered with the above criteria during model respecification (Kline, 1998). Social item 15 was dropped because of a low regression weight. At this point, the self and social factors both had five items, and the directive factor had seven items. Thus the two items with the lowest regression weights (items 23 and 29) were dropped from the directive factor.⁵

The model fit was improved substantially by these respecifications (see Table 2). The overall model fit was very good: the CMIN/df was well below 3. The absolute model fit indices suggested that the respecified model exceeded fit criterion and that the data fitted the model very well. The GFI was .90 and the RMSEA approached .05 and

was below .08. The IFI was above .90, approaching .95, suggesting that there was substantial fit as compared to the initial theoretical (or replication) model. The model and standardized regression weights are reported in Figure 1. All are above .40 and most are in the .60 to .70 range.

Finally, the three factors, allowed to correlate in the CFA model (see Figure 1), were interrelated, as expected from Bluck and colleagues' (2005) work. The regression weights suggest that the directive factor is related to both the self factor (.71) and social factor (.52). The self and social factors were modestly related to one another (.32). Thus the 15 items in the final respecified model load highly on the intended factor and do not cross-load with other factors or share substantial unsystematic error variance with other items (i.e., overlap). The factors also are related as expected. Having identified a good-fitting, parsimonious model, the next step was to interpret the factors and test the psychometric properties of the respecified TALE.

The TALE subscales: Self-Continuity, Social-Bonding, and Directing-behaviour

In this section the three subscales of the 15-item TALE are interpreted conceptually and good internal consistency of each subscale is demonstrated. In Table 3 the 15 items of the TALE, internal consistency statistics, and descriptive statistics for the items and subscales are presented. Note that these internal consistencies are comparable to those of the questionnaire originally used by Bluck et al. (2005). Correlations between the three subscales, controlling for overall thinking and talking about the past, are reported in Table 4 and suggest that our conceptual interpretation of the subscales as theoretically distinct, yet interrelated, is correct. For those researchers interested in using the newly developed TALE scale, a copy of the measure including directions and items (in random order for administration purposes) appears in the Appendix.

Self-related items formed the Self-Continuity function subscale (Chronbach's $\alpha = .83$), which represents thinking about the past to consider whether one is changing or staying the same over time (e.g., self-over-time; Fivush, 1998). It does not reflect thinking about or understand-

⁵Note that the model fit improved substantially by dropping each of these two directive items systematically, providing statistical criteria, as well as conceptual rationale (i.e., equal items on each factor) for dropping these two directive items.

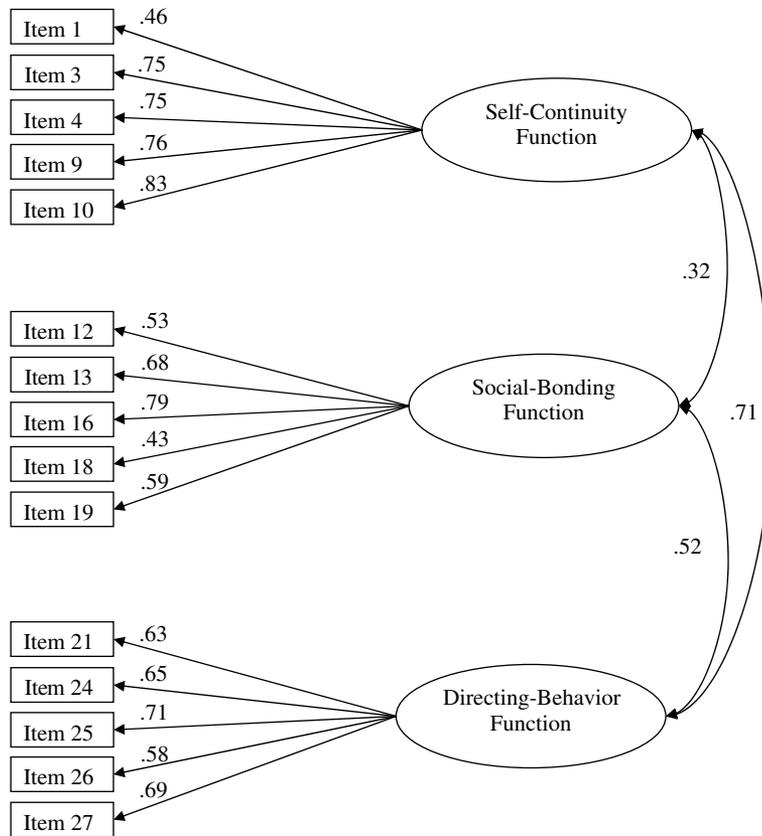


Figure 1. Standardised regression weights (i.e., factor loadings) and items for the respecified final model.

ing one's self in the present, but focuses on how one has maintained stability and/or has changed over time in terms of one's self-definition, values, and beliefs. Although this subscale focuses on concern with self-continuity in the face of change, this appears to be distinct from a search for coherence in terms of life having a unifying story or overall theme (i.e., these items did not load on the factor). The Self-Continuity function reflects thinking back over or talking about one's past in order to assess self-continuity and change or development (Conway, 1996) over lived time. Note also that it does not place a value on being either continuous or changing and it is not clear whether participants who score high on this subscale feel positively about staying the same, or changing, over time. Participants reported using autobiographical memory to serve a Self-Continuity function from *seldom* to *occasionally* ($M = 2.80$, $SD = .90$, ranging from 1 to 5).

The Social-Bonding function subscale (Chronbach's $\alpha = .74$) centres on thinking and talking about the past for the purpose of initiating or sustaining social bonds; that is, in order to get to know others and to maintain closeness in existing

relationships. Thus different aspects of social bonding, using autobiographical memory to develop new relationships and nurturing existing relationships (as found in Bluck et al., 2005), are represented in a single subscale. This subscale does not represent using one's personal past merely for introducing oneself to others, and also does not encompass empathising with or helping others. Participants reported using autobiographical memory to meet these social-bonding needs from *occasionally* to *often* ($M = 3.23$, $SD = .75$, ranging from 1 to 5).

The Directing-behaviour function subscale (Chronbach's $\alpha = .78$) focuses on drawing on one's past to direct behaviour in the present and for the future. It concerns thinking and talking about the past to guide current actions (through drawing on lessons learned), and using the past to guide choices about one's future. This involves reflecting both on lessons learned and past mistakes made in order to react well in the present and make choices for the future. It does not include evaluative aspects, such as examining one's progress in life so far, assessing whether one is moving in the right direction, or

TABLE 3
Internal consistency and descriptive statistics for items and subscales of the 15-item TALE

Item	<i>M</i>	<i>SD</i>
<i>Self-Continuity Function Subscale/Alpha = .83</i>		
1 when I want to feel that I am the same person that I was before.	2.49	1.18
3 when I am concerned about whether I am still the same type of person that I was earlier.	3.42	1.00
4 when I am concerned about whether my values have changed over time.	2.78	1.13
9 when I am concerned about whether my beliefs have changed over time.	2.76	1.20
10 when I want to understand how I have changed from who I was before.	3.30	1.15
<i>Social-Bonding Function Subscale/Alpha = .74</i>		
12 when I hope to also find out what another person is like.	3.03	1.16
13 when I want to develop more intimacy in a relationship.	3.63	.95
16 when I want to develop a closer relationship with someone.	3.10	1.19
18 when I want to maintain a friendship by sharing memories with friends.	2.96	1.15
19 when I hope to also learn more about another person's life.	3.64	.91
<i>Directing-Behaviour Function Subscale/Alpha = .78</i>		
21 when I want to remember something that someone else said or did that might help me now.	3.18	1.11
24 when I believe that thinking about the past can help guide my future.	3.98	.90
25 when I want to try to learn from my past mistakes.	2.84	1.13
26 when I need to make a life choice and I am uncertain which path to take.	3.09	1.00
27 when I want to remember a lesson I learned in the past.	2.88	1.14
Total 15-item TALE/Alpha = .86	3.14	.63

Item numbering reflects that of the TALE-30 as also represented in Figure 1.

giving one confidence to take a next step in life. It also does not relate specifically to setting goals. The Directing-behaviour function of autobiographical memory was reported as used from *occasionally to often* ($M = 3.39$, $SD = .76$, ranging from 1 to 5).

TABLE 4
Partial correlations between TALE subscales

TALE Subscale	TALE subscale		
	<i>Self-Continuity</i>	<i>Social-Bonding</i>	<i>Directing-Behaviour</i>
Self-Continuity Function	–		
Social-Bonding Function	.25*	–	
Directing-Behaviour Function	.56*	.36*	–

Partial correlations control for the two general questions from the TALE about baseline level of thinking and talking about the past. * $p < .001$.

Convergent and discriminant validity

Convergent and discriminant validity were assessed by examining correlations of the Self-Continuity, Social-Bonding, and Directing-Behaviour subscales with the baseline TALE questions about general frequency of thinking and talking about the past. These items were also used in the original questionnaire (Bluck et al., 2005); the pattern of correlations with the subscales remains relatively similar across the two studies though the correlations were sometimes slightly higher in the original work. In both studies all are in the low to moderate range. The Self-Concept Clarity Scale, personality subscales of Extraversion and Neuroticism, and the Future Orientation scale were added to this study to provide further ability to assess convergent-divergent validity. Correlations are reported in Table 5.

The Self-Continuity function subscale demonstrates both strong convergent and discriminant validity. There is a strong correlation between the Self-Continuity function subscale and overall thinking about the past. Using autobiographical memory to consider how one has changed or

TABLE 5

Correlations between the function subscales of the TALE and the validity measures

Validity measure	Self-Continuity	Social-Bonding	Directing-Behaviour
Overall thinking about the past	.17**	.21***	.24***
Overall talking about the past	.10	.28***	.23***
Self concept clarity	-.24**	-.05	-.03
Future orientation	.18**	.10	.25**
Extraversion	-.01	.19*	.04
Neuroticism	.12	-.10	.00

* $p < .05$; ** $p < .01$; *** $p < .001$.

stayed the same is related to private reflection on one's personal past, as a solitary not a social activity (i.e., no relation to general frequency of talking about one's past with others). This subscale is also related to self-concept clarity. As expected, individuals with lower self-concept clarity more frequently use autobiographical memory in an attempt to create self-continuity (i.e., to achieve a clearer self-concept). The Self-Continuity function subscale did not correlate with unrelated constructs such as overall talking about the past, future orientation, or extraversion, suggesting good discriminant validity. As expected, frequency of use of autobiographical memory to serve a self-continuity function was unrelated to neuroticism scores (e.g., viewing oneself as a worrier).

The Social-Bonding function subscale was related to overall frequency of both thinking about and talking about the past. Individuals who more frequently think and talk about their past in general, more frequently do so for the specific purpose of social bonding. While at first one might expect the social-bonding function of autobiographical memory to be related only to talking more about the past, it makes sense that (most people) need to think in order to talk. Thus both higher frequency of thinking and talking about the past converge with the Social-Bonding function subscale. This relation between talking about one's past and social bonding is mirrored in analyses showing that frequency of use of autobiographical memory to serve a social-bonding function is related to higher levels of extraversion. Discriminant validity is indicated in that the Social-Bonding function subscale is not related to self-concept clarity or future orientation. As expected, this subscale was also unrelated to

neuroticism (e.g., feeling inferior in social relationships).

The Directing-behaviour function subscale also shows both convergent and discriminant validity. The more often people report using autobiographical memory to generally think and talk about the past, the more likely they are to use memory to learn lessons from past experience that guide present and future behaviour. This function of autobiographical memory is related to both private contemplation of one's past and social memory sharing. The Directing-behaviour function subscale is significantly correlated with the future orientation scale: those with a more open-ended view of the future report using autobiographical memory more frequently to direct their current and future behaviours. The subscale is not related to conceptually unrelated constructs such as self-concept clarity or extraversion, nor is it related to neuroticism (e.g., being anxious about the future).

Factorial equivalence of the 15-item TALE across age and gender

Given that the psychometric properties of the new TALE measure appeared sound, an additional issue to address was whether the scale can be appropriately administered to both older and younger men and women. The factorial equivalence across age and gender and internal consistency of the subscale items within age and gender groups was thus examined. It is recognised that testing for factorial invariance is typically done with an independent sample, and a factor congruence score is computed (Reise, Waller, & Comry, 2000). This would be inappropriate here, as we are examining factorial equivalence within

TABLE 6

Factorial equivalence of the TALE across age and gender groups

Fit index	Age		Gender	
	Young	Old	Male	Female
CMIN	119.77*	159.37*	139.22*	145.68*
CMIN/DF	1.37	1.83	1.60	1.67
GFI	.91	.87	.89	.88
RMSEA	.05	.08	.07	.07
IFI	.96	.89	.92	.93

Young adult $n = 154$; older adult $n = 136$; male $n = 146$; female $n = 144$.* $p < .01$.

the same data set (i.e., the sample is being split) used to generate the final model (see Staudinger, Bluck, & Herzberg, 2003 for a similar data-analytic strategy). Thus we report only whether the final TALE model fits the data equally for young and older individuals, and for men and women separately. Results are summarised in Table 6. Descriptive statistics by age and gender are also given (see Table 7).

As can be seen in Table 6, fit indices suggest that the three-factor 15-item TALE fits the data well for both young and older adults and men and women. The overall fit indices (CMIN and CMIN/df) for both age and gender groups is slightly better than the full model (see Table 2), which is expected given the sensitivity of these measures to large sample sizes (Buntler & Bonett, 1980). The CMIN is still significant for the groups, but the CMIN/df is well below 3.00, suggesting very good fit of the model for young and older adults, and men and women separately. The GFI, RMSEA, and IFI indices for the young adult group suggests that the data fit the young adult group as well as the data fit the overall model, meeting all cut-off criteria for good fit. The data also fit the older adult group well. The GFI and the IFI are just below the .90 cut-off criterion for good fit, but the RMSEA index is adequate at the .08 level. The model fits the data well and similarly for both men and women. The GFI is just below the .90 criterion, and the RMSEA is between the criteria for good and adequate fit. The IFI is above the .90 cut-off criterion for good fit.

Regression weights also suggest that the items correspond similarly to the factors across age and gender groups, and Chronbach's alpha suggest that the items have good internal consistency across these groups examined separately. For the young

adult group, regression weights ranged from .48 to .81 for the Self-Continuity function (Chronbach's alpha = .84), the Social-Bonding function ranged from .30 to .75 (Chronbach's alpha = .72), and the Directing-Behaviour function ranged from .52 to .73 (Chronbach's alpha = .78). The older adult group had similarly good regression weights. These ranged from .37 to .85 for the Self-Continuity function (Chronbach's alpha = .84), .51 to .82 for the Social-Bonding function (Chronbach's alpha = .72), and .55 to .67 for the Directing-Behaviour function (Chronbach's alpha = .78). Although regression weights were generally high, two fell below the .40 criterion. For the young adult group, social item 12 had a regression weight of .30, and for the older adult group, self item 1 had a regression weight of .37. Note that these two items are also the items with the lowest factor loadings in the entire sample.

Examination of the standardized regression weights and alphas for each gender also suggest consistency for men and women. For men, the regression weights ranged from .46 to .79 for the Self-Continuity Function (Chronbach's alpha = .81), .43 to .72 for the Social-Bonding Function (Chronbach's alpha = .68), and .56 to .75 for the Directing-Behaviour function (Chronbach's alpha = .78). For women, the regression weights for the Self-Continuity Function ranged from .45 to .76 (Chronbach's alpha = .85), for the Social-Bonding Function from .45 to .83 (Chronbach's alpha = .78), and for the Directing-behaviour function from .57 to .70 (Chronbach's alpha = .78).

DISCUSSION

For several decades theorists have suggested taking a functional approach to autobiographical memory (e.g., Baddeley, 1987; Bruce, 1989; Neisser, 1978; Pillemer, 1992). Until recently, however, little empirical research has embraced this approach (for reviews see Bluck, 2003, 2009). The current study presents construction and validation of a new measure, the Thinking About Life Experiences (TALE) scale, that promises to be of use in moving empirical research forward in this area. The TALE was developed using CFA, based on preliminary work that used EFA (Bluck et al., 2005). The absolute model fit indices suggest that the respecified model exceeded fit criterion and that the data fit the model very well. The result is construction of a brief, valid self-

TABLE 7

Means and SD for the function subscales of the TALE by Age and Gender

Function	Age		Gender	
	Young	Old	Male	Female
Self-Continuity	3.04 (.78)	2.66 (.84)	2.76 (.78)	2.94 (.87)
Social-Bonding	3.48 (.64)	3.19 (.61)	3.29 (.57)	3.38 (.70)
Directing-Behaviour	3.47 (.67)	3.05 (.67)	3.17 (.70)	3.36 (.69)
Total Function Use	3.31	2.95	3.14	3.24

Standard deviations are in parentheses. Five-point Likert-type scales.

report measure of three major functions of autobiographical remembering.

The three subscales of the TALE represent theoretical functions of autobiographical remembering that are conceptually based, having long been discussed in the literature (e.g., Cohen, 1998; Pillemer, 1992). Benefits of the new measure are that it is brief (15 items) and the subscales clearly represent self-continuity, social-bonding, and directing-behaviour functions. Scale reliabilities show good internal consistency for each subscale and the items have high face validity.

To examine overall convergent and discriminant validity, participants rated their baseline tendency to think about and to talk about the past and completed the Neuroticism subscale of the Big Five trait personality inventory. As expected, overall tendency to think about the past was moderately related to each of the functions. However, note that overall tendency to talk about the past was not related to the self-continuity function. That is, examining self-continuity and change appears to be related to thinking but not talking about the past. This is consistent with the introspective nature of the task of forging and maintaining a continuous sense of identity. The neuroticism subscale was administered because rumination and dwelling on the past are often conceptualised as negative indicators of mental health. From a functional perspective, however, thinking about one's past is viewed as part of everyday life that serves important psychosocial ends. Thus we wanted to ensure that this new measure of thinking about the past did not tap into neurotic tendencies to dwell negatively on the past. Results show that none of the three subscales was related to neuroticism.

In addition, to assess convergent validity for each of the three subscales individually, measures of self-concept clarity, trait extraversion, and future time orientation were administered. All of these measures demonstrated convergent validity as expected. Individuals with lower levels of self-concept clarity more frequently reported using autobiographical memory to serve a self-continuity function (see also Bluck & Alea, 2009). Those higher in trait extraversion endorsed the use of autobiographical memory to serve the social-bonding function. Having a more open-ended sense of future time was related to more frequent use of autobiographical memory for directing behaviour. Thus each of the TALE subscales not only shows good psychometric

properties but also demonstrates validity in relation to expected psychological constructs.

Analyses were also completed to demonstrate factorial equivalence across age and gender groups for the TALE to ascertain whether it might be appropriately administered to both older and younger men and women (for a similar analytic strategy see Staudinger et al., 2003). Findings suggest that the data fit the three-factor model for all of these groups. Recent research using the TALE demonstrates that it provides a psychologically meaningful tool for examining adult age differences in the functional use of autobiographical memory (Bluck & Alea, 2008, 2009). However, future research should continue to examine whether the factor structure is maintained in independent samples of older and younger men and women. Some preliminary research (Bender et al., 2007) suggests that the three-factor TALE model holds in both German and Chinese samples, although further cross-cultural validation of the current scale is clearly warranted.

Potential use and limitations

The TALE has utility as a tool that can be employed by researchers interested in systematically examining the functional use of memory across different groups of individuals (e.g., caregivers of young children, Kukolfsky & Koh, 2009; hospice volunteers versus non-volunteers, Bluck et al., 2008). It can also be included in studies examining topics related to each of the three subscales; that is, the relation of self to memory, the effects of social processes on recall, or how memory is used in problem solving and directing future behaviour. The TALE is equally applicable in studies of voluntary and involuntary memory (Berntsen, 2009) and due to its brief format can be administered in lab or field settings and is suitable for online survey administration where time is constrained. Thus, as compared to our original work in which the theoretical functions of remembering were generally mapped, the current study provides a valid scale for use in research.

One limitation of the TALE is that it is a self-report measure. Although evidence supporting its construct validity was found, the self-report nature of the measure may reduce its utility for answering particular types of research questions. However, in those cases where an experimental approach is used, the TALE can be administered

as a control variable or as an outcome measure. That is, certain experimental effects (e.g., imagination inflation, eyewitness biases, co-constructive social processes in memory) may be moderated by an individual's tendency to use memory in certain ways; that is, to use the personal past to serve particular functions. Administration of the TALE could allow checking for mediator and moderator effects in experimental designs. In addition, although the measure presented here is administered without reference to a particular memory episode, we have also used the TALE as an outcome measure (i.e., dependent variable) by changing the instructions so that participants answer the 15 items in reference to particular memories generated in different conditions of an experimental design (e.g., Bluck et al., 2008).

A second issue to note is that, as with all factor-analytic scale development, the factors derived are a product of the initial items included in the questionnaire. The choice of the particular items employed in the current research is described earlier in the paper: it was based on the theoretical literature and item reduction was based on empirical grounds. Regardless, the subscales are certainly not exhaustive of all functions that autobiographical memory likely serves. For example, the self-continuity subscale focuses on stability and change of the self, but not on self-evaluation or emotion regulation. Some research suggests that one function of autobiographical memory is to allow a self-enhancement bias (e.g., Wilson et al., 2009) or to repair one's mood (Pasupathi, 2003). In addition the other subscales are rather broad, and those interested, for example, in more specific social functions might prefer a scale in which social bonding was broken down into separate relationship phases (e.g., initiating relationships, maintaining relationships; Bluck et al., 2005). Likewise, others may want more specificity in terms of the type of social bonding (e.g., intimacy, Alea & Bluck, 2007). The current scale does not assess all functions served by autobiographical remembering and assesses function at a relatively broad level.

Crafting the TALE: Conclusion

Theory suggests that autobiographical remembering serves three broad psychosocial functions useful to humans in navigating their everyday lives (e.g., Pillemer, 1998, 2009). One barrier to

empirical research in this area has been the lack of a valid instrument to assess the frequency with which individuals use memory to serve these functions. The brief, valid measure presented in this paper builds on previous empirical efforts at mapping the functions of autobiographical remembering (Bluck et al., 2005). The newly developed Thinking About Life Experiences (TALE) scale shows good internal consistency as well as convergent validity for three subscales: the self-continuity function, social-bonding function, and directing-behaviour function. Analyses demonstrate factorial equivalence across age and gender groups. The TALE should be a useful tool for stimulating empirical investigation of the functions of autobiographical remembering.

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APPENDIX

Thinking About Life Experiences (TALE) scale

Instructions: Sometimes people think back over their life or talk to other people about their life: it may be about things that happened quite a long time ago or more recently. We are not interested in your memory for a particular event, but more generally in how you bring together and connect the different events and periods of your life. Please circle a response to answer these two questions:

1B. In general, how often do you think back over your life?

Almost never Seldom Occasionally Often Very Frequently

2B. In general, how often do you talk to others about what's happened in your life?

Almost never Seldom Occasionally Often Very Frequently

Next we present a variety of situations. Please circle one response on each scale to indicate **how often, when you think back about or talk about your life, you do it for the reasons given.** There are no right or wrong answers. Do not hesitate to use any of the points on the scale. If you never think back over your life for this reason, circle "Almost never." Please answer every question.

I think back over or talk about my life or certain periods of my life ...**1. when I want to feel that I am the same person that I was before.**

Almost never Seldom Occasionally Often Very Frequently

2. when I want to remember something that someone else said or did that might help me now.

Almost never Seldom Occasionally Often Very Frequently

3. when I hope to also find out what another person is like.

Almost never Seldom Occasionally Often Very Frequently

4. when I am concerned about whether I am still the same type of person that I was earlier.

Almost never Seldom Occasionally Often Very Frequently

5. when I believe that thinking about the past can help guide my future.

Almost never Seldom Occasionally Often Very Frequently

6. when I am concerned about whether my values have changed over time.

Almost never Seldom Occasionally Often Very Frequently

7. when I want to try to learn from my past mistakes.

Almost never Seldom Occasionally Often Very Frequently

I think back over or talk about my life or certain periods of my life ...**8. when I want to develop more intimacy in a relationship.**

Almost never Seldom Occasionally Often Very Frequently

9. when I need to make a life choice and I am uncertain which path to take.

Almost never Seldom Occasionally Often Very Frequently

10. when I want to remember a lesson I learned in the past.

Almost never Seldom Occasionally Often Very Frequently

11. when I want to develop a closer relationship with someone.

Almost never Seldom Occasionally Often Very Frequently

12. when I want to maintain a friendship by sharing memories with friends.

Almost never Seldom Occasionally Often Very Frequently

13. when I am concerned about whether my beliefs have changed over time.

Almost never Seldom Occasionally Often Very Frequently

14. when I hope to also learn more about another person's life.

Almost never Seldom Occasionally Often Very Frequently

15. when I want to understand how I have changed from who I was before.

Almost never Seldom Occasionally Often Very Frequently

Key to Subscales

Self-Continuity Function (Items #1, 4, 6, 13, 15)

Social-Bonding Function (Items #3, 8, 11, 12, 14)

Directing-Behaviour Function (Items #2, 5, 7, 9, 10)

Initial items numbered 1B and 2B assess baseline levels of thinking and talking about one's past.